Facility:	**McGuire**	Scenario No.: **2**	Op Test No.: **N16-1**
Examiners:	____________	Operators:	____________ (SRO)
	____________		____________ (RO)
	____________		____________ (BOP)

Initial Conditions:	The plant is at 90% power (MOL). The area has experienced steady light rain for the past 8 hours, with light wind from the South at 2-5 mph, and this is expected to continue throughout the shift. A Containment Air Release is in progress per OP/1/A/6450/17, "Containment Air Release and Addition System."
Turnover:	The following equipment is Out-Of-Service: The VUCDT Level indication is OOS. ACTION has been taken in accordance with Technical Specification LCO 3.4.15 ACTION C. The 1B MDCA Pump is OOS for bearing replacement. ACTION has been taken in accordance with Technical Specification LCO 3.7.5 ACTION B. MCB Annunciator 1AD-8, A-4, "CF PUMP DISCHARGE HI PRESS," has alarmed spuriously several times over the last hour, and has currently failed ON (IAE is investigating).

Event No.	Malf. No.	Event Type*	Event Description
1	1	C-BOP C-SRO	VCT Level Channel 1 fails HIGH
2	2	I-BOP I(TS)-SRO	1EMF-38 (LO) fails HIGH/VQ valves fail to Auto CLOSE
3	3	C-RO C(TS)-SRO	1SA48 fails OPEN/TDCA Pump starts inadvertently
4	NA	R-RO N-BOP N-SRO	Rapid Downpower
5	4	C-RO C-SRO	Turbine Control Unit fails to MANUAL
6	5	C-BOP C-SRO	High Vibration on 1B NCP
7	6	M-RO M-BOP M-SRO	Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation
8	6	NA	Overspeed Trip of TDCA Pump
9	6	NA	1A MDCA Pump trips upon Auto Start

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

McGuire 2016 NRC Scenario #2

The plant is at 90% power (MOL). The area has experienced steady light rain for the past 8 hours, with light wind from the South at 2-5 mph, and this is expected to continue throughout the shift. A Containment Air Release is in progress per OP/1/A/6450/17, "Containment Air Release and Addition System."

The following equipment is Out-Of-Service: The VUCDT Level indication is OOS. ACTION has been taken in accordance with Technical Specification LCO 3.4.15 ACTION C. The 1B MDCA Pump is OOS for bearing replacement. ACTION has been taken in accordance with Technical Specification LCO 3.7.5 ACTION B. MCB Annunciator 1AD-8, A-4, "CF PUMP DISCHARGE HI PRESS," has alarmed spuriously several times over the last hour, and has currently failed ON (IAE is investigating).

Shortly after taking the watch, the VCT Level Channel 1 will fail HIGH. The operator will respond in accordance with MCB Annunciator 1AD-2, F8, DCS ALTERNATE ACTION, and go to OP/1/A/6102/003, "DCS System Operation," Enclosure 4.1, "Removing/Returning a VCT Level Channel From/To Service."

Next, 1EMF-38, Containment Particulate Radiation Monitor, will fail HIGH, although the VQ valves will fail to automatically CLOSE. The operator will respond in accordance with OP/1/A/6100/010 Q, "Annunciator Response for 1RAD-1," A-1, 1EMF 38 CONTAINMENT PART HI RAD, and manually terminate the Containment Release. The operator may enter Case I of AP/1/A/5500/10, "NC System Leakage Within the Capacity of Both NV Pumps." The crew will determine that the alarm is due to a failure, and NOT an actual high radioactivity condition. The operator will address Technical Specification LCO 3.4.15, "RCS Leakage Detection Instrumentation."

Following this, 1SA48 will fail OPEN causing the TDCA Pump to start. The crew will recognize that reactor power is rising, and that the pump should not be running, and take action to reduce Turbine load and isolate CA flow to the Steam Generators per the Crew Expectation Manual. The operator will be unable to locally isolate steam to the TDCA pump and leave the CA throttle valves closed. The operator will address Technical Specification LCO 3.7.5, "Auxiliary Feedwater (AFW) System," which will require a plant shutdown, and SLC 16.9.7, "Standby Shutdown System." The operator may use AP/1/A/5500/1, "Steam Leak," to diagnose the failure, and if so, use OP/1/A/6250/002, "Auxiliary Feedwater System," in an attempt to stop the pump. Ultimately, the crew will enter AP/1/A/5500/4, "Rapid Downpower."

During the downpower, a failure will occur in the Turbine Control Unit causing the unit to shift from Operator Auto to Manual control. The operator will address 1AD-1/F-4, TURBINE IN MANUAL, and control the Turbine manually during the downpower in accordance with OP/1/A/6300/001A, Enclosure 4.1, "Turbine Generator Load Change."

After this, a high vibration condition will develop on the 1B NCP. The operator will respond in accordance with OAC Alarm M1D3041, 1B NC PUMP VIBRATION (HALM), and enter AP/1/A/5500/08, "Malfunction of NC Pump." Ultimately, the vibration condition will rise above the Hi-Hi threshold requiring tripping of the reactor and stopping the NCP. The operator will manually trip the reactor and enter EP/1/A/5000/E-0, "Reactor Trip or Safety Injection."

Following the plant trip, a Feedwater Isolation Signal (FWIS) will occur prematurely, the Main Turbine will fail to trip automatically or manually, and the Main Steam Line Isolation signal will fail to automatically actuate. The operator will be required to either manually close the Turbine Governor Valves or the MSIVs. It is likely that SI will actuate due to the delayed Turbine isolation.

At the same time, the TDCA Pump, if not already running, will start on low Steam Generator levels. If the TDCA Pump was not running at the start of the event, it will trip on overspeed upon startup. If the TDCA Pump was running at the start of the event, it will trip when the operator initiates flow to the Steam Generators. Furthermore, the 1A MDCA Pump will trip on overcurrent during pump startup, and any attempts to restart the pump will be unsuccessful. Consequently, a Red Path on Heat Sink will occur shortly after SI actuation, or upon the transition to EP/1/A/5000/ES-0.1, “Reactor Trip Response.” The operator will transition from EP/1/A/5000/E-0 to EP/1/A/5000/FR-H.1, “Response to Loss of Secondary Heat Sink.”

The operator will eventually restore feed flow using a CF Pump in accordance with Enclosure 8 (Re-establishing CF Flow) of FR-H.1, and the scenario will terminate.

<u>Critical Tasks:</u>

Trip the Reactor prior to stopping the NCP during a high vibration condition, and trip the NCP only after Reactor power level has dropped to less than 5%.

Safety Significance: The P-8 interlock allows one NCP to be stopped less than 48% power. If a NCP is stopped in Mode 1 or 2, Tech Spec 3.4.4 requires the unit to be in Mode 3 within 6 hours. In addition, T-ave for the idle loop may violate Tech Spec 3.4.2, minimum temperature for criticality. In this case, the unit must be sub-critical within 30 minutes. The transient placed on the unit when a NCP is secured at power can challenge both reactor protection and control systems. Furthermore, an added burden is placed on the operator to stabilize the unit and shut down within 6 hours (possibly 30 minutes) to comply with Tech Specs. Even though the plant is designed and analyzed to operate in this configuration for a short time, station management has decided that the conservative approach to dealing with this transient is to trip the reactor anytime a NCP malfunction warrants stopping a pump in Mode 1 or 2. Guidance is given to wait until reactor power is less than 5% before stopping the NC pump. This will ensure the NC pump will provide adequate flow/core cooling until reactor power is sufficiently low enough to preclude a challenge to fuel integrity. If the action can be taken, and is not taken, this demonstrates “mis-operation” or incorrect operation that could unnecessarily challenge a fission product barrier (NCS).

Manually close the Main Turbine Governor Valves and establish feedwater flow into at least one Steam Generator before Wide Range Level in 3 Steam Generators reaches 24% (36%).

Safety Significance: Failure to trip the Main Turbine when conditions exist that allow the operator to do so, and failure to establish feedwater flow into at least one Steam Generator results in the crew having to rely upon the lower-priority action of having to initiate RCS Bleed and Feed to minimize the possibility of core uncovery. Failure to perform this task, when able to do so, constitutes incorrect performance that leads to degradation of the RCS and/or fuel cladding fission product barriers.

PROGRAM: McGuire Operations Training

MODULE: Initial License Operator Training Class 16-1

TOPIC: NRC Simulator Exam

Scenario N16-1-2

REFERENCES:

1. OP/1/A/6100/010 N, “Annunciator Response for Panel 1AD-13” (Rev 78)
2. Technical Specification LCO 3.4.15, “RCS Leakage Detection Instrumentation” (Amendment 235/217)
3. Technical Specification LCO 3.7.5, “Auxiliary Feedwater (AFW) System” (Amendment 221/203)
4. OP/1/A/6100/010 C, “Annunciator Response for Panel 1AD-2” (Rev 5
5. OP/1/A/6102/003, “DCS System Operation” (Rev 10)
6. OP/1/A/6100/010 Q, “Annunciator Response for Panel 1RAD-1” (Rev 66)
7. AP/1/A/5500/10, “NC System Leakage Within the Capacity of Both NV Pumps” (Rev 23)
8. Control Room Crew Expectations Manual (Rev 8/8/12)
9. AP/1/A/5500/1, “Steam Leak” (Rev 18)
10. OP/1/A/6250/002, “Auxiliary Feedwater System” (Rev 129)
11. SLC 16.9.7, “Standby Shutdown System” (Rev 145)
12. Technical Specification LCO 3.4.1 “RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits” (Amendment 219/201)
13. AP/1/A/5500/04, “Rapid Downpower” (Rev 28)
14. OP/1/A/6100/010 B, “Annunciator Response for Panel 1AD-1” (Rev 48)
15. OP/1/A/6300/001A, “Turbine Generator Load Change” (Rev 12)
16. AP/1/A/5500/08, “Malfunction of NC Pump” (Rev 14)
17. EP/1/A/5000/E-0, “Reactor Trip or Safety Injection” (Rev 34)
18. EP/1/A/5000/ES-0.1, “Reactor Trip Response” (Rev 42)
19. EP/1/A/5000/F-0, “Critical Safety Function Status Trees” (Rev 6)
20. EP/1/A/5000/FR-H.1, “Response to Loss of Secondary Heat Sink” (Rev 19)

Validation Time: 103 minutes

Author: David Lazarony, Essential Training & Consulting, LLC

Facility Review: ________________________

Rev. 032116

Facility: **McGuire**	Scenario No.: **2**	Op Test No.: **N16-1**	
Examiners: ____________	Operators:	____________ (SRO)	
____________		____________ (RO)	
____________		____________ (BOP)	

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McGuire 2016 NRC Scenario #2

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SIMULATOR OPERATOR INSTRUCTIONS

	Bench Mark	ACTIVITY	DESCRIPTION
☐	Sim. Setup	**Rod Step On**	
☐		**Reset to Temp IC 236**	**T = 0 Malfunctions:** **Initiate a Containment Release per Enclosure 4.2 of OP/1/A/6450/17.** **insert XMT-WL_1WLLT5591 = 100 (1WLL-5591, VUCDT Tank Level is OOS)** **insert LOA-CA010 = RACKED OUT; insert LOA-CA010A = RACKED OUT; (1B MDCA Pump is OOS)** **insert OVR-1AD8_A04 = ON (MCB Annunciator 1AD8/A4)** **<u>Per Lesson Plan 2016 NRC Exam Scenario 2</u>** **insert MAL-DEH008A TRUE cd='h_x10_280_4 eq 1' (DEH Switch to Manual - triggered from 1NV-265B open light ON)** **insert MAL-ISE007A ACT_AUTO cd='H_X01_094_2 EQ 1' (Automatic FWI Train A occurs on Reactor Trip Breaker Open Indicating Light)** **insert MAL-ISE007B ACT_AUTO cd='H_X01_094_2 EQ 1' (Automatic FWI Train B occurs on Reactor Trip Breaker Open Indicating Light)** **insert MAL-ISE007A INACTIVE cd='H_X02_102_2 EQ 1' (Remove signal after insertion)** **insert MAL-ISE007B INACTIVE cd='H_X02_110_2 EQ 1' (Remove signal after insertion)** **insert MAL-CA009A TRUE cd='H_X10_077_4 EQ 1' delay=0 (MD CA Pump 1A trips on overcurrent after pump ON light actuates)** **insert MAL-CA005 TRIP cd='H_X01_094_2 EQ 1' delay=0** **insert MAL-SM029 = 0, cd=H_X01_094_2 EQ1 (TDCA Overspeed Trip occurs and Breaker Open Indicating Light, 1SA-3 fails CLOSED on Reactor Trip)** **insertMAL-DEH003A = TRUE (Main Turbine fails to Auto Trip)** **insertMAL-DEH003B = TRUE (Main Turbine fails to Manually Trip)** **insertMAL-ISE006A = BLK_AUTO (MSI Fails in AUTO)**

	Bench Mark	ACTIVITY	DESCRIPTION
			insertMAL-ISE006B = BLK_AUTO (MSI Fails in AUTO)
☐		**RUN** **Reset all SLIMs**	**Place Tagout/O-Stick on:** **1B MDCA Pump (Tagout)** **1WLL-5591 (O-stick)** **MCB Annunciator 1AD-13, C-7 (O-stick)** **MCB Annunciator 1AD-8, A-4 (O-stick)**
☐		**Update** Status Board, **Setup OAC**	**NOTE:** RMWST DO = <1000 ppb.
☐		**Freeze.**	
☐		**Update Fresh Tech. Spec. Log.**	
☐		**Fill out the AO's Available section of Shift Turnover Info.**	
☐	Prior to Crew Briefing	**RUN**	
☐	**Crew Briefing** 1. Assign Crew Positions based on evaluation requirements 2. Review the Shift Turnover Information with the crew. 3. Direct the crew to Review the Control Boards taking note of present conditions, alarms. 4. Provide the crew with an “In-progress” copy of Enclosure 4.2 of OP/1/A/6450/17.		
☐	T-0	Begin Familiarization Period	
☐	At direction of examiner	**Execute Lesson Plan for Simulator Scenario N16-1-2.**	

	Bench Mark	ACTIVITY	DESCRIPTION
☐	At direction of examiner	**Event 1** **insertXMT-NV_1NVLT5760 = 100**	VCT Level Channel 1 fails HIGH
☐	At direction of examiner	**Event 2** **insert EMF-38L = 10^4 (5 seconds delayed)** **insert MAL-ISE008A/B = BLK** **Insert 1AD9_F08=ON (6 seconds delayed)**	1EMF-38 (LO) fails HIGH/VQ valves fail to Auto CLOSE
☐	At direction of examiner	**Event 3** **insert REM-SA0048ABC = 1.0**	1SA48 fails OPEN/TDCA Pump starts inadvertently **NOTE: Locally Close 1SA-1 if directed: insert REM-SA0001 = 0**
☐	Upon Crew Entry into AP4	**Event 4**	Rapid Downpower
☐	At direction of examiner	**Event 5** **insert DEH008A (Turbine Control Fails to MANUAL) Set in initial conditions. Triggered from 1NV-265B open light ON.**	Turbine Control Unit fails to MANUAL
☐	At direction of examiner	**Event 6** **insertMAL-NCP003B=4.6 (HI Vibration Alarm)** **insertMAL-NCP003B=5.1 cd = X05_001e11_1 = 1 (Hi Vibration Alarm Ramp = 360 seconds) (HI-HI Vibration Alarm)**	High Vibration on 1B NCP

	Bench Mark	ACTIVITY	DESCRIPTION
☐	At direction of examiner	**Event 7** **insert ISE007A/B (FWIS actuates) Set in initial conditions. Triggered from Rx trip.** **insert DEH003A/B (Main Turbine fails to trip) Set in initial conditions.**	Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation **These malfunctions will occur on Reactor Trip.** **NOTE: Start 2A RN Pump and throttle flow:** **insertLOA-RN088 = ON** **insert LOA-RN084 = 8000.0024**
☐	Post-Rx Trip	**Event 8** **insert CA005 and SM-029** **Set in initial conditions.**	Overspeed Trip of TDCA Pump **This malfunction will occur on Reactor Trip.**
☐	Post-Rx Trip	**Event 9** **insert CA009** **Set in initial conditions.**	1A MDCA Pump trips upon Auto Start **This malfunction will occur on Reactor Trip.**
☐	**Terminate the scenario upon direction of Lead Examiner**		

Op Test No.: N16-1 Scenario # 2 Event # 1	Page 9 of 74
Event Description:	**VCT Level Channel 1 fails HIGH**

Shortly after taking the watch, the VCT Level Channel 1 will fail HIGH. The operator will respond in accordance with MCB Annunciator 1AD-2, F8, DCS ALTERNATE ACTION, and go to OP/1/A/6102/003, "DCS System Operation," Enclosure 4.1, "Removing/Returning a VCT Level Channel From/To Service."

Booth Operator Instructions: **insert XMT-NV_1NVLT5760 = 100**

Indications Available:

- MCB Annunciator 1AD-7 D3, VCT ABNORMAL (Momentary)
- MCB Annunciator 1AD-2 E8, DCS TROUBLE
- MCB Annunciator 1AD-2 F8, DCS Alternate Action
- VCT Level (1NVP-5760) indicates 100%
- VCT Level (1NVP-5763) indicates that the level is lowering.
- VCT Level SLIMs shifts into MANUAL

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The BOP may address ARP for 1AD-7, D3.
			NOTE: The CRS may direct the BOP to place 1NV-137 to VCT position.
		MCB ANNUNCIATOR 1AD-2, F8 **DCS ALTERNATE ACTION**	
	CRS	(Step 1) Halt any power change in progress.	
	BOP	(Step 2) Check DCS Workstation alarms.	
		DCS WORKSTATION ALARMS **M1D1168, VCT LEVEL ALTERNATE ACTION**	
	BOP	(Step 1) Manually control VCT level at desired value.	
	CRS	(Step 2) Write work request and investigate repair.	

Op Test No.:	N16-1	Scenario #	2	Event #	1	Page	10 of 74
Event Description:	**VCT Level Channel 1 fails HIGH**						

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 3) GO TO OP/1/A/6102/003 (DCS System Operation).	
			NOTE: The CRS will transition to OP/1/A/6102/003.
OP/1/A/6102/003, DCS SYSTEM OPERATION **ENCLOSURE 4.1, REMOVING/RETURNING A VCT LEVEL CHANNEL FROM/TO SERVICE**			
	BOP	(Step 3.1) Performing the following section, as applicable:	
		• Section 3.2, Respond To An Alternate Action.	
	BOP	(Step 3.2) Respond To An Alternate Action	
		• On DCS Boric Acid Blender graphic, perform the following:	
		• Select 2XS for VCT Level 1.	
		• Determine which level transmitter is NOT faulted.	
		▪ NVAA 5760 (Transmitter A)	
		▪ NVAA 5761 (Transmitter B)	**NOTE:** NVAA 5761 (Transmitter B) is NOT faulted.
		• Select the non-faulted level transmitter for VCT level input (Transmitter A or Transmitter B).	**NOTE:** The BOP will select Transmitter B.
		• Select “DEV MRE INHIBIT” to block the deviation input.	
		• Check “MRE BLOCKED” lit (blinking red).	
	BOP	• On DCS Boric Acid Blender Graphic, perform the following:	
		• Select 2XS for VCT Level 2.	
		• Determine which level transmitter is NOT faulted.	

Op Test No.: N16-1	Scenario # 2	Event # 1	Page 11 of 74
Event Description:	**VCT Level Channel 1 fails HIGH**		

Time	Pos.	Expected Actions/Behavior	Comments
		▪ NVAA 5761 (Transmitter A)	**NOTE:** NVAA 5761 (Transmitter A) is NOT faulted.
		▪ NVAA 5760 (Transmitter B)	
		• Select the non-faulted level transmitter for VCT level input (Transmitter A or Transmitter B).	**NOTE:** The BOP will recognize that Transmitter A is selected.
		• Select "DEV MRE INHIBIT" to block the deviation input.	
		• Check "MRE BLOCKED" lit (blinking red).	
			NOTE: An Auto Makeup may occur once the crew removes the faulty instrument from service.
	BOP	• On DCS Boric Acid Blender graphic, perform the following:	
		• Select NV-137A (VCT Level)	
		• Ensure NV-137A is in auto	
	CRS	• WHEN VCT Level Channel has been repaired, go to Section 3.4.	**NOTE:** The CRS may call WCC/IAE to address the malfunction. If so, **Booth Instructor** acknowledge as WCC.
			NOTE: The CRS will likely conduct a Focus Brief.
At the discretion of the Lead Examiner move to Event #2.			

Op Test No.: N16-1	Scenario # 2	Event # 2	Page 12 of 74
Event Description:	**1EMF-38 (LO) fails HIGH/VQ valves fail to Auto CLOSE**		

Next, 1EMF-38, Containment Particulate Radiation Monitor, will fail HIGH, although the VQ valves will fail to automatically CLOSE. The operator will respond in accordance with OP/1/A/6100/010 Q, "Annunciator Response for 1RAD-1," A-1, 1EMF 38 CONTAINMENT PART HI RAD, and manually terminate the Containment Release. The operator may enter Case I of AP/1/A/5500/10, "NC System Leakage Within the Capacity of Both NV Pumps." The crew will determine that the alarm is due to a failure, and NOT an actual high radioactivity condition. The operator will address Technical Specification LCO 3.4.15, "RCS Leakage Detection Instrumentation."

Booth Operator Instructions:

Insert EMF-38L = 10^4 (5 seconds delayed)

Insert MAL-ISE008A/B = BLK

Insert 1AD9_F08=ON (6 seconds delayed)

Indications Available:

- 1EMF-38 in TRIP 2
- MCB Annunciator 1RAD1-A1, 1EMF 38 CONTAINMENT PART HI RAD, is LIT
- MCB Annunciator 1RAD1-E2, 1EMF CONTAINMENT PARTS
- MCB Annunciator 1AD9-F8, CONT VENT ISOL
- 1VQ-1A Red light is LIT, Green light is OFF
- 1VQ-2B Red light is LIT, Green light is OFF

Time	Pos.	Expected Actions/Behavior	Comments
		OP/1/A/6100/010 Q, ANNUNCIATOR RESPONSE FOR 1RAD-1 A-1, 1EMF 38 CONTAINMENT PART HI RAD	
	RO	(IA Step 1) IF VP in operation,……	**NOTE:** VP is NOT in operation.
	BOP	(IA Step 2) Ensure VQ valves are closed to prevent possible release.	**NOTE:** The VQ Valves should have closed, but a failure has prevented this. The BOP will need to manually close the VQ Valves.

Op Test No.:	N16-1	Scenario #	2	Event #	2	Page 13 of 74
Event Description:	1EMF-38 (LO) fails HIGH/VQ valves fail to Auto CLOSE					

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(SA Step 1) Notify RP to perform trending for source term identification and leak location.	**NOTE:** The CRS may call RP to address the Rad Monitor failure. If so, **Booth Instructor** acknowledge as RP. After **five minutes** report back that **there is no abnormal radiation and that it is believed that 1EMF-38 has failed high.**
	CRS	(SA Step 2) IF VP in operation,……	**NOTE:** VP is NOT in operation.
	CRS	(SA Step 3) WHEN informed by RP that Containment purge OR air release is permissible, perform the following:	**NOTE:** EMF-38L will remain failed throughout the remainder of the scenario.
		• Ensure "1EMF 38 CONTAINMENT PART HI RAD" alarm is clear.	
		• Reset Containment Ventilation isolation.	
		• Startup VP per OP/1/A/6450/015 (Containment Purge System) OR VQ per OP/1/A/6450/017 (Containment Air Release and Addition System), if desired.	
	CRS	(SA Step 4) IF Trip 2 alarm is valid,……	**NOTE:** It will ultimately be determined that the Trip 2 alarm is invalid.
	CRS	(SA Step 5) IF 1EMF-38 is declared inoperable, perform PT/1/A/4200/040 (Reactor Coolant Leakage Detection) as required.	**NOTE:** Ultimately, 1EMF-38L will be declared inoperable, and this action will be required.
			NOTE: The CRS may enter AP-10 believing that an NCS leak exists.

Op Test No.: N16-1	Scenario # 2	Event # 2	Page 14 of 74
Event Description:	**1EMF-38 (LO) fails HIGH/VQ valves fail to Auto CLOSE**		

Time	Pos.	Expected Actions/Behavior	Comments
AP/1/A/5500/10, NC SYSTEM LEAKAGE WITHIN THE CAPACITY OF BOTH NV PUMPS, CASE I			
			NOTE: After the RP has reported that it is suspected that 1EMF-38(L) has failed high, the operator may suspend use of AP-10.
	BOP	(Step 1) Check leak - KNOWN TO BE IN THE AUX BUILDING.	**NOTE:** There is no NCS leak.
	BOP	(Step 2) Check Pzr level - STABLE OR GOING UP.	**NOTE:** Pzr level will be stable.
	CRS/ BOP	(Step 3) IF AT ANY TIME while in this procedure Pzr level cannot be maintained stable, THEN perform Step 2.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	RO/ BOP	(Step 4) Check Pzr pressure - STABLE OR IF TRENDING TO 2235 PSIG.	
	RO/ BOP	(Step 5) Check main steam line intact as follows:	
		• Reactor power - AT TURBINE POWER	
		• NC Loop T-Avg - STABLE.	
	CRS	(Step 6) Announce occurrence on page.	**NOTE:** CRS may ask U2 RO to make Plant Announcement. If so, **Floor Instructor** acknowledge as U2 RO.
	RO/ BOP	(Step 7) Estimate leak rate using any of the following methods:	**NOTE:** There is no NCS leak.
		Monitor OAC NV graphic	
		OR	
		Compare charging flow to letdown flow plus seal return flow	

Op Test No.: N16-1	Scenario # 2	Event # 2	Page 15 of 74
Event Description:	**1EMF-38 (LO) fails HIGH/VQ valves fail to Auto CLOSE**		

Time	Pos.	Expected Actions/Behavior	Comments
		OR	
		Monitor VCT level trend (OAC point M1P1271).	
	CRS	(Step 8) REFER TO the following:	
		• RP/0/A/5700/000 (Classification of Emergency)	
		• RP/0/A/5700/010 (NRC Immediate Notification Requirements).	
	CRS	(Step 9) IF AT ANY TIME NC leakage exceeds Tech Spec limits, THEN perform the following:	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
		• Ensure Outside Air Pressure Filter Train in service PER OP/0/A/6450/011 (Control Area Ventilation/Chilled Water System), Enclosure 4.4 (Control Room Atmosphere Pressurization During Abnormal Conditions).	
		• Have another SRO evaluate if leakage exceeds SLC 16.9.7 condition C limits and immediately notify Security if SSF is inoperable.	
	CRS	(Step 10) IF AT ANY TIME VCT level goes below 16% (“VCT ABNORMAL LEVEL” alarm (1AD-7, D-3) low setpoint), THEN align NV pump suction to FWST	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	BOP	(Step 11) IF AT ANY TIME Containment pressure exceeds Tech Spec limit (0.3 PSIG), THEN evaluate placing all 4 VL AHU mode select switches in “HIGH” to prevent them from cycling around 0.5 PSIG.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	BOP	(Step 12) Check seal leakoff on all NC pumps – LESS THAN 6 GPM.	

Op Test No.:	N16-1	Scenario #	2	Event #	2	Page	16 of 74
Event Description:	**1EMF-38 (LO) fails HIGH/VQ valves fail to Auto CLOSE**						

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 13) Check NC pump thermal barriers intact as follows:	
		• NC pump thermal barrier KC outlet flows and temperatures on OAC KC graphic NORMAL (flow and temperature should be similar for all 4 NC pumps).	
		• KC surge tank level rates on OAC KC graphic – NORMAL.	
		• KC Surge Tank level – NORMAL.	
		• 1EMF-46A (Train A Component Cooling) – NORMAL.	
		• 1EMF-46B (Train B Component Cooling) – NORMAL.	
	CRS	(Step 14) GO TO Step 16.	
	BOP	(Step 16) Check leak – SUSPECTED ON LETDOWN LINE NEAR DEMINERALIZERS.	**NOTE:** The NCS leak is NOT suspected to be on the Letdown Line near the Demineralizers.
	CRS	(Step 16 RNO) GO TO Step 18.	
	BOP	(Step 18) Check leak – KNOWN TO BE ON NORMAL LETDOWN LINE.	**NOTE:** The NCS leak is NOT known to be on the Normal Letdown Line.
	CRS	(Step 18 RNO) GO TO Step 20.	
	BOP	(Step 20) Check leak – KNOWN TO BE ON VCT.	**NOTE:** The NCS leak is NOT known to be on the VCT.
	CRS	(Step 20 RNO) GO TO Step 22.	

Op Test No.: N16-1	Scenario # 2	Event # 2	Page 17 of 74
Event Description:	**1EMF-38 (LO) fails HIGH/VQ valves fail to Auto CLOSE**		

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 22) Check leak – KNOWN TO BE ON NORMAL CHARGING LINE DOWNSTREAM OF 1NV-244A (Charging Line Cont Outside Isol).	**NOTE:** There is no NCS leak.
	CRS	(Step 22 RNO) GO TO Step 24.	
	BOP	(Step 24) Check the following indications – NORMAL:	
		• Pzr safeties:	
		• "PZR RELIEF VALVE TEMP"	
		• "PZR RELIEF LINE NO FLOW" acoustic indication light.	
		• Pzr PORVs:	
		• "PZR RELIEF VALVE TEMP".	
		• PRT conditions:	
		• Pressure	
		• Level	
		• Temperature	
	BOP	(Step 25) check all CLA levels – NORMAL.	
	BOP	(Step 26) Check the following NCDT parameters:	
		• Level – NORMAL	
		• Temperature – NORMAL	
		• "PUMP FLOW" – AT "RECIRC FLOW".	
	BOP	(Step 27) Check Containment floor and equipment sumps – NORMAL.	
	CRS	(Step 28) Check leak location – HAS BEEN IDENTIFIED.	**NOTE:** There is no NCS leak.

Op Test No.:	N16-1	Scenario #	2	Event #	2	Page	18	of 74
Event Description:	**1EMF-38 (LO) fails HIGH/VQ valves fail to Auto CLOSE**							

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 28 RNO) Perform the following steps as necessary to identify location of leak:	
		• IF leak is inside containment, THEN evaluate isolating letdown and charging PER Steps 19 and 23 to see if leak exists on these headers.	
		• Notify WCC SRO to review recent changes in plant status:	**NOTE:** CRS may call WCC to address the suspected leak. If so, **Booth Instructor** acknowledge as WCC, and respond as appropriate.
		• Any equipment removed from service	
		• Any equipment returned to service	
		• Any venting or draining in progress.	
	BOP	• Notify Radwaste Chemistry to check the following tanks and sumps for excessive input:	**NOTE:** CRS may call RW to address the suspected leak. If so, **Booth Instructor** acknowledge as RW, and respond as appropriate.
		• ND/NS sump	
		• RHT	
		• Waste Drain Tank	
		• WEFT	
		• FDT	
		• Spent Resin Storage Tank.	
		• IF affected tank or sump readily identified,……	
	BOP	• IF affected tank or sump not identified, THEN check all tanks and sumps in next steps.	
		• Check inputs to desired tanks and sumps PER PT/1/A/4150/001D (Identifying NC System Leakage).	**NOTE:** CRS may ask U2 BOP to perform. If so, **Floor Instructor** acknowledge as U2 BOP.

Op Test No.: N16-1	Scenario # 2	Event # 2	Page 19 of 74
Event Description:	**1EMF-38 (LO) fails HIGH/VQ valves fail to Auto CLOSE**		

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	• IF necessary to check inputs to FDT or WEFT, THEN ……..	**NOTE:** The suspected NCS leak location is known to be in the Containment.
		• IF leakage suspected through 1NV-137A (NC Filters Otlt 3-Way Cntrl) to RHT, THEN ………	**NOTE:** The suspected NCS leak location is known to be in the Containment.
	CRS	(Step 29) Ensure RP is notified of location and size of leak.	**NOTE:** CRS may call WCC/RP to address the NCS leak. If so, **Booth Instructor** acknowledge as WCC/RP.
	BOP	(Step 30) Check normal letdown - IN SERVICE.	
	CRS	(Step 31) Contact station management to evaluate need to shutdown.	**NOTE:** CRS may call WCC to contact management. If so, **Booth Instructor** acknowledge as WCC.
	CRS	(Step 32) Check unit shutdown – REQUIRED.	
	CRS	(Step 32 RNO) GO TO Step 35	
			NOTE: After the RP has reported that it is suspected that 1EMF-38(L) has failed high, the operator may suspend use of AP-10.

Op Test No.:	N16-1	Scenario #	2	Event #	2	Page	20	of 74
Event Description:	1EMF-38 (LO) fails HIGH/VQ valves fail to Auto CLOSE							

Time	Pos.	Expected Actions/Behavior	Comments
TECHNICAL SPECIFICATION 3.4.15, RCS LEAKAGE DETECTION INSTRUMENTATION			
	CRS	LCO 3.4.15, The following RCS leakage detection instrumentation shall be OPERABLE:	
		The containment floor and equipment sump level monitors and the incore instrument sump level alarm;	
		The containment atmosphere particulate radioactivity monitor; and	
		The containment ventilation unit condensate drain tank level monitor.	
	CRS	APPLICABILITY: MODE 1 for all instrumentation.	
	CRS	ACTIONS	

Op Test No.:	N16-1	Scenario #	2	Event #	2	Page	21 of 74

Event Description: **1EMF-38 (LO) fails HIGH/VQ valves fail to Auto CLOSE**

Time	Pos.	Expected Actions/Behavior			Comments
		CONDITION	REQUIRED ACTION	COMPLETION TIME	**NOTE:** The CRS will determine that ACTION B and D must be entered (C is already entered).
		B. Containment atmosphere particulate radioactivity monitor inoperable.	B.1 Perform SR 3.4.13.1. OR B.2 Analyze grab samples of the containment atmosphere.	Once per 24 hours Once per 24 hours	
		D. Containment atmosphere particulate radioactivity monitor inoperable in MODE 1. AND Containment ventilation unit condensate drain tank level monitor inoperable in MODE 1.	D.1 Restore containment atmosphere particulate radioactivity monitor to OPERABLE status. OR D.2 Restore containment ventilation unit condensate drain tank level monitor to OPERABLE status.	30 Days 30 Days	

At the discretion of the Lead Examiner move to Event #3.

Op Test No.:	N16-1	Scenario #	2	Event #	3	Page	22 of 74
Event Description:	**1SA48 fails OPEN/TDCA Pump starts inadvertently**						

Following this, 1SA48 will fail OPEN causing the TDCA Pump to start. The crew will recognize that reactor power is rising, and that the pump should not be running, and take action to reduce Turbine load and isolate CA flow to the Steam Generators per the Crew Expectation Manual. The operator will be unable to locally isolate steam to the TDCA pump and leave the CA throttle valves closed. The operator will address Technical Specification LCO 3.7.5, "Auxiliary Feedwater (AFW) System," which will require a plant shutdown, and SLC 16.9.7, "Standby Shutdown System." The operator may use AP/1/A/5500/1, "Steam Leak," to diagnose the failure, and if so, use OP/1/A/6250/002, "Auxiliary Feedwater System," in an attempt to stop the pump. Ultimately, the crew will enter AP/1/A/5500/4, "Rapid Downpower."

Booth Operator Instructions:

Contact the Control Room as the VE System Engineer and request that the BOP report which train of VE is currently in service.

When BOP at VE Panel, insert REM-SA0048ABC = 1.0

Indications Available:

- Reactor power starts to rise
- 1SA48ABC Red status light is LIT
- TDCA Pump Turbine Speed rising

Time	Pos.	Expected Actions/Behavior	Comments
		CONTROL ROOM EXPECTATIONS MANUAL	
	RO/ BOP	T/G load reduction during normal ops and transients (no procedure guidance and immediate need to reduce load = transient) for over power events.	

Op Test No.: N16-1	Scenario # 2	Event # 3	Page 23 of 74
Event Description:	**1SA48 fails OPEN/TDCA Pump starts inadvertently**		

Time	Pos.	Expected Actions/Behavior	Comments
		Normal load changes: Auto is preferred Transient load changes: Manual is preferred- immediately reduce 20MWe and then reduce as needed to maintain Rx power less than pre-transient condition. After the initial 20 MWe load reduction, it is preferred that the operators use multiple and diverse indications to determine how much more load should be reduced. TPBE on the OAC updates once per minute. Other indications (PR meters and Delta T meters) will indicate reactor response more quickly and will enable the operators to control the plant even more precisely. (This combines the Operator Fundamentals of Conservatism and Controlling Plant Evolutions Precisely).	**NOTE:** The RO will reduce Turbine load sufficiently to maintain Rx power < 90%.
	RO/ BOP	CA Operation above 10% power.	
		IF CA Auto start at greater than 3% power and Main Feedwater is providing flow to the steam generators, then CA flow should be throttled/isolated as soon as practical. This will make the affected CA pumps inoperable due to the control valve not being fully open above 10% as required by the CA Surveillance Requirements.	**NOTE:** The BOP will throttle CA flow from the TDCA Pump, rendering the CA Pumps inoperable.
			NOTE: The CRS may or may not address AP1. If so, the crew may ultimately go to OP/1/A/6250/002 and attempt to shutdown the TDCA Pump. On the other hand, the operator may elect to leave the pump running, close the CA Control Valves, and investigate the failure.

Op Test No.: N16-1	Scenario # 2	Event # 3		Page 24 of 74	
Event Description:	**1SA48 fails OPEN/TDCA Pump starts inadvertently**				

Time	Pos.	Expected Actions/Behavior	Comments
		AP/1/A/5500/01, STEAM LEAK	
	CRS	(Step 1) Monitor Foldout page.	**NOTE:** Manual Reactor Trip Criteria is NOT expected to be utilized.
	RO	(Step 2) Reduce turbine load to maintain the following:	**NOTE:** The RO will need to reduce load to limit reactor power.
		• Excore NI's – LESS THAN OR EQUAL TO 100%.	
		• NC Loop D/T's – LESS THAN 60°F D/T	
		• T-Avg – AT T-REF.	
	CRS	(Step 3) Check containment entry – IN PROGRESS.	**NOTE:** A Containment Entry is NOT in progress.
	CRS	(Step 3 RNO) GO TO Step 5.	
	BOP	(Step 5) Check Pzr pressure prior to event – GREATER THAN P-11 (1955 PSIG).	
	BOP	(Step 6) Check Pzr level – STABLE OR GOING UP.	**NOTE:** Pzr level is expected to be stable, however, it may be lowering. If so, perform Step 6 RNO. Otherwise continue with Step 7.
	BOP	(Step 6 RNO) Perform the following as required to maintain level:	
		• Maintain charging flow less than 200 GPM at all times in subsequent steps.	
		• Ensure 1NV-238 (U1 Charging Hdr Control) OPENING.	

Op Test No.:	N16-1	Scenario #	2	Event #	3	Page	25 of 74
Event Description:	**1SA48 fails OPEN/TDCA Pump starts inadvertently**						

Time	Pos.	Expected Actions/Behavior	Comments
		• OPEN 1NV-241 (U1 Seal Water Inj Flow Control) while maintaining NC pump seal flow greater than 6 GPM.	
		• Reduce or isolate letdown.	
		• Start additional NV pump.	
		IF Pzr level going down with maximum charging flow…	**NOTE:** It is expected that the BOP will be able to control Pzr level.
	BOP	(Step 7) IF AT ANY TIME while in this procedure Pzr level cannot be maintained stable, THEN RETURN TO Step 6.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	CRS	(Step 8) GO TO Step 12.	
	CRS	(Step 12) Announce occurrence on paging system.	**NOTE:** CRS may ask U2 RO to make Plant Announcement that AP-1 has been entered. If so, **Floor Instructor** acknowledge as U2 RO.
	RO/ BOP	(Step 13) Identify and isolate leak on Unit 1 as follows:	
		• (Step 13a) Check SM PORVs – CLOSED.	
		• (Step 13.b) Check condenser dump valves – CLOSED.	
		• (Step 13.b RNO) IF steam dumps required to be closed…	**NOTE:** The Steam Dumps are likely to be closed.
		• (Step 13.c) Check containment conditions – NORMAL:	
		• Containment temperature	
		• Containment pressure	
		• Containment humidity	

Op Test No.:	N16-1	Scenario #	2	Event #	3	Page	26 of	74
Event Description:	**1SA48 fails OPEN/TDCA Pump starts inadvertently**							

Time	Pos.	Expected Actions/Behavior	Comments
		• Containment floor and equipment sump level.	
	RO / BOP	• (Step 13.d) Check TD CA pump – OFF.	**NOTE:** The TDCA Pump is running.
		• (Step 13.d RNO) IF operation of TD CA pump is causing uncontrolled cooldown AND flow from TD CA pump not required, THEN stop TD CA pump PER OP/1/A/6250/002 (Auxiliary Feedwater System) Enclosure 4.4 (Manual Operation of #1 TD CA Pump)	**Examiner NOTE:** CRS may direct that the TDCA Pump be stopped per the OP. If so, continue as scripted. If NOT, continue with the remaining steps of **AP-1 on Page 28**.
			NOTE: The CRS may address Tech Specs based on plant response.
OP/1/A/6250/002, AUXILIARY FEEDWATER SYSTEM ENCLOSURE 4.4, MANUAL OPERATION OF #1 TD CA PUMP			
	BOP	(Step 3.1) Evaluate all outstanding R&Rs that may impact performance of this procedure.	**NOTE:** The CRS/BOP may call WCC/IAE to address the R&Rs on the TDCA Pump. If so, **Booth Instructor** acknowledge as WCC, and report none exist.
	BOP	(Step 3.2) Ensure that a pre-job briefing has been performed that includes discussion of reactivity management concerns with this procedure.	
	BOP	(Step 3.3) IF #1 TD CA Pump to be operated locally…	**NOTE:** The pump is NOT to be operated locally.
	BOP	(Step 3.4) Perform the following sections, as applicable:	
		• Section 3.6, Stopping #1 TD CA Pump	

Op Test No.:	N16-1	Scenario #	2	Event #	3	Page	27 of	74
Event Description:	**1SA48 fails OPEN/TDCA Pump starts inadvertently**							

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 3.6) Stopping #1 TD CA Pump	
		• IF stopping pump following EP/AP, check "TURB" depressed on the following:	**NOTE:** The CRS may decide to take this action if the OP was entered from AP1.
		• CA Modulating Valves Reset Train A	
		• CA Modulating Valves Reset Train B	
		• IF operating #1 TD CA Pump locally…	**NOTE:** The pump is NOT to be operated locally.
	BOP	• Ensure the following closed:	
		• 1CA-64AB (U1 TD CA Pump Disch to 1A S/G Control)	
		• 1CA-52AB (U1 TD CA Pump Disch to 1B S/G Control)	
		• 1CA-48AB (U1 TD CA Pump Disch to 1C S/G Control)	
		• 1CA-36AB (U1 TD CA Pump Disch to 1D S/G Control)	
	BOP	• Ensure “RESET” lit on “TD CA Pump Auto Start Reset.	
	BOP	• Place “#1 TD CA Pump” in “STOP”.	
		• Ensure the following closed:	
		• 1SA-48ABC (1C S/G SM Supply To U1 TD CA Pump Turb Isol)	**NOTE:** The CRS may dispatch an AO or contact WCCS/IAE to investigate the failure of 1SA-48ABC. If so, **Floor Instructor** acknowledge as **AO**. **Booth Instructor:** Wait 2 minutes and indicate that the valve is OPEN, not sure why, and that it will require further investigation.

Op Test No.: N16-1	Scenario # 2	Event # 3		Page 28 of 74	
Event Description:	**1SA48 fails OPEN/TDCA Pump starts inadvertently**				

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The CRS will recognize that 1SA-48ABC has failed OPEN. Because of this the CRS may dispatch an AO to locally close the upstream isolation valve 1SA-1. The only other choice is to leave the TDCA Pump running. If so, **Floor Instructor** acknowledge as **AO**. **Booth Instructor:** Wait 3 minutes and then call as AO and report that 1SA-1 CANNOT be CLOSED.
		• 1SA-49AB (1B S/G SM Supply To U1 TD CA Pump Turb Isol)	
			NOTE: The CRS will likely conduct a Focus Brief.
AP/1/A/5500/01, STEAM LEAK			
			Examiner NOTE: Continue here if the OP is NOT used to stop TDCA Pump.
	BOP	• (Step 13.e) Check valves on “STEAM LINE DRAIN VALVES” board (1MC-9) – CLOSED.	**NOTE:** One or more of these valves may be cycling. The RNO will direct closing the valves.
	CRS	• (Step 13.f) Check opposite Unit (Unit 2) “STEAM HEADER PRESSURE” – GREATER THAN 200 PSIG.	**NOTE:** CRS may ask U2 RO for AS Header pressure. If so, **Floor Instructor** report as **U2 RO** that **U2 Steam Header pressure is ≈1000 psig.**

Op Test No.:	N16-1	Scenario #	2	Event #	3	Page	29 of 74
Event Description:	**1SA48 fails OPEN/TDCA Pump starts inadvertently**						

Time	Pos.	Expected Actions/Behavior	Comments
		• (Step 13.g) Dispatch operator to check for leaks.	**NOTE:** The CRS may dispatch an AO to look for leaks. If so, **Floor Instructor:** acknowledge**.** **Booth Instructor:** Report back in 3-5 minutes that there are no leaks.
			NOTE: The CRS may NOT dispatch AOs to look for leaks because it is understood that 1SA48 opening was the reason that AP-1 was entered.
	BOP	(Step 14) Check UST level – STABLE OR GOING UP.	
	CRS	(Step 15) Evaluate unit shutdown as follows:	
		• Check unit status – IN MODE 1 OR 2.	
		• Determine if unit shutdown or load reduction is warranted based on the following criteria:	
		• Size of leak	
		• Location of leak	
		• Rate of depletion of secondary inventory	
		• IF steam is leaking from a secondary heater relief OR MSR relief valve, THEN reducing turbine load….	**NOTE:** No Relief Valve is leaking.
		• IF turbine trip will isolate steam leak (such as feedwater heater leak or MSR leak)…	**NOTE:** A Turbine Trip is NOT needed to isolate the steam leak.
		• Check unit shutdown or load reduction – REQUIRED.	**NOTE:** Shutdown/Load Reduction will NOT be required to mitigate the Steam leak.
	CRS	(Step 15.c RNO) Perform the following:	

Op Test No.: N16-1	Scenario # 2	Event # 3	Page 30 of 74
Event Description:	**1SA48 fails OPEN/TDCA Pump starts inadvertently**		

Time	Pos.	Expected Actions/Behavior	Comments
		• Maintain present plant conditions until leak can be isolated or repaired.	
		• Exit this procedure.	
			NOTE: The CRS will likely conduct a Focus Brief.
			NOTE: The CRS may address Tech Specs based on plant response.
TECHNICAL SPECIFICATION 3.7.5, AUXILIARY FEEDWATER (AFW) SYSTEM			
	CRS	LCO 3.7.5 Three AFW trains shall be OPERABLE.	
	CRS	APPLICABILITY: MODE 1, 2, And 3, MODE 4 when steam generator is relied upon for heat removal.	
	CRS	ACTIONS	

Op Test No.:	N16-1	Scenario #	2	Event #	3	Page 31 of 74
Event Description:	1SA48 fails OPEN/TDCA Pump starts inadvertently					

Time	Pos.	Expected Actions/Behavior			Comments
		CONDITION	REQUIRED ACTION	COMPLETION TIME	
		A. One steam supply to turbine driven AFW pump inoperable	A.1 Restore steam supply to OPERABLE status.	7 days AND 10 days form discovery of failure to meet the LCO	**NOTE:** The CRS will determine that ACTION A.1 must be entered.
		B. One AFW train inoperable in MODE 1, 2, or 3 for reasons other than Condition A.	B.1 Restore AFW train to OPERABLE status.	72 hours AND 10 days from discovery of failure to meet the LCO	**NOTE:** The CRS will recognize that ACTION B.1 was entered upon shift turnover.
		C. Required Action and associated Completion Time for Condition A or B not met. OR Two AFW trains inoperable in MODE 1, 2, or 3.	C.1 Be in MODE 3. AND C.2 Be in MODE 4.	6 hours 12 hours	**NOTE:** Because the CA Valves must remain closed the CRS will determine that ACTION C.1 and C.2 must be entered. The CRS will note that this condition requires a plant shutdown.
SELECTED LICENSEE COMMITMENT 16.9.7, STANDBY SHUTDOWN SYSTEM					
	CRS	COMMITMENT The Standby Shutdown System (SSS) shall be FUNCTIONAL.			
	CRS	APPLICABILITY: MODES 1, 2, and 3.			
	CRS	REMEDIAL ACTIONS			
		The SRO should ensure that security is notified 10 minutes prior to declaring the SSS inoperable. Immediately upon discovery of the SSS inoperability, Security must be notified to implement compensatory measures within 10 minutes of discovery.			

Op Test No.:	N16-1	Scenario #	2	Event #	3	Page	32 of 74
Event Description:	**1SA48 fails OPEN/TDCA Pump starts inadvertently**						

<table>
<tr><th>Time</th><th>Pos.</th><th>Expected Actions/Behavior</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>CRS</td><td><table><tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr><tr><td>A. One or more required SSS components identified in Table 16.9.7-1 non-functional.</td><td>A.1 Verify the FUNCTIONALITY of fire detection and suppression systems in the associated areas identified in Table16.9.7-1.
AND
A.2 Restore the component to FUNCTIONAL status.</td><td>1 hour

7 days</td></tr></table></td><td>NOTE: Because the CA Valves are closed the CRS will determine that SLC 16.9.7 ACTION A.1 and A.2 must be entered.</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">TECHNICAL SPECIFICATION 3.4.1, RCS PRESSURE, TEMPERATURE, AND FLOW DEPARTURE FROM NUCLEATE BOILING (DNB) LIMITS</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>CRS</td><td>LCO 3.4.1 RCS DNB parameters for pressurizer pressure, RCS average temperature, and RCS total flow rate shall be within the limits specified in Table 3.4.1-1.</td><td>NOTE: If NC System Pressure drops to < 2216 psig on the failure, then TS 3.4.1 will be entered and exited during the transient.</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>CRS</td><td>APPLICABILITY: MODE 1.</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>CRS</td><td>ACTIONS</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

Op Test No.:	N16-1	Scenario #	2	Event #	3	Page	33 of 74
Event Description:	**1SA48 fails OPEN/TDCA Pump starts inadvertently**						

Time	Pos.	Expected Actions/Behavior			Comments
		CONDITION	REQUIRED ACTION	COMPLETION TIME	**NOTE:** The CRS will determine that ACTION A.1 must be entered (May be cleared by the time that the determination is made).
		A. Pressurizer pressure or RCS average temperature DNB parameters not within limits.	A.1 Restore DNB parameter(s) to within limit.	2 hours	
					NOTE: CRS will call WCC/Management to address the CA inoperability. When this occurs, **Booth Instructor** acknowledge as **WCC,** and **as Station Management** direct the crew to **be in Mode 3** within **2 hours due to plant conditions.**

At the discretion of the Lead Examiner move to Event #4.

Op Test No.:	N16-1	Scenario #	2	Event #	4	Page	34 of 74
Event Description:	**Rapid Downpower**						

Ultimately, the crew will enter AP/1/A/5500/4, "Rapid Downpower."	
Booth Operator Instructions:	**NA**
Indications Available:	**NA**

Time	Pos.	Expected Actions/Behavior	Comments
		AP/1/A/5500/04, RAPID DOWNPOWER	
	RO/ BOP	(Step 1) Monitor Foldout page.	
		Uncontrolled Cooldown (If Tavg < 551F and lowering…..Not Expected)	
		Power Factor (Adjust power factor during load reduction to maintain power factor between 0.9 to 1.0 lagging, using "VOLTAGE ADJUST" pushbutton)	**NOTE:** The RO will adjust MVARS as needed.
		Manual Rod Control Criteria (< C-5, Not Expected)	
		Turbine Shutdown (Turbine Load < 15 MWe Not Expected)	
	CRS	(Step 2) Announce occurrence on page.	**NOTE:** The CRS may ask U2 RO to make Plant Announcement that AP-4 has been entered. If so, **Floor Instructor** acknowledge as U2 RO.
	RO	(Step 3) Check turbine control – IN AUTO.	
	RO	(Step 4) Check "MW LOOP" – IN SERVICE.	**NOTE:** IF MW LOOP is in service, proceed to Step 5.
	RO	(Step 4 RNO) Depress "MW IN/MW OUT" pushbutton.	

Op Test No.: N16-1	Scenario # 2	Event # 4	Page 35 of 74
Event Description:	**Rapid Downpower**		

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 5) Check shutdown to Mode 3 – DESIRED.	
	CRS	(Step 6) Check if "Shutdown Via Reactor Trip from 15% Power" appropriate:	
		• Shutdown Via Reactor Trip from 15% Power – DESIRED	**NOTE:** It is normal practice to shut down the reactor by driving rods, rather than tripping from 15%. If the crew elects to trip the reactor from 15% power, the CRS will perform Step 7, rather than the Step 6 RNO.
		• At least two CA pumps - FUNCTIONAL.	
	CRS	(Step 6 RNO) Perform the following:	
		• IF Mode 3 is timed critical AND the reactor will be shutdown by manually inserting control rods, THEN allow an additional 45 minutes to reach Mode 3 once turbine load reduction is complete.	
		• IF turbine will be shutdown during downpower, THEN enter target load of 15 MWE in turbine control panel.	
		• Observe Note prior to Step 8 and GO TO Step 8.	
	RO	(Step 7) Enter target load of 180 MWE in turbine control panel.	**NOTE:** Only performed if the CRS elects to trip the reactor from 15% power.
	CRS	(Step 8) Determine the required power reduction rate (MW/min).	**NOTE:** The CRS will reduce load at ≈10-15 MWe/minute.
	RO	(Step 9) Check control rods – IN AUTO.	

Op Test No.:	N16-1	Scenario #	2	Event #	4	Page	36 of 74
Event Description:	**Rapid Downpower**						

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 10) Notify SOC of load reduction (red dispatcher phone).	**Booth Instructor:** as **SOC**, acknowledge.
	RO	(Step 11) Initiate turbine load reduction to desired load at desired rate.	
	BOP	(Step 12) Borate NC System as follows:	
		• Energize all backup Pzr heaters.	
	CRS	• Check unit to be shutdown – VIA REACTOR TRIP FROM 15% POWER.	**NOTE:** It is normal practice to shut down the reactor by driving rods, rather than tripping from 15%.
	CRS	(Step 12.b RNO) GO TO Step 12.d.	
	RO	(Step 12.c) Calculate total power change (%):	**NOTE:** Only performed if the CRS elects to trip the reactor from 15% power.
	BOP	(Step 12.d) Determine boration amount based on the following:	
		• Power Reduction Rate (MW/min)	
		• Present NC System Boron Concentration (ppm)	
		• Total Power change (%).	**NOTE:** The total power change will be determined by the CRS, and will affect the amount of boron inserted by the BOP.
		• Record calculated boration amount:	
	RO	• Check auto or manual rod control – AVAILABLE.	
	BOP	• Perform boration in 4 equal additions during load reduction PER Enclosure 2 (Emergency Boration).	

Op Test No.: N16-1	Scenario # 2	Event # 4	Page 37 of 74
Event Description:	**Rapid Downpower**		

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The CRS may assign the BOP to perform this action. If so, **BOP Examiner** follow actions of Enclosure 2. **Other Examiners** follow **AP-4** Actions, **Step 13**, on **Page 38**.
AP/1/A/5500/04, RAPID DOWNPOWER ENCLOSURE 2, EMERGENCY BORATION			
	BOP	(Step 1) Check OAC - AVAILABLE.	
	BOP	(Step 2) Use OAC point M1P0785 to monitor boric acid gallons added while 1NV-265B (U1 NV Pump Boric Acid Sup Isol) is open.	
	BOP	(Step 3) GO TO Step 5.	
	BOP	(Step 5) Check boric acid transfer pump - RUNNING.	**NOTE:** If a Boric Acid Transfer Pump is NOT running, the BOP will start one pump using the RNO, and stop it later, after the boration is complete.
	BOP	(Step 6) OPEN 1NV-265B (U1 NV Pump Boric Acid Sup Isol).	
	BOP	(Step 7) Do not continue until desired amount of boric acid has been added.	
	BOP	(Step 8) CLOSE 1NV-265B (U1 NV Pump Boric Acid Sup Isol).	**Examiner NOTE:** When the Turbine Shifts to Manual, move to Event #5.
	BOP	(Step 9) IF boric acid transfer pump was started in Step 5 RNO, THEN perform the following:	**NOTE:** If a Boric Acid Transfer Pump was started earlier, it will be stopped here.
		• Stop boric acid transfer pump.	

Op Test No.: N16-1	Scenario # 2	Event # 4	Page 38 of 74
Event Description:	**Rapid Downpower**		

Time	Pos.	Expected Actions/Behavior	Comments
		• Ensure one boric acid transfer pump is in auto.	
	BOP	(Step 10) Repeat enclosure as required.	
		AP/1/A/5500/04, RAPID DOWNPOWER	
			Examiner NOTE: Examiners following the **CRS/RO** continue **HERE.** **Examiner NOTE:** When the Turbine Shifts to Manual, move to Event #5.
	BOP	(Step 13) Display Rod Insertion Limits on OAC by entering turn on code "RIL."	
	CRS	(Step 14) IF AT ANY TIME "CONTROL ROD BANK LO LO LIMIT" alarm (1AD-2, B-9) is lit, THEN perform one of the following to comply with Tech Spec 3.1.6 (Control Bank Insertion Limits):	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
		• Ensure alarm clears within one hour as Xenon builds in.	
		OR	
		• Initiate boration as necessary within one hour to restore control rods above insertion limits.	
	CRS	(Step 15) IF AT ANY TIME during this procedure C-7A is received, THEN ensure Transient Monitor freeze is triggered.	
	CRS	(Step 16) REFER TO the following:	**NOTE:** The CRS may ask OSM to address. If so, **Floor Instructor** acknowledge as OSM.
		• RP/0/A/5700/000 (Classification of Emergency)	

Op Test No.:	N16-1	Scenario #	2	Event #	4	Page	39	of 74
Event Description:	**Rapid Downpower**							

Time	Pos.	Expected Actions/Behavior	Comments
		• RP/0/A/5700/010 (NRC Immediate Notification Requirements).	
	CRS	(Step 17) Notify Reactor Engineer on duty of load reduction.	**NOTE:** The CRS may call WCC/RE. If so, **Booth Instructor** acknowledge.
	RO	(Step 18) Check target load - LESS THAN 1000 MW.	
	CRS	(Step 19) Check Unit 2 available to supply aux steam as follows:	**NOTE:** The CRS will ask U2 RO. **Floor Instructor:** As U2 RO report “All these conditions are met.”
		• Unit 2 Reactor power - GREATER THAN 15%	
		• Unit 2 2AS-12 (U2 SM to AS Hdr Control Inlet Isol) - OPEN	
		• Unit 2 - AVAILABLE TO SUPPLY AS HEADER.	
	RO	(Step 20) Check SM flow on all S/Gs – GREATER THAN 25%.	
When the Turbine Shifts to Manual, move to Event #5.			

Op Test No.:	N16-1	Scenario #	2	Event #	5	Page	40 of 74
Event Description:	**Turbine Control Unit fails to MANUAL**						

During the downpower, a failure will occur in the Turbine Control Unit causing the unit to shift from Operator Auto to Manual control. The operator will address 1AD-1/F-4, TURBINE IN MANUAL, and control the Turbine manually during the downpower in accordance with OP/1/A/6300/001A, Enclosure 4.1, “Turbine Generator Load Change.”

Booth Operator Instructions: **(Turbine Control Fails to MANUAL) Set in initial conditions. Triggered from 1NV-265B open light ON.**

Indications Available:

- Turbine MWe indication stabilizes
- MCB Annunciator 1AD-1/F-4, TURBINE IN MANUAL

Time	Pos.	Expected Actions/Behavior	Comments
			Examiner NOTE: The CRS will continue in AP-4 while the ARP/OP are addressed **(Page 41)**.
			NOTE: The BOP may stop the boration.
MCB ANNUNCIATOR 1AD-1/F4, TURBINE IN MANUAL			
	RO	Immediate Action: Ensure Turbine/Generator operation stabilizes in either Load or Speed Modes of operation.	**NOTE:** The Turbine will stabilize in LOAD Mode.
	CRS	(Step 1) Determine cause and effect, then notify IAE of any malfunction.	**NOTE:** The CRS may call WCC/IAE to address the Turbine Control failure. If so, **Booth Instructor** acknowledge as WCC.
	RO	(Step 2) Refer to OP/1/A/6300/001 A (Turbine-Generator Load Change) for manual operation of Turbine Generator.	**NOTE:** The RO will continue the load reduction in MANUAL.
	CRS	(Step 3) WHEN available and desired, return DEH to “OPER AUTO”.	

Op Test No.:	N16-1	Scenario #	2	Event #	5	Page	41 of 74
Event Description:	**Turbine Control Unit fails to MANUAL**						

Time	Pos.	Expected Actions/Behavior	Comments
		OP/1/A/6300/001 A, TURBINE-GENERATOR LOAD CHANGE ENCLOSURE 4.1, TURBINE-GENERATOR LOAD CHANGE	
	RO	(Step 3.5) Changing Turbine Load	
	RO	(Step 3.5.1) IF Turbine in "OPERATOR AUTO"…	
	RO	(Step 3.5.3) IF Turbine in "MANUAL" perform the following:	
		• Ensure desired change within "Calculated Capability Curve".	
		• If turbine load will increase or decrease more than 10 MWs, notify Dispatcher of expected load change.	
		• IF raising load, …	
		• IF decreasing load, depress "GV LOWER".	
		AP/1/A/5500/04, RAPID DOWNPOWER	
	RO	(Step 13) Display Rod Insertion Limits on OAC by entering turn on code "RIL".	
	CRS	(Step 14) IF AT ANY TIME "CONTROL ROD BANK LO LO LIMIT" alarm (1AD-2, B-9) is lit, THEN perform one of the following to comply with Tech Spec 3.1.6 (Control Bank Insertion Limits)	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
		• Ensure alarm clears within one hour as Xenon builds in.	
		OR	
		• Initiate boration as necessary within one hour to restore control rods above insertion limits.	

Op Test No.:	N16-1	Scenario #	2	Event #	5	Page	42	of	74

Event Description: **Turbine Control Unit fails to MANUAL**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 15) IF AT ANY TIME during this procedure C-7A is received, THEN ensure Transient Monitor freeze is triggered.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	CRS	(Step 16) REFER TO the following:	**NOTE:** The CRS may ask OSM to address. If so, **Floor Instructor** acknowledge as OSM.
		• RP/0/A/5700/000 (Classification of Emergency)	
		• RP/0/A/5700/010 (NRC Immediate Notification Requirements).	
	CRS	(Step 17) Notify Reactor Engineer on duty of load reduction.	**NOTE:** The CRS may call WCC/RE to address the load reduction. If so, **Booth Instructor** acknowledge as WCC/RE.
			Examiner NOTE: The CRS may proceed past Step 18 of AP4 while waiting for the BOP to complete the first boration. If so, wait until the BOP is complete with the first boration and then proceed to the next event.
		(Step 18) Check target load – LESS THAN 1000 MW.	
		(Step 19) Check Unit 2 available to supply aux steam as follows:	
		• Unit 2 Reactor power – GREATER THAN 15%	**NOTE:** CRS will ask U2 RO for status. **Floor Instructor:** Report **as U2 RO** that **Unit 2** is at **100% power.**

Op Test No.:	N16-1	Scenario #	2	Event #	5	Page	43 of 74
Event Description:	**Turbine Control Unit fails to MANUAL**						

Time	Pos.	Expected Actions/Behavior	Comments
		• Unit 2 AS-12 (U2 SM to AS Hdr Control Inlet Isol) – OPEN	**NOTE:** CRS will ask U2 RO for valve position. **Floor Instructor:** Report **as U2 RO** that **Unit 2 AS-12** is **OPEN.**
		• Unit 2 – AVAILABLE TO SUPPLY AS HEADER.	**NOTE:** CRS will ask U2 RO for AS availability. **Floor Instructor:** Report **as U2 RO** that **Unit 2** is **available to supply AS Header.**
		(Step 20) Check SM flow on all S/Gs – GREATER THAN 25%.	
		(Step 21) WHEN all SM flows are less than 75%, THEN ensure the following valves ramp CLOSED:	
		• 1CF-104AB (1A S/G CF Control Bypass)	
		• 1CF-105AB (1B S/G CF Control Bypass)	
		• 1CF-106AB (1C S/G CF Control Bypass)	
		• 1CF-107AB (1D S/G CF Control Bypass)	
			EXAMINER NOTE: The crew will continue in AP4 as Event 6 is ramping in.

At the discretion of the Lead Examiner, move to Event #6.

Op Test No.:	N16-1	Scenario #	2	Event #	6	Page	44 of 74
Event Description:	**High Vibration on 1B NCP**						

After this, a high vibration condition will develop on the 1B NCP. The operator will respond in accordance with OAC Alarm M1D3041, 1B NC PUMP VIBRATION (HALM), and enter AP/1/A/5500/08, "Malfunction of NC Pump." Ultimately, the vibration condition will rise above the Hi-Hi threshold requiring tripping of the reactor and stopping the NCP. The operator will manually trip the reactor and enter EP/1/A/5000/E-0, "Reactor Trip or Safety Injection."	
Booth Operator Instructions:	**insertMAL-NCP003B=4.6 (HI Vibration Alarm)** **insertMAL-NCP003B=5.1 cd = X05_001E11_1 = 1 (Hi Vibration Alarm Ramp = 300 seconds) (HI-HI Vibration Alarm)**

Indications Available:

- OAC Alarm: 1B NC Pump Vibration
- MCB Annunciator 1AD-6/E-11 NC Pump Hi Vibration
- 1B NC Pump hi vibration on NC Pump Vibration Monitor

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The performance of Step 5 of AP8 will be dependent upon the timing of addressing the procedure (i.e. Step 5 may be performed when Hi-Hi Vibration exceeds setpoint).
		AP/1/A/5500/08, MALFUNCTION OF NC PUMP CASE III, EXCESSIVE VIBRATION	
	BOP	(Step 1) Check NC Pump vibration problem – KNOWN TO BE VALID.	
	BOP	(Step 2) Check affected NC pump vibration indication within operating limits:	
		• Motor frame vibration – LESS THAN 5 MILS • All of the following - LESS THAN 20 MILS • Motor shaft vibration • Pump shaft vibration • Motor axial vibration • Motor flywheel vibration	**NOTE:** The Motor Frame Vibration will be rising.

Op Test No.:	N16-1	Scenario #	2	Event #	6	Page	45	of	74
Event Description:	**High Vibration on 1B NCP**								

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 3) IF AT ANY TIME vibration exceeds operating limits, THEN GO TO Step 5	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	CRS	(Step 4) GO TO Step 6	
	CRS	(Step 6) Announce occurrence on the paging system.	**NOTE:** The CRS may ask U2 RO to make Plant Announcement that AP-8 has been entered. If so, **Floor Instructor** acknowledge as U2 RO.
	CRS	(Step 7) Check NC pumps - ANY RUNNING	**NOTE:** All 4 NCPs are currently running. The CRS will direct the crew to continue monitoring NCP vibrations until the Hi-Hi Vibration alarm actuates. When alarm occurs, the crew will go to Step 5.
	BOP	(Step 5) Stop affected NC pump as follows:	
		• IF A or B NC pump is the affected pump, Then CLOSE associated spray valve:	
	BOP	• 1NC-27C (1A NC Loop PZR Spray Control).	
		• 1NC-29C (1B NC Loop PZR Spray Control).	**NOTE:** The 1B RCP is affected.
		• Check unit status – IN MODE 1 OR 2.	
	RO	• Trip reactor	
	BOP	• WHEN reactor power less than 5%, THEN stop affected NC pump.	

Op Test No.:	N16-1	Scenario #	2	Event #	6	Page	46	of	74
Event Description:	High Vibration on 1B NCP								

Time	Pos.	Expected Actions/Behavior	Comments
Critical Task: **Trip the Reactor prior to stopping the NCP during a high vibration condition, and trip the NCP only after Reactor power level has dropped to less than 5%.** Safety Significance: The P-8 interlock allows one NCP to be stopped less than 48% power. If a NCP is stopped in Mode 1 or 2, Tech Spec 3.4.4 requires the unit to be in Mode 3 within 6 hours. In addition, T-ave for the idle loop may violate Tech Spec 3.4.2, minimum temperature for criticality. In this case, the unit must be sub-critical within 30 minutes. The transient placed on the unit when a NCP is secured at power can challenge both reactor protection and control systems. Furthermore, an added burden is placed on the operator to stabilize the unit and shut down within 6 hours (possibly 30 minutes) to comply with Tech Specs. Even though the plant is designed and analyzed to operate in this configuration for a short time, station management has decided that the conservative approach to dealing with this transient is to trip the reactor anytime a NCP malfunction warrants stopping a pump in Mode 1 or 2. Guidance is given to wait until reactor power is less than 5% before stopping the NC pump. This will ensure the NC pump will provide adequate flow/core cooling until reactor power is sufficiently low enough to preclude a challenge to fuel integrity. If the action can be taken, and is not taken, this demonstrates "mis-operation" or incorrect operation that could unnecessarily challenge a fission product barrier (NCS).			
	CRS	• GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).	
When the crew trips the reactor move to Events #7-9.			

Op Test No.:	N16-1	Scenario #	2	Event #	7, 8 & 9	Page	47	of	74

Event Description: **Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**

Following the plant trip, a Feedwater Isolation Signal (FWIS) will occur prematurely, the Main Turbine will fail to trip automatically or manually, and the Main Steam Line Isolation signal will fail to automatically actuate. The operator will be required to either manually close the Turbine Governor Valves or the MSIVs. It is likely that SI will actuate due to the delayed Turbine isolation. At the same time, the TDCA Pump, if not already running, will start on low Steam Generator levels. If the TDCA Pump was not running at the start of the event, it will trip on overspeed upon startup. If the TDCA Pump was running at the start of the event, it will trip when the operator initiates flow to the Steam Generators. Furthermore, the 1A MDCA Pump will trip on overcurrent during pump startup, and any attempts to restart the pump will be unsuccessful. Consequently, a Red Path on Heat Sink will occur shortly after SI actuation, or upon the transition to EP/1/A/5000/ES-0.1, “Reactor Trip Response.” The operator will transition from EP/1/A/5000/E-0 to EP/1/A/5000/FR-H.1, “Response to Loss of Secondary Heat Sink.” The operator will eventually restore feed flow using a CF Pump in accordance with Enclosure 8 (Re-establishing CF Flow) of FR-H.1. Upon restoration of feed flow to the Steam Generators, the crew will transition back to E-0. The scenario will terminate upon the operator returning to E-0, or ES-0.1, after the secondary heat sink has been restored.

Booth Operator Instructions:

The following will occur on the Rx trip:

- **insert MAL-ISE007A ACT_AUTO cd='H_X01_094_2 EQ 1' (FWIS Train A)**
- **insert MAL-ISE007B ACT_AUTO cd='H_X01_094_2 EQ 1' (FWIS Train B)**
- **insertMAL-DEH003A = TRUE (Main Turbine fails to Auto Trip)**
- **insertMAL-DEH003B = TRUE (Main Turbine fails to Manually Trip)**
- **insert MAL-CA009A TRUE cd='H_X10_102_4 EQ 1' (MD CA Pump 1A trips on startup)**
- **insert MAL-CA005 TRIP cd='H_X01_094_2 EQ 1' delay=0, insert MAL-SM029 = 0, cd=H_X01_094_2 EQ1 (TDCA Overspeed Trip occurs and Breaker Open Indicating Light, 1SA-3 fails CLOSED on Reactor Trip)**

NOTE: **When an AO is dispatched to check the 1A MDCA Pump Breaker. Acknowledge as AO. Wait five minutes and report back that the breaker has an overcurrent lockout relay showing, and the motor smells of burnt insulation.**

NOTE: **When an AO is dispatched to check the 1TDCA Pump. Wait five minutes and report back that the TDCA Turbine has tripped on overspeed and will NOT reset.**

Op Test No.:	N16-1	Scenario #	2	Event #	7, 8 & 9	Page	48 of 74

Event Description: **Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**

Indications Available:

- MCB Annunciator 1AD-4/B-1 through 4, S/G A-D LEVEL DEVIATION
- MCB Annunciator 1AD-4/C-1 through 4, S/G A-D FLOW MISMATCH LO CF FLOW
- MCB Annunciator 1AD-4/E-1 through 4, S/G A-D LO LEVEL ALERT
- RED Path on Heat Sink.

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: If the TDCA Pumps is still running from a previous malfunction, the BOP may attempt to open the CA Control Valves to prevent the Red Path on Heat Sink. However, the TDCA will overspeed shortly after event initiation.
EP/1/A/5000/E-0, REACTOR TRIP OR SAFETY INJECTION			
	RO/ BOP	(Step 1) Monitor Foldout page.	
		NC Pump Trip Criteria (Not expected)	
		CA Suction Sources (CA storage tank (water tower) goes below 1.5 ft – Not expected)	
		Position Criteria for 1NV-150B and 1NV-151A (U1 NV Pump Recird Isol)	**NOTE:** The BOP will monitor these conditions.
		• IF NV S/I flowpath aligned AND NC pressure is less than 1500 PSIG, THEN CLOSE 1NV-150B and 1NV-151A.	
		• IF NC pressure is greater than 2000 PSIG, THEN OPEN 1NV-150B and 1NV-151A.	
		Ruptured S/G Aux Feedwater Isolation Criteria (Not expected)	
		Faulted S/G Aux Feedwater Isolation Criteria (Not expected)	
	RO	(Step 2) Check Reactor trip:	**Immediate Action**
		• All rod bottom lights – LIT	

Op Test No.: N16-1	Scenario # 2	Event # 7, 8 & 9	Page 49 of 74				
Event Description:	**Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**						

Time	Pos.	Expected Actions/Behavior	Comments
		• Reactor trip and bypass breakers – OPEN	
		• I/R amps – GOING DOWN.	
	RO	(Step 3) Check Turbine Trip:	**Immediate Action**
		• All throttle valves – CLOSED.	
	RO	(Step 3 RNO) Perform the following:	**Immediate Action**
		• Trip turbine.	
		• IF turbine will not trip, THEN perform the following:	**NOTE:** Turbine will NOT trip manually.
		• Place turbine in manual.	
		• CLOSE governor valves in fast action.	
		• IF governor valves will not close…	

Critical Tasks:

Manually close the Main Turbine Governor Valves or establish feedwater flow into at least one Steam Generator before Wide Range Level in 3 Steam Generators reaches 24% (36%).

Safety Significance: Failure to trip the Main Turbine when conditions exist that allow the operator to do so, or failure to establish feedwater flow into at least one Steam Generator results in the crew having to rely upon the lower-priority action of having to initiate RCS Bleed and Feed to minimize the possibility of core uncovery. Failure to perform this task, when able to do so, constitutes incorrect performance that leads to degradation of the RCS and/or fuel cladding fission product barriers.

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 4) Check 1ETA and 1ETB – ENERGIZED.	**Immediate Action**

Op Test No.: N16-1	Scenario # 2	Event # 7, 8 & 9	Page 50 of 74				

Event Description: **Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
			Examiner NOTE: Depending on the timing of diagnosis of the failure of the Main Turbine to trip, the crew may or may not actuate SI. The script assumes that SI has occurred, and that FR-H.1 will be entered later. **If SI is NOT actuated** the crew will transition to EP/1/A/5000/ES-0.1, and with the RED Path on Heat Sink active, transition to FR-H.1 instead. If so, **Examiners move forward to Page 53.**
	RO/ BOP	(Step 5) Check if S/I is actuated:	**Immediate Action**
		• "A SAFETY INJECTION ACTUATED" status light (1SI-18) – LIT.	
		• Both LOCA Sequencer Actuated status lights (1SI-14) – LIT.	
	CRS	(Step 6) Announce "Unit 1 Safety Injection".	**NOTE:** CRS may ask U2 RO to make Plant Announcement that Unit 1 Safety Injection has actuated. If so, **Floor Instructor** acknowledge as U2 RO.
	RO	(Step 7) Check all Feedwater Isolation status lights (1SI-4) – LIT.	
	BOP	(Step 8) Check Phase A "RESET" lights – DARK.	

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Event Description: **Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 9) Check ESF Monitor Light Panel on energized train(s):	
		• Groups 1, 2, 5 – DARK.	
		• Group 3 – LIT.	
		• Group 4 – LIT AS REQUIRED.	
		• Group 6 – LIT.	
	CRS	• GO TO Step 10.	
	RO/ BOP	(Step 10) Check proper CA pump status:	**NOTE:** Both MDCA Pumps are OFF.
		• MD CA pumps – ON	
		(Step 10a RNO) Start pumps	
		• N/R level in at least 3 S/Gs – GREATER THAN 17%.	
		(Step 10b RNO) Ensure TD CA pump on.	
	BOP	(Step 11) Check all KC pumps - ON	
	BOP	(Step 12) Check both RN pumps – ON.	
	CRS	(Step 13) Notify Unit 2 to perform the following:	**Floor Instructor:** As U2 RO report “2A RN Pump is running.”
		• Start 2A RN pump.	

Op Test No.: N16-1 Scenario # 2 Event # 7, 8 & 9	Page 52 of 74
Event Description:	**Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
		• THROTTTLE Unit 2 RN flow to minimum for existing plant conditions.	**Booth Instructor:** **insert LOA-RN087 (Start 2A RN Pump)** **insert LOA-RN083 8050.000000 delay=0 ramp=10 (Unit 2 Train A Demand Flow)**
	RO	(Step 14) Check all S/G pressures – GREATER THAN 775 PSIG.	
	BOP	(Step 15) Check Containment Pressure – HAS REMAINED LESS THAN 3 PSIG.	**NOTE:** Containment pressure is normal.
	BOP	(Step 16) Check S/I flow:	
	BOP	• Check “NV PMPS TO COLD LEG FLOW” gauge – INDICATING FLOW.	
		• Check NC pressure – LESS THAN 1600 PSIG.	
	BOP	(Step 16.b RNO) Perform the following:	
	BOP	• Ensure ND pump miniflow valve on running pump(s) OPEN:	
		• 1ND-68A (1A ND Pump & Hx Mini Flow Isol)	
		• 1ND-67B (1B ND Pump & Hx Mini Flow Isol).	
	CRS	• IF valve(s) open on all running ND pumps, THEN GO TO Step 17.	
	CRS	(Step 17) Notify OSM or other SRO to perform EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 22 (OSM Actions Following an S/I) within 10 minutes.	**NOTE:** The CRS may ask OSM to address. If so, **Floor Instructor** acknowledge as OSM.

Op Test No.:	N16-1	Scenario #	2	Event #	7, 8 & 9	Page	53	of	74

Event Description: **Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
		(Step 18) Check CA flow:	
		• Total CA flow – GREATER THAN 450 GPM.	
		(Step 18 RNO) Perform the following:	
		• IF N/R level in all S/Gs is less than 11% (32% ACC), THEN perform the following:	
		• Ensure correct valve alignment.	
		• Start CA pumps.	
		• IF N/R level in all S/Gs is less than 11% (32% ACC) AND feed flow greater than 450 GPM cannot be established, THEN perform the following:	
		• Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).	
		• GO TO EP/1/A/5000/FR-H.1 (Response To Loss of Secondary Heat Sink).	
			NOTE: It is expected that the Red Path on Heat Sink will exist by this time. The CRS will transition to FR-H.1.
EP/1/A/5000/FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK			
	CRS	(Step 1) IF total feed flow is less than 450 GPM due to operator action…	**NOTE:** This condition is NOT met, and the crew will remain in FR-H.1.
	RO/ BOP	(Step 2) Check if secondary heat sink is required:	

Op Test No.:	N16-1	Scenario #	2	Event #	7, 8 & 9	Page	54 of 74
Event Description:	**Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**						

Time	Pos.	Expected Actions/Behavior	Comments
		• NC pressure – GREATER THAN ANY NON-FAULTED S/G PRESSURE.	
		• Any NC T-Hot – GREATER THAN 350°F (347°F ACC).	**NOTE:** A Secondary Heat Sink is required.
	RO/ BOP	(Step 3) Monitor Foldout Page.	
		NC System Feed and Bleed Criteria (Applies after Step 2 in the body of the procedure) (3 S/Gs goes below 24% (36% ACC) – Not expected)	
		Cold Leg Recirc Switchover Criteria (FWST level reaches 95 inches – Not expected)	
		CA Suction Sources (CA storage tank (water tower) goes below 1.5 ft – Not expected)	
	BOP	(Step 4) Check at least one of the following NV pumps – AVAILABLE:	
		• 1A NV pump	
		OR	
		• 1B NV pump.	
	RO	(Step 5) Check if NC System feed and bleed should be initiated:	
		• Check W/R level in at least 3 S/Gs – LESS THAN 24% (36% ACC).	
	RO/ BOP	(Step 5.a RNO) Perform the following:	
		• Monitor feed and bleed initiation criteria.	
		• WHEN criteria satisfied, THEN GO TO Step 22.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	CRS	• GO TO Step 6.	

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Event Description: **Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 6) Ensure S/G BB and NM valves CLOSED PER Enclosure 3 (S/G BB and Sampling Valve Checklist).	**NOTE:** The CRS may assign the BOP (RO) to perform this action. If so, **BOP (RO) Examiner** follow actions of **Enclosure 3**. **Others** should move ahead to Step 7 on **Page 56** to continue in FR-H.1.
EP/1/A/5000/FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK ENCLOSURE 3, S/G BB AND SAMPLING VALVE CHECKLIST			
	BOP (RO)	(Step 1) Check the following valves – CLOSED.	**Examiner NOTE:** Follow the actions associated with Enclosure 3 if BOP is assigned by CRS to perform.
		• 1BB-1B (1A S/G Blowdown Cont Outside Isol Control) - CLOSED	
		• 1BB-2B (1B S/G Blowdown Cont Outside Isol Control) - CLOSED	
		• 1BB-3B (1C S/G Blowdown Cont Outside Isol Control) - CLOSED	
		• 1BB-4B (1D S/G Blowdown Cont Outside Isol Control) - CLOSED	
		• 1BB-5A (A S/G BB Cont Inside Isol) - CLOSED	
		• 1BB-6A (B S/G BB Cont Inside Isol) - CLOSED	
		• 1BB-7A (C S/G BB Cont Inside Isol) - CLOSED	
		• 1BB-8A (D S/G BB Cont Inside Isol) - CLOSED	

Op Test No.: N16-1	Scenario # 2	Event # 7, 8 & 9	Page 56 of 74

Event Description: **Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
		• 1NM-187A (1A S/G Upper Shell Sample Cont Inside Isol) - CLOSED	
	BOP (RO)	• 1NM-190A (1A S/G Blowdown Sample Cont Inside Isol) - CLOSED	
		• 1NM-201A (1B S/G Blowdown Sample Hdr Cont Outside Isol) - CLOSED	
		• 1NM-207A (1C S/G Upper Shell Sample Cont Inside Isol) - CLOSED	
		• 1NM-210A (1C S/G Blowdown Sample Cont Inside Isol) - CLOSED	
		• 1NM-221A (1D S/G Blowdown Sample Hdr Cont Outside Isol) - CLOSED	
		• 1NM-191B (1A S/G Blowdown Sample Hdr Cont Outside Isol) - CLOSED	
		• 1NM-197B (1B S/G Upper Shell Sample Cont Inside Isol) - CLOSED	
	BOP (RO)	• 1NM-200B (1B S/G Blowdown Sample Cont Inside Isol) - CLOSED	
		• 1NM-211B (1C S/G Blowdown Sample Hdr Cont Outside Isol) - CLOSED	
		• 1NM-217B (1D S/G Upper Shell Sample Cont Inside Isol) - CLOSED	
		• 1NM-220B (1D S/G Blowdown Sample Cont Inside Isol) - CLOSED	
EP/1/A/5000/FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK			
	RO (BOP)	(Step 7) Attempt to establish CA flow to at least one S/G as follows:	**Examiner NOTE:** Examiners NOT following BOP (RO) actions in Enclosure 3, continue **HERE**.
		• Check power to both MD CA pumps – AVAILABLE.	**NOTE:** The 1A MDCA Pump is OOS, and the 1B MDCA Pump has failed upon Auto Start.

Op Test No.:	N16-1	Scenario #	2	Event #	7, 8 & 9	Page	57 of 74
Event Description:	**Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**						

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 7.a RNO) Perform the following:	
		• IF 1ETA OR 1ETB deenergized, THEN…..	**NOTE:** 1ETA and 1ETB are both energized.
		• IF the essential bus is energized, THEN dispatch operator to determine cause of breaker failure.	**NOTE:** The CRS will dispatch an AO. **Booth Instructor:** Acknowledge as AO. Wait **five minutes** and **report back** that the breaker has an **overcurrent lockout relay showing**, and the motor smells of burnt insulation.
	RO (BOP)	(Step 7.b) Ensure control room CA valves aligned PER Enclosure 4 (CA Valve Alignment).	**NOTE:** The CRS may assign the RO (BOP) to perform this action. If so, RO (**BOP) Examiner** follow actions of **Enclosure 4.** **Others** should move ahead to Step 7.c on **Page 60** to continue in FR-H.1.
EP/1/A/5000/FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK ENCLOSURE 4, CA VALVE ALIGNMENT			
			Examiner NOTE: Follow the actions associated with Enclosure 4 if RO (BOP) is assigned by CRS to perform.
	RO (BOP)	(Step 1) Check the following valves - OPEN	
		• 1CA-66AC (U1 TD CA Pump Disch To 1A S/G Isol) - OPEN	
		• 1CA-62A (1A CA Pump Disch To 1A S/G Isol) - OPEN	
		• 1CA-54AC (U1 TD CA Pump Disch To 1B S/G Isol) - OPEN	

Op Test No.:	N16-1	Scenario #	2	Event #	7, 8 & 9	Page	58	of	74

Event Description: **Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
		• 1CA-58A (1A CA Pump Disch To 1B S/G Isol) - OPEN	
		• 1CA-50B (U1 TD CA Pump Disch To 1C S/G Isol) - OPEN	
		• 1CA-46B (1B CA Pump Disch To 1C S/G Isol) - OPEN	
		• 1CA-38B (U1 TD CA Pump Disch To 1D S/G Isol) - OPEN	
		• 1CA-42B (1B CA Pump Disch To 1D S/G Isol) - OPEN	
	RO (BOP)	(Step 2) Check the following valves - OPEN	
		• 1CA-64B (U1 TD CA Pump Disch To 1A S/G Control) – OPEN	
		• 1CA-60A (1A CA Pump Disch To 1A S/G Control) - OPEN	
		• 1CA-52AB (U1 TD CA Pump Disch To 1B S/G Control) - OPEN	
		• 1CA-56A (1A CA Pump Disch To 1B S/G Control) - OPEN	
		• 1CA-48AB (U1 TD CA Pump Disch To 1C S/G Control) - OPEN	
		• 1CA-44B (1B CA Pump Disch To 1C S/G Control) - OPEN	
		• 1CA-36AB (U1 TD CA Pump Disch To 1D S/G Control) - OPEN	
		• 1CA-40B (1B CA Pump Disch To 1D S/G Control) - OPEN	
	RO (BOP)	(Step 3) Check CA Storage Tank (water tower) level – GREATER THAN 1.5 FT.	
	RO (BOP)	(Step 4) Check the following valves - CLOSED	

Op Test No.:	N16-1	Scenario #	2	Event #	7, 8 & 9	Page	59 of 74

Event Description: **Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
		• 1RN-69A (1A RN Assured Supply TO U1 CA Isol) - CLOSED	
		• 1CA-86A (U1 TD CA Pump Suction From 1A RN Isol) - CLOSED	
		• 1CA-15A (1A CA Pump Suction From 1A RN Isol) - CLOSED	
		• 1RN-162B (1B RN Assured Supply To U1 CA Isol) - CLOSED	
		• 1CA-116B (U1 TD CA Pump Suction From 1B RN Isol) - CLOSED	
		• 1CA-18B (1B CA Pump Suction From 1B RN Isol) - CLOSED	
	RO (BOP)	(Step 5) Check the following valves – OPEN:	
		• 1CA-11A (1A CA Pump Suction Isol) - OPEN	
		• 1CA-7AC (U1 TD CA Pump Suction Isol) - OPEN	
		• 1CA-9B (1B CA Pump Suction Isol) - OPEN	
	RO (BOP)	(Step 6) GO TO Step 8.	
	RO (BOP)	(Step 8) Check 1CA-2 (U1 CA Pump Suct From CA Storage Tank Isol) – OPEN.	
	RO (BOP)	(Step 9) Check CA pump suction from UST and CA Condensate Storage Tank (service bldg roof tank) valves – CLOSED:	
		• 1CS-18 (U1 UST To CA Pump Suct Hdr Isol) - CLOSED	
		• 1CA-4 (U1 CA Pumps Suct From SUT Isol) - CLOSED	

Op Test No.: N16-1	Scenario # 2	Event # 7, 8 & 9	Page 60 of 74
Event Description:	**Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**		

Time	Pos.	Expected Actions/Behavior	Comments
		• 1CA-6 (U1 CA Pumps Suct From CA CST Isol) – CLOSED.	
EP/1/A/5000/FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK			
			Examiner NOTE: Examiners NOT following RO (BOP) actions in Enclosure 4, continue **HERE**.
	BOP (RO)	(Step 7.c) Start all available CA pumps.	
	BOP (RO)	(Step 7.d) Check TD CA pump – RUNNING.	**NOTE:** The TDCA Pump is NOT running.
	BOP (RO)	(Step 7.d RNO) Perform the following as necessary:	
		• IF 1SA-48BC (SM From S/G C To TD CA Pump Isol) is closed, THEN…	**NOTE:** 1SA-48BC indicates OPEN.
		• IF 1SA-49AB (SM From S/G B to TD CA Pump Isol) is closed, THEN…	**NOTE:** 1SA-49AB indicates OPEN.
	CRS	• IF "TD CA PUMP STOP VLV NOT OPEN" alarm (1AD-5, F-3) is lit, THEN dispatch operator to reset 1SA-3 (Unit 1 TD CA Pump Turb Stop Valve) PER EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 24 (Resetting TD CA Stop Valve).	**NOTE:** The CRS will dispatch an AO. **Booth Instructor:** Acknowledge as AO. Wait **five minutes** and **report back** that the **TDCA Turbine has tripped on overspeed and will NOT reset.**
	CRS	• IF reason for loss of steam supply to TD CA pump not determined,…	**NOTE:** The CRS will determine from the AO report that the TDCA Pump is unavailable.
	RO/ BOP	(Step 7.e) Check total flow to S/G(s) – GREATER THAN 450 GPM.	**NOTE:** There is no feedwater flow.

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Event Description: **Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
	RO/ BOP	(Step 7.e RNO) Perform the following:	
		• IF only one MD CA pump is on,…	**NOTE:** There are no MDCA Pumps running.
		• IF any CA pump is running,…	**NOTE:** There are no CA Pumps running.
		• IF any feed flow to at least one S/G is indicated,…	**NOTE:** There is no feedwater flow.
	CRS	• IF no feed flow indicated, THEN perform the following:	
		• IF no CA pump can be started, THEN dispatch operator and maintenance to CA pumps to try to restore one CA pump to service.	**NOTE:** The CRS may call WCC/IAE to address the CA Pump situation. If so, **Booth Instructor** acknowledge as WCC.
		• Dispatch operator to ensure CA valves aligned PER Enclosure 6 (Local CA Valve Alignment).	**NOTE:** The CRS will dispatch an AO. **Floor Instructor/Booth Instructor:** Acknowledge as AO. **Booth Instructor:** After **5 minutes** report completion.
	CRS	• GO TO Step 8.	
	RO	(Step 8) Check steam dumps as follows:	
		• Check condenser available as follows:	
		• "C-9 COND AVAILABLE FOR STEAM DUMP" status light (1SI-18) - LIT	

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Event Description:	**Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**							

Time	Pos.	Expected Actions/Behavior	Comments
		• Any MSIV – OPEN.	**NOTE:** The MSIVs may be OPEN or CLOSED. If the MSIVs are CLOSED, proceed to Step 9.
		• "STEAM DUMP SELECT" – IN T-AVG MODE.	
		• Perform the following to place steam dumps in steam pressure mode:	
		• Ensure "STM PRESS CONTROLLER" setpoint at 1090-1095 PSIG.	
		• Place "STM PRESS CONTROLLER" in manual.	
		• Adjust "STM PRESS CONTROLLER" output to equal "STEAM DUMP DEMAND" signal.	
		• Place "STEAM DUMP SELECT" in steam pressure mode.	
		• Place "STM PRESS CONTROLLER" in auto.	
	BOP	(Step 9) Stop all NC pumps.	
	BOP	(Step 10) Reset Feedwater Isolation as follows:	
		• Check any Condensate Booster pump – ON.	
		• Check the following alarms – DARK.	
		• 1AD-5, G-6 (Inner Doghouse Level Hi)	
		• 1AD-5, H-6 (Outer Doghouse Level Hi).	

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Event Description:	**Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**							

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	• Dispatch operator to block Feedwater Isolation signal PER Enclosure 7 (Feedwater Isolation Override).	**NOTE:** The CRS will dispatch an AO. **Floor Instructor/Booth Instructor:** Acknowledge as AO. **Booth Instructor: dellA MAL-ISE007A = 2 (Upon Demand to Reset FWIS) dellA MAL-ISE007B = 2 (Upon Demand to Reset FWIS) insert MAL-ISE007A = BLK_BOTH (Upon Demand to Reset FWIS)** **insert MAL-ISE007B = BLK_BOTH (Upon Demand to Reset FWIS)** As **AO**, report completion. **Booth instructor: do not delay performance of Enclosure 7**
	BOP	• Check S/I – HAS BEEN ACTUATED.	**NOTE:** SI may have been actuated.
	BOP	• Reset the following:	
		• S/I	
		• Sequencers	
	BOP	• IF AT ANY TIME a B/O signal occurs, THEN restart S/I equipment previously on.	
	BOP	• Do not continue until Enclosure 7 (Feedwater Isolation Override) is completed.	
	BOP	(Step 11) Check CM System in service:	
		• Hotwell pump(s) - ON	

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Event Description: **Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
		• Condensate Booster pump(s) – ON.	
	RO/ BOP	(Step 12) Check CF pumps – AT LEAST ONE AVAILABLE TO START.	**NOTE:** Both CF Pumps are available to start.
	CRS	(Step 13) Establish CF flow PER Enclosure 8 (Re-establishing CF Flow).	
			NOTE: The CRS will transition to Enclosure 8.
EP/1/A/5000/FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK ENCLOSURE 8, RE-ESTABLISHING CF FLOW			
	RO/ BOP	(Step 1) Place the following valves in manual and CLOSE:	
		• S/G CF control valves	
		• S/G CF control bypass valves.	
	RO/ BOP	(Step 2) Lower output to 0% for the following valves:	
		• All S/G CF control valves	
		• All S/G CF control bypass valves.	
	RO/ BOP	(Step 3) CLOSE the following CF control isolation valves:	
		• CLOSE 1CF-31 (1A S/G CF Control Inlet Isol).	
		• CLOSE 1CF-22 (1B S/G CF Control Inlet Isol).	
		• CLOSE 1CF-19 (1C S/G CF Control Inlet Isol).	
		• CLOSE 1CF-18 (1D S/G CF Control Outlet Isol).	

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Event Description: **Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Note prior to Step 4) The following step must be completed even if a Feedwater Isolation signal has not occurred.	
	BOP	(Step 4) Depress and release the Feedwater Isolation reset pushbuttons.	
	RO/ BOP	(Step 5) Check any CF pump – RESET.	**Examiner NOTE:** If a Safety Injection has NOT occurred the CRS will continue with Step 6.
	CRS	(Step 5 RNO) GO TO Step 14.	**Examiner NOTE:** If a Safety Injection HAS occurred the CRS will read Step 5 RNO and transition to Step 14 to reset one CF pump. If so, pick up with scripting for Step 14 on page 68.
	RO / BOP	(Step 6) Check both CF pumps - RESET.	**NOTE:** If a Safety Injection has NOT occurred, both CF pumps will likely be reset.
	CRS	(Note prior to Step 7) Only one CF pump will be placed in service in subsequent steps. The other CF pump governor valves are closed to reduce loading on the AS Header.	
	CRS	(Step 7) Isolate steam flow to the CF pump not being placed in service as follows:	
	RO / BOP	(Step 7.a) Place low pressure governor control in manual.	

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Event Description: **Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
	RO / BOP	(Step 7.b) Place high pressure governor control in manual.	
	RO / BOP	(Step 7.c) Lower low pressure governor control output to 0%.	
	RO / BOP	(Step 7.d) Lower high pressure governor control output to 0%.	
	CRS	(Step 8) Align AS header as follows:	
	RO / BOP	(Step 8.a) CLOSE 1AS-9 (U1 C Htr Bleed To AS Hdr Isol).	
	CRS	(Step 8.b) Check Unit 2 as follows:	
		• Unit 2 Reactor power - GREATER THAN 15%	**NOTE:** CRS will ask U2 RO to report power level. If so, **Floor Instructor** report 100% as U2 RO.
		• Unit 2 2AS-12 (U2 SM to AS Hdr Control Inlet Isol) - OPEN	**NOTE:** CRS will ask U2 RO to report valve position. If so, **Floor Instructor** report 2AS-12 is OPEN.
		• Unit 2 - AVAILABLE TO SUPPLY AS HEADER.	**NOTE:** CRS will ask U2 RO to report U2 AS Availability. If so, **Floor Instructor** report U2 AS is available.
	CRS	(Step 8.c) Isolate Unit 1 SM to AS header as follows:	

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Event Description: **Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 8.c.1) IF AT ANY TIME AS header pressure cannot be maintained greater than 140 PSIG while performing the following step, THEN GO TO Step 8.e.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	RO / BOP	(Step 8.c.2) Slowly CLOSE 1AS-12 (U1 SM To AS Hdr Control Inlet Isol) while monitoring AS header pressure.	
	CRS	(Step 8.d) GO TO Step 9.	
	RO / BOP	(Step 9) CLOSE the following valves:	
		• CLOSE 1CF-35AB (1A S/G CF Cont Outside Isol).	
		• CLOSE 1CF-30AB (1B S/G CF Cont Outside Isol).	
		• CLOSE 1CF-28AB (1C S/G CF Cont Outside Isol).	
		• CLOSE 1CF-26AB (1D S/G CF Cont Outside Isol).	
	RO / BOP	(Step 10) Check 1HM-95 (U1 Aux Steam Supply to CF Pumps Turbine Isol) - CLOSED.	
	RO / BOP	(Step 11) Check the following on CF pump to be placed in service:	
		• CF pump low pressure governor control - IN AUTO	
		• CF pump high pressure governor control - IN AUTO	
	CRS	(Step 12) Perform the following on the CR pump to be placed in service:	

Op Test No.:	N16-1	Scenario #	2	Event #	7, 8 & 9	Page	68 of 74

Event Description: **Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
	RO / BOP	(Step 12.a) Maintain CF pump governors in auto while performing the following steps.	
	RO / BOP	(Step 12.b) Lower setpoint (SP) to 0 RPM using control located on low pressure governor controller.	
	RO / BOP	(Step 12.c) Do not continue until low pressure governor control output is 0%.	
	RO / BOP	(Step 12.d) OPEN 1HM-95 (U1 Aux Steam Supply to CF Pumps Turbine Isol).	
	RO / BOP	(Step 12.e) Raise speed setpoint (SP) using control located on low pressure governor controller to establish "CF HEADER PRESSURE" 50-100 PSIG above S/G pressure.	
	CRS	(Step 13) GO TO Step 22.	**Examiner NOTE:** Pick up with Step 22 scripting on page 71.
	RO/ BOP	(Step 14) Depress “RESET” on “1A OR 1B CF PUMP RECIRC VALVE CLOSURE CIRCUIT” and check “RESET” light lit.	**Examiner NOTE:** If a Safety Injection HAS occurred the CRS will transition to this step from the Step 5 RNO.
	RO/ BOP	(Step 15) Reset CF pump turbine that will be placed in service as follows:	
		• Depress “RESET” and hold “RESET” 2-3 seconds after the “RST” light is lit on pump to be started.	
		• Check CF pump turbine to be started RESET.	

Event Description: **Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 16) Align AS header as follows:	
		• CLOSE 1AS-9 (U1 C Htr Bleed To AS Hdr Isol).	
	CRS	• Check Unit 2 as follows:	
		• Unit 2 Reactor power – GREATER THAN 15%	**NOTE:** CRS will ask U2 RO to report power level. If so, **Floor Instructor** report 100% as U2 RO.
		• Unit 2 2AS-12 (U2 SM to AS Hdr Control Inlet Isol) - OPEN	**NOTE:** CRS will ask U2 RO to report valve position. If so, **Floor Instructor** report 2AS-12 is OPEN.
	CRS	• Unit 2 – AVAILABLE TO SUPPLY AS HEADER.	**NOTE:** CRS will ask U2 RO to report U2 AS Availability. If so, **Floor Instructor** report U2 AS is available.
	RO/ BOP	• Isolate Unit 1 SM to AS header as follows:	
		• IF AT ANY TIME AS header pressure cannot be maintained greater than 140 PSIG while performing the following step, THEN GO TO Step 16.e.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	RO/ BOP	• Slowly CLOSE 1AS-12 (U1 SM To AS Hdr Control Inlet Isol) while monitoring AS header pressure.	
	CRS	(Step 16.d) GO TO Step 17.	
	RO/ BOP	(Step 17) Check 1HM-95 (U1 Aux Steam Supply to CF Pumps Turbine Isol) – OPEN.	**NOTE:** 1HM-95 is CLOSED.

Op Test No.:	N16-1	Scenario #	2	Event #	7, 8 & 9	Page	70	of	74

Event Description: **Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
	RO/ BOP	(Step 17 RNO) Open 1HM-95.	
	RO/ BOP	(Step 18) CLOSE the following valves:	
		• CLOSE 1CF-35AB (1A S/G CF Cont Outside Isol).	
		• CLOSE 1CF-30AB (1B S/G CF Cont Outside Isol).	
		• CLOSE 1CF-28AB (1C S/G CF Cont Outside Isol).	
		• CLOSE 1CF-26AB (1D S/G CF Cont Outside Isol).	
	RO/ BOP	(Step 19) Check 1A CF pump – TO BE PLACED IN SERVICE.	**NOTE:** The CRS may elect to use the 1B CF Pump, rather than the 1A CF Pump. If so, similar steps are used to those associated with the starting the 1A CF Pump.
	RO/ BOP	(Step 20) Place 1A CF pump in service as follows:	**NOTE:** The CRS may elect to use the 1B CF Pump.
		• Place the following in auto:	
		• 1A CF pump turbine low pressure governor control.	
		• 1A CF pump turbine high pressure governor control.	
		• OPEN stop valves by depressing “RAISE” on “1A CF PUMP TURBINE HP-LP SV” until “MAX” light is lit on the following:	
		• 1SP-15 (1A CFPT Turb Hi Press Step valve)	**NOTE:** If the 1B CF Pump is used, 1SP-17
		• 1HM-157 (1A CFPT Turb Lo Press Step valve)	**NOTE:** If the 1B CF Pump is used, 1HM-159

Op Test No.:	N16-1	Scenario #	2	Event #	7, 8 & 9	Page	71	of	74

Event Description: **Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
		• Adjust 1A CF pump turbine speed using control located on low pressure governor controller to establish "CF HEADER PRESSURE" 50-100 PSIG above S/G pressure.	**NOTE:** S/G pressures are ≈1100 psig.
	CRS	(Step 20.d) GO TO Step 22.	
	RO/ BOP	(Step 22) Check feed and bleed – ESTABLISHED IN BODY OF THIS PROCEDURE.	**NOTE:** Feed and Bleed has NOT been established.
	RO/ BOP	(Step 22 RNO) Perform the following:	
		• WHEN restoring feed flow in next steps, THEN control feed flow as required to raise S/G levels while preventing an uncontrolled NC system cooldown.	
	CRS	• GO TO Step 25.	
	RO	(Step 26) OPEN the following valve(s) for the S/Gs to be fed:	
		• 1CF-126B (1A S/G CF To CA Nozzle Isol)	
		• 1CF-127B (1B S/G CF To CA Nozzle Isol)	
		• 1CF-128B (1C S/G CF TO CA Nozzle Isol)	
		• 1CF-129B (1D S/G CF To CA Nozzle Isol).	
	RO	(Step 27) Establish feed flow to desired S/G(s) as follows:	
		• THROTTLE OPEN S/G CF control bypass valve for S/G(s) to be fed.	

Op Test No.: N16-1	Scenario # 2	Event # 7, 8 & 9	Page 72 of 74

Event Description: **Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
		• Monitor CF pump discharge pressure and adjust CF pump speed as needed to maintain “CF HEADER PRESSURE” 50-100 PSIG above S/G pressure.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
		• IF AT ANY TIME S/G CF control bypass valves are throttled closed, THEN ensure pump speed is controlled at same time to avoid a CF pump trip on high discharge pressure (1435 PSIG).	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	CRS	(Step 28) Check Step 24 or 25 in this enclosure – IMPLEMENTED.	**NOTE:** Step 24 or 25 have NOT been implemented.
	RO	(Step 28 RNO) Perform the following:	
		• WHEN S/G N/R level is greater than 11% (32% ACC), THEN control CF flow to maintain N/R level between 11% (32% ACC) and 50%.	

Critical Task:

Manually close the Main Turbine Governor Valves or establish feedwater flow into at least one Steam Generator before Wide Range Level in 3 Steam Generators reaches 24% (36%).

Safety Significance: Failure to trip the Main Turbine when conditions exist that allow the operator to do so, or failure to establish feedwater flow into at least one Steam Generator results in the crew having to rely upon the lower-priority action of having to initiate RCS Bleed and Feed to minimize the possibility of core uncovery. Failure to perform this task, when able to do so, constitutes incorrect performance that leads to degradation of the RCS and/or fuel cladding fission product barriers.

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 28 RNO b) RETURN TO step in effect in body of this procedure.	**NOTE:** The CRS will transition to Step 14 of FR-H.1.

Op Test No.: N16-1	Scenario # 2	Event # 7, 8 & 9	Page 73 of 74				

Event Description: **Premature FWIS/Failure of Main Turbine to Trip/Failure of Main Steam Line Isolation/Overspeed Trip of TDCA Pump/1A MDCA Pump trips upon Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
At the discretion of the Lead Examiner terminate the exam.			

UNIT 1 STATUS:

Power Level: 90% NCS [B] 960 ppm Pzr [B]: 960 ppm Xe: Per OAC

Power History: At this power level for 24 hours Core Burnup: 251 EFPDs

CONTROLLING PROCEDURE: OP/1/A/6100/003 Controlling Procedure for Unit Operation

OTHER INFORMATION NEEDED TO ASSUME THE SHIFT:

- The area has experienced steady light rain for the past 8 hours, with light wind from the South at 2-5 mph, and this is expected to continue throughout the shift.
- A Containment Air Release is in progress per OP/1/A/6450/17, "Containment Air Release and Addition System."

The following equipment is Out-Of-Service:

- The VUCDT Level indication is OOS. ACTION has been taken in accordance with Technical Specification LCO 3.4.15 ACTION C.
- The 1B MDCA Pump is OOS for bearing replacement. ACTION has been taken in accordance with Technical Specification LCO 3.7.5 ACTION B.
- MCB Annunciator 1AD-8, A-4, "CF PUMP DISCHARGE HI PRESS," has alarmed spuriously several times over the last hour, and has currently failed ON (IAE is investigating).

Crew Directions:

- Maintain Plant conditions.

Work Control SRO/Offsite Communicator	**Jim**
Plant SRO	**Joe (FB)**

AO's AVAILABLE

<u>Unit 1</u>	**<u>Unit 2</u>**
Aux Bldg. John	**Aux Bldg. Chris**
Turb Bldg. Bob (FB)	**Turb Bldg. Mike (FB)**
5th Rounds. Carol	

Extra(s) Bill (FB) Ed (FB) Wayne (FB) Tanya Gus (RW)

Facility: **McGuire**	Scenario No.: **3**	Op Test No.: **N16-1**	
Examiners: ____________		Operators: ____________	(SRO)
____________		____________	(RO)
____________		____________	(BOP)

Initial Conditions:	The plant is at 75% power (MOL). The area has experienced steady light rain for the past 8 hours, with light wind from the South at 2-5 mph, and this is expected to continue throughout the shift. A Containment Air Release is in progress per OP/1/A/6450/17, "Containment Air Release and Addition System."
Turnover:	The following equipment is Out-Of-Service: The VUCDT Level indication is OOS. ACTION has been taken in accordance with Technical Specification LCO 3.4.15 ACTION C. The TDCA Pump is OOS for bearing replacement. ACTION has been taken in accordance with Technical Specification LCO 3.7.5 ACTION A. MCB Annunciator 1AD-12, A-4, "B RN PMP DISCHARGE LO PRESS," has alarmed spuriously several times over the last hour, and has currently failed OFF (IAE is investigating).

Event No.	Malf. No.	Event Type*	Event Description
1	NA	R-RO N-BOP N-SRO	Power Increase
2	1	I(TS)-SRO	Pzr Level Channel 3 fails LOW
3	2	C-RO C-SRO	Steam Dump Valve fails OPEN
4	3	C-RO C-BOP C(TS)-SRO	Zone 1B Lockout causing Runback/Rods fail to move in AUTO/Stuck Rod
5	4	C-BOP C-SRO	1KC-425 fails CLOSED
6	5	M-RO M-BOP M-SRO	Steam Equalization Header Line Rupture
7	6	NA	MSI fails in Auto/Manual/All MSIVs fail OPEN
8	7	C-BOP C-SRO	1A/1B MD CA Pumps fail to start in AUTO

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

McGuire 2016 NRC Scenario #3

The plant is at 75% power (MOL). The area has experienced steady light rain for the past 8 hours, with light wind from the South at 2-5 mph, and this is expected to continue throughout the shift. A Containment Air Release is in progress per OP/1/A/6450/17, "Containment Air Release and Addition System."

The following equipment is Out-Of-Service: The VUCDT Level indication is OOS. ACTION has been taken in accordance with Technical Specification LCO 3.4.15 ACTION C. The TDCA Pump is OOS for bearing replacement. ACTION has been taken in accordance with Technical Specification LCO 3.7.5 ACTION A. MCB Annunciator 1AD-12, A-4, "B RN PMP DISCHARGE LO PRESS," has alarmed spuriously several times over the last hour, and has currently failed OFF (IAE is investigating).

Shortly after taking the watch, the operator will commence a load increase to 100% starting with Step 3.37.10 of Enclosure 4.1, Power Increase, of OP/1/A/6100/003, "Controlling Procedure for Unit Operation." The operator will dilute the NC System Boron concentration in accordance with Enclosure 4.3, "Dilute," of OP/1/A/6150/009, "Boron Concentration Control," and raise Turbine load in accordance with OP/1/A/6300/001 A, "Turbine-Generator Load Change."

During the power increase, Pzr Level channel 3 will fail LOW. The DCS will automatically select a non-failed instrument to replace the failed instrument as the controlling channel, and no NCS inventory control upset will result. The operator will address Technical Specification LCO 3.3.1, "Reactor Trip System (RTS) Instrumentation."

After this, the Steam Dump Valve SB-27 will slowly fail to FULL OPEN due to a valve positioner failure. The crew will enter AP/1/A/5500/01, "Steam Leak," stabilize turbine load, attempt to close, and ultimately isolate the valve.

Next, a Zone 1B Lockout causes PCB 11 and 12 to open, as well as the 1B Main Generator Breaker to open and the turbine to automatically runback to 56%. The operator will implement AP/1/A/5500/03, "Load Rejection." During the runback the operator will notice that the rods do not move in auto, and the operator will need to drive rods in manually. When the Control Rods are driven inward, one Control Bank D rod will stick in its original position. After stabilizing the plant, the operator will address AP/1/A/5500/14, "Rod Control Malfunction," to address the Stuck Rod. The operator will address Technical Specification LCO 3.1.4, "Rod Group Alignment Limits," and Technical Specification LCO 3.2.4, "Quadrant Power Tilt Ratio."

Subsequently, 1KC-425, "NC Pumps Ret Hdr Cont Outside Isol)," will fail CLOSED. The operator will respond per OP/1/A/6100/010 G, "Annunciator Response for 1AD-6," B1, A NC PUMP UPPER MTR BRG LO KC FLO, and manually open the valve. The operator may enter AP/1/A/5500/08, "Malfunction of NC Pump."

Following this a steam break will occur on the Main Steam Equalization Header in the Turbine Building. Simultaneously all four MSIVs will fail OPEN resulting in four faulted Steam Generators (Both Auto and Manual actuations of MSI have failed). Additionally, the 1A/1B MD CA Pump will fail to start automatically. The operator will be expected to manually start the 1A and 1B MD CA Pumps.

The crew will enter EP/1/A/5000/E-0, "Reactor Trip or Safety Injection" and transition to EP/1/A/5000/E-2, "Faulted Steam Generator Isolation." On the other hand, due to the NCS cooldown, an Orange Path could exist on the NCS Integrity Critical Safety Function. If so, the crew will transition to EP/1/A/5000/FR-P.1, “Response to Imminent Pressurized Thermal Shock Condition.”

If the crew made the transition to E-2, the crew will transition to EP/1/A/5000/ECA-2.1 at Step 4 of E-2 when it is determined that all four Steam Generator pressures are lowering. On the other hand, if the crew transitions to FR-P.1, the crew will take the actions required by ECA-2.1, in FR-P.1 (i.e. reduce feed flow to each Steam Generator to 25 gpm each, depressurize NCS and terminate SI).

It is expected that the crew will eventually transition to EP/1/A/5000/FR-P.1, “Response to Imminent Pressurized Thermal Shock Condition.”

The scenario will terminate at Step 11.c of FR-P.1 after the operator has closed 1NI-9A and 10B.

Critical Tasks:

Establish ≥ 450 gpm of CA Flow to the Steam Generators during the performance of E-0 such that transition to EP/1/A/5000/FR-H.1 is not required.

Safety Significance: Failure to establish a Secondary Heat Sink through the initiation of CA flow unnecessarily challenges both the HEAT SINK and the CORE COOLING Critical Safety Functions. Additionally, the FSAR Safety Analysis results are predicated on the assumption that at least one train of safeguards actuates and delivers a minimum amount of AFW flow to the Steam Generators. Failure to perform this task, when the ability to do so exists, results in a violation of the Facility License Condition and places the plant in an unanalyzed condition.

Control the CA Flowrate to approximately 25 gpm per SG in order to minimize the NC Cooldown rate in ECA-2.1 or FR-P.1.

Safety Significance: Failure to control the CA flow rate to the SGs, when able to do so, leads to an unnecessary and avoidable severe or extreme challenge to the Integrity CSF. Also, failure to perform the Critical Task increases challenges to the Subcriticality Critical Safety Function which otherwise would not occur. If the action can be taken, and is not taken, this demonstrates “mis-operation” or incorrect operation that could unnecessarily challenge a fission product barrier (NCS).

PROGRAM: McGuire Operations Training

MODULE: Initial License Operator Training Class ILC 16-1

TOPIC: NRC Simulator Exam

Scenario N16-1-3

REFERENCES:

1. OP/1/A/6100/010 N, “Annunciator Response for Panel 1AD-13” (Rev 78)
2. Technical Specification LCO 3.4.15, “RCS Leakage Detection Instrumentation” (Amendment 235/217)
3. Technical Specification LCO 3.7.5, “Auxiliary Feedwater (AFW) System” (Amendment 221/203)
4. OP/1/A/6100/003, “Controlling Procedure for Unit Operation” (Rev 197)
5. OP/1/A/6150/009, “Boron Concentration Control” (Rev 132)
6. OP/1/A/6300/001A, “Turbine Generator Load Change” (Rev 12)
7. Technical Specification LCO 3.3.1, “Reactor Trip System (RTS) Instrumentation” (Amendment 184/166)
8. Crew Expectations Manual (Rev 8/8/12)
9. AP/1/A/5500/01, “Steam Leak” (Rev 18)
10. Technical Specification LCO 3.4.1, “RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits” (Amendment 219/201)
11. AP/1/A/5500/03, “Load Rejection” (Rev 30)
12. AP/1/A/5500/14, “Rod Control Malfunction” (Rev 16)
13. Technical Specification LCO 3.1.4, “Rod Group Alignment Limits” (Amendment 184/166)
14. Technical Specification LCO 3.2.4, “Quadrant Power Tilt Ratio” (Amendment 184/166)
15. OP/1/A/6100/010 G, “Annunciator Response for Panel 1AD-6” (Rev 68)
16. AP/1/A/5500/08, “Malfunction of NC Pump” (Rev 14)
17. EP/1/A/5000/E-0, “Reactor Trip or Safety Injection” (Rev 34)
18. EP/1/A/5000/E-2, “Faulted Steam Generator Isolation” (Rev 10)
19. EP/1/A/5000/ECA-2.1, “Uncontrolled Depressurization of All Steam Generators” (Rev 20)
20. EP/1/A/5000/F-0, “Critical Safety Function Status Trees” (Rev 6)
21. EP/1/A/5000/FR-P.1, “Response To Imminent Pressurized Thermal Shock Condition” (Rev 14)
22. EP/1/A/5000/ES-1.1, “Safety Injection Termination” (Rev 27)

Validation Time: 100 minutes

Author: David Lazarony, Essential Training & Consulting, LLC

Facility Review: ________________________

Rev. 031416

Facility:	**McGuire**	Scenario No.:	**3**	Op Test No.:	**N16-1**
Examiners:	____________	Operators:		____________	(SRO)
	____________			____________	(RO)
	____________			____________	(BOP)

Initial Conditions:	The plant is at 75% power (MOL). The area has experienced steady light rain for the past 8 hours, with light wind from the South at 2-5 mph, and this is expected to continue throughout the shift. A Containment Air Release is in progress per OP/1/A/6450/17, "Containment Air Release and Addition System."
Turnover:	The following equipment is Out-Of-Service: The VUCDT Level indication is OOS. ACTION has been taken in accordance with Technical Specification LCO 3.4.15 ACTION C. The TDCA Pump is OOS for bearing replacement. ACTION has been taken in accordance with Technical Specification LCO 3.7.5 ACTION A. MCB Annunciator 1AD-12, A-4, "B RN PMP DISCHARGE LO PRESS," has alarmed spuriously several times over the last hour, and has currently failed OFF (IAE is investigating).

Event No.	Malf. No.	Event Type*	Event Description
1	NA	R-RO N-BOP N-SRO	Power Increase
2	1	I(TS)-SRO	Pzr Level Channel 3 fails LOW
3	2	C-RO C-SRO	Steam Dump Valve fails OPEN
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* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

McGuire 2016 NRC Scenario #3

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Shortly after taking the watch, the operator will commence a load increase to 100% starting with Step 3.37.10 of Enclosure 4.1, Power Increase, of OP/1/A/6100/003, “Controlling Procedure for Unit Operation.” The operator will dilute the NC System Boron concentration in accordance with Enclosure 4.3, “Dilute,” of OP/1/A/6150/009, “Boron Concentration Control,” and raise Turbine load in accordance with OP/1/A/6300/001 A, “Turbine-Generator Load Change.”

During the power increase, Pzr Level channel 3 will fail LOW. The DCS will automatically select a non-failed instrument to replace the failed instrument as the controlling channel, and no NCS inventory control upset will result. The operator will address Technical Specification LCO 3.3.1, “Reactor Trip System (RTS) Instrumentation.”

After this, the Steam Dump Valve SB-27 will slowly fail to FULL OPEN due to a valve positioner failure. The crew will enter AP/1/A/5500/01, “Steam Leak,” stabilize turbine load, attempt to close, and ultimately isolate the valve.

Next, a Zone 1B Lockout causes PCB 11 and 12 to open, as well as the 1B Main Generator Breaker to open and the turbine to automatically runback to 56%. The operator will implement AP/1/A/5500/03, “Load Rejection.” During the runback the operator will notice that the rods do not move in auto, and the operator will need to drive rods in manually. When the Control Rods are driven inward, one Control Bank D rod will stick in its original position. After stabilizing the plant, the operator will address AP/1/A/5500/14, “Rod Control Malfunction,” to address the Stuck Rod. The operator will address Technical Specification LCO 3.1.4, “Rod Group Alignment Limits,” and Technical Specification LCO 3.2.4, “Quadrant Power Tilt Ratio.”

Subsequently, 1KC-425, “NC Pumps Ret Hdr Cont Outside Isol),” will fail CLOSED. The operator will respond per OP/1/A/6100/010 G, “Annunciator Response for 1AD-6,” B1, A NC PUMP UPPER MTR BRG LO KC FLO, and manually open the valve. The operator may enter AP/1/A/5500/08, “Malfunction of NC Pump.”

Following this a steam break will occur on the Main Steam Equalization Header in the Turbine Building. Simultaneously all four MSIVs will fail OPEN resulting in four faulted Steam Generators (Both Auto and Manual actuations of MSI have failed). Additionally, the 1A/1B MD CA Pump will fail to start automatically. The operator will be expected to manually start the 1A and 1B MD CA Pumps.

The crew will enter EP/1/A/5000/E-0, “Reactor Trip or Safety Injection” and transition to EP/1/A/5000/E-2, “Faulted Steam Generator Isolation.” On the other hand, due to the NCS cooldown, an Orange Path could exist on the NCS Integrity Critical Safety Function. If so, the crew will transition to EP/1/A/5000/FR-P.1, “Response to Imminent Pressurized Thermal Shock Condition.”

If the crew made the transition to E-2, the crew will transition to EP/1/A/5000/ECA-2.1 at Step 4 of E-2 when it is determined that all four Steam Generator pressures are lowering. On the other hand, if the crew transitions to FR-P.1, the crew will take the actions required by ECA-2.1, in FR-P.1 (i.e. reduce feed flow to each Steam Generator to 25 gpm each, depressurize NCS and terminate SI).

It is expected that the crew will eventually transition to EP/1/A/5000/FR-P.1, “Response to Imminent Pressurized Thermal Shock Condition.”

The scenario will terminate at Step 11.c of FR-P.1 after the operator has closed 1NI-9A and 10B.

Critical Tasks:

Establish ≥ 450 gpm of CA Flow to the Steam Generators during the performance of E-0 such that transition to EP/1/A/5000/FR-H.1 is not required.

Safety Significance: Failure to establish a Secondary Heat Sink through the initiation of CA flow unnecessarily challenges both the HEAT SINK and the CORE COOLING Critical Safety Functions. Additionally, the FSAR Safety Analysis results are predicated on the assumption that at least one train of safeguards actuates and delivers a minimum amount of AFW flow to the Steam Generators. Failure to perform this task, when the ability to do so exists, results in a violation of the Facility License Condition and places the plant in an unanalyzed condition.

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SIMULATOR OPERATOR INSTRUCTIONS

	Bench Mark	ACTIVITY	DESCRIPTION
☐	Sim. Setup	**Rod Step On**	
☐		**Reset to Temp IC 237**	**T = 0 Malfunctions:** **Initiate a Containment Release per Enclosure 4.2 of OP/1/A/6450/17.** **insert XMT-WL_1WLLT5591 = 100 (1WLL-5591, VUCDT Tank Level is OOS)** **insert REM-SA0001 = 0 (Steam 1B Supply to TDCA Pump Closed)** **insert REM-SA0002 = 0 (Steam 1C Supply to TDCA Pump Closed)** **insert OVR-1AD12_A04 = OFF (MCB Annunciator 1AD12/A4)** **<u>Per Lesson Plan 2016 NRC Exam Scenario 3</u>** **insert CA004A = AUTO (1A MD CA Pump fails to start in AUTO Only)** **insert CA004B = AUTO (1B MD CA Pump fails to start in AUTO Only)** **DEL IAMAL-010D12 = 2, Cd X01_094_2 = 1 (Delete Stuck Rod on Rx Trip)**
☐		**RUN** **Reset all SLIMs**	**Place Tagout/O-Stick on:** **TDCA Pump (Tagout)** **1WLL-5591 (O-stick)** **MCB Annunciator 1AD-13, C-7 (O-stick)** **MCB Annunciator 1AD-12, A-4 (O-stick)**
☐		**Update** Status Board, **Setup OAC**	**NOTE:** RMWST DO = <1000 ppb.
☐		**Freeze.**	
☐		**Update Fresh Tech. Spec. Log.**	

	Bench Mark	ACTIVITY	DESCRIPTION
☐		**Fill out the AO's Available section of Shift Turnover Info.**	
☐	Prior to Crew Briefing	**RUN**	
☐	**Crew Briefing** 1. Assign Crew Positions based on evaluation requirements 2. Review the Shift Turnover Information with the crew. 3. Provide Enclosure 4.1 of OP/1/A/6100/003 marked up as follows: • Step 2.3 initialed. • Note prior to Step 3.1 checked. • Step 3.1 Checkbox is checked. • Step 3.2 initialed. • Step 3.3 initialed. • Step 3.3.1 Checkbox is checked. • Step 3.3.2 Checkbox is checked, Step 3.37.10 is entered. • Step 3.3.3 Checkbox is checked. • Step 3.3.4 Initialed. • Step 3.37.12 is NA. • Step 3.37.13 is NA. 4. Provide the crew with OP/1/A/6150/009 (Boron Concentration Control) and OP/1/A/6300/1 A (Turbine-Generator Load Change). 5. Direct the crew to Review the Control Boards taking note of present conditions, alarms. 6. Provide the crew with an "In-progress" copy of Enclosure 4.2 of OP/1/A/6450/17.		
☐	T-0	Begin Familiarization Period	
☐	At direction of examiner	**Execute Lesson Plan for Simulator Scenario N16-1-3.**	
☐	At direction of examiner	**Event 1**	Power Increase
☐	At direction of examiner	**Event 2** **insert XMT-NC_1NCLT5170 = 0**	Pzr Level Channel 3 fails LOW

	Bench Mark	ACTIVITY	DESCRIPTION
☐	At direction of examiner	**Event 3** **Insert REM-SB0027 = 1, delay = 0, ramp = 120 seconds** **Cd=X02_183_1 EQ 1 (OFF/RESET Switch to OFF), insert REM-SB0027 = 0**	Steam Dump Valve fails OPEN
☐	At direction of examiner	**Event 4** **insert MAL-EP003C = ACTIVE** **insert MAL-IRE009 = FAIL_OF_AUTO** **Insert MAL IRE010D12 =TRUE**	Zone 1B Lockout causing Runback/Rods fail to move in AUTO/Stuck Rod **NOTE: insertLOA-IPB003 Override when directed.**
☐	At direction of examiner	**Event 5** **Insert REM-KC0425A = 0** **dellA REM-KC0425A = 2, cd=X11_135_1=1**	1KC-425 fails CLOSED
☐	At direction of examiner	**Event 6** **insertMAL-SM009 = 16500000**	Steam Equalization Header Line Rupture

	Bench Mark	ACTIVITY	DESCRIPTION
☐	Post-Rx Trip	**Event 7** **insertMAL-ISE006A = BLOCK_BOTH (MSI Fails in AUTO/MANUAL)** **insertMAL-ISE006B = BLOCK_BOTH (MSI Fails in AUTO/MANUAL)** **insertMAL-SM006A = TRUE 1A MSIV Fails OPEN (Cd = H_X01_094_2 EQ1 [1A Rx Trip Breaker OPEN light ON])** **insertMAL-SM006B = TRUE 1B MSIV Fails OPEN (Cd = H_X01_094_2 EQ1 [1A Rx Trip Breaker OPEN light ON])** **insertMAL-SM006C = TRUE 1C MSIV Fails OPEN (Cd = H_X01_094_2 EQ1 [1A Rx Trip Breaker OPEN light ON])** **insertMAL-SM006D = TRUE 1D MSIV Fails OPEN (Cd = H_X01_094_2 EQ1 [1A Rx Trip Breaker OPEN light ON])**	MSI fails in Auto/Manual/All MSIVs fail OPEN **Note: These Malfunctions are inserted at Steam Line Break.**
☐	Post-Rx Trip	**Event 8** **insert CA004A = AUTO** **insert CA004B = AUTO** **Set in initial conditions.**	1A/1B MD CA Pumps fail to start in AUTO **This malfunction will occur on Reactor Trip.**
☐	**Terminate the scenario upon direction of Lead Examiner**		

Op Test No.:	N16-1	Scenario #	3	Event #	1	Page	9 of 67
Event Description:	**Power Increase**						

Shortly after taking the watch, the operator will commence a load increase to 100% starting with Step 3.37.10 of Enclosure 4.1, Power Increase, of OP/1/A/6100/003, "Controlling Procedure for Unit Operation." The operator will dilute the NC System Boron concentration in accordance with Enclosure 4.3, "Dilute," of OP/1/A/6150/009, "Boron Concentration Control," and raise Turbine load in accordance with OP/1/A/6300/001 A, "Turbine-Generator Load Change."

Booth Operator Instructions: **NA**

Indications Available: **NA**

Time	Pos.	Expected Actions/Behavior	Comments
		OP/1/A/6100/003, CONTROLLING PROCEDURE FOR UNIT OPERATIONS ENCLOSURE 4.1, POWER INCREASE	
	CRS	(Step 3.37.10) Prior to increasing to greater than 75% RTP, check all governor valves open.	**NOTE:** The power increase will be at 2-3 MWe/minute.
	RO/ BOP	(Step 3.37.11) WHEN 77-80% RTP, enable, OTDT DCS alarming as follows:	**NOTE:** Based on the extent of the power increase, this action may or may not be taken.
		• On DCS graphics, select "MAINTENANCE MENU".	
		• Select "TAVG, DELTA T INPUTS & ALARM CHECKING" graphic.	
		• Select "ON" for the following:	
		• NCAA 5422	
		• NCAA 5462	
		• NCAA 5502	
		• NCAA 5542	
		• OTDELTAT-FAIL	
	CRS	(Step 3.37.12) IF startup from refueling outage…..	

Op Test No.:	N16-1	Scenario #	3	Event #	1	Page	10 of 67
Event Description:	**Power Increase**						

Time	Pos.	Expected Actions/Behavior	Comments
		(Step 3.37.13) IF performing Generator/Automatic Voltage Regulator (AVR) testing at 78% RTP…	
			Examiner NOTE: The CRS may elect to initiate the Turbine Load increase **(See Page 14)**, or Dilute first.
		OP/1/A/6150/009, BORON CONCENTRATION CONTROL ENCLOSURE 4.3, DILUTE	
	BOP	(Step 3.1) Evaluate all outstanding R&RS that may impact performance of this procedure.	**NOTE:** The CRS may call WCC to address the R&Rs. If so, **Booth Instructor** acknowledge as WCC, and report none.
	BOP	(Step 3.2) IF the lowest NCP seal leakoff is less than 2 gpm…	**NOTE:** All NCP Seal leakoffs are normal.
	BOP	(Step 3.3) Evaluate energizing additional pressurizer heaters per OP/1/A/6100/003 (Controlling Procedure For Unit Operation) to enhance system mixing when changing NC System boron concentration. (R.M.)	
	BOP	(Step 3.4) Determine current blender contents and evaluate any potential Reactivity effects prior to performing this enclosure:	
		• Rx Makeup Water	
		• Blend	
		• Boron	
	BOP	(Step 3.5) Determine amount of reactor makeup water needed to obtain desired boron concentration using McGuire Data Book, OAC, Reactor Group Guidance, or plant parameters (T-Ave. Steam Pressure, Xenon worth, etc.). (R.M.)	**NOTE:** The BOP will add 200 gallons of MU Water.

Op Test No.:	N16-1	Scenario #	3	Event #	1	Page	11 of 67
Event Description:	**Power Increase**						

Time	Pos.	Expected Actions/Behavior	Comments
		• Total Reactor Makeup Water:	
	BOP	(Step 3.6) Ensure the following reset to zero: (R.M.)	
		• Total Make Up Flow Counter	
		• Boric Acid Flow Counter	
	BOP	(Step 3.7) Set Total Make Up Flow Counter to value determined in Step 3.5.	
	BOP	(Step 3.8) Select "DILUTE" on "NC Sys M/U Controller".	
	BOP	(Step 3.9) IF AT ANY TIME it is desired to adjust reactor makeup water flow, adjust "Rx M/U Water Flow Control" setpoint to achieve desired flowrate.	
	BOP	(Step 3.10) IF AT ANY TIME it is desired to manually adjust reactor makeup water flow, perform the following:	
		• Place "Rx M/U Water Flow Control" in manual.	
		• Adjust "Rx M/U Water Flow Control" output to control reactor makeup water flowrate.	
	BOP	(Step 3.11) IF AT ANY TIME it is desired to lower VCT level, perform the following:	
		• Monitor Letdown Pressure.	
		• Select "HUT" on 1NV-137A (U1 NC Filter Otlt to VCT 3-Way Diversion Cntrl).	
		• IF Letdown Pressure increases greater than 20 psig, notify CRS.	

Op Test No.:	N16-1	Scenario #	3	Event #	1	Page	12 of 67
Event Description:	**Power Increase**						

Time	Pos.	Expected Actions/Behavior	Comments
		• AFTER desired level achieved, select "AUTO" on 1NV-137A (U1 NC Filter Otlt to VCT 3-Way Diversion Cntrl).	
	BOP	(Step 3.12) IF AT ANY TIME plant parameters require termination of dilution, perform the following:	
		• Place "NC System Make Up" to "STOP". (R.M.)	
		• IF 1NV-137A (U1 NC Filter Otlt to VCT 3-Way Diversion Cntrl) placed to HUT, place to "AUTO".	
	BOP	(Step 3.13) Momentarily select "START" on "NC System Make Up". (R.M.)	
	BOP	(Step 3.14) Check "NC System Make Up" red light lit.	
	BOP	(Step 3.15) Check 1NV-171A (U1 Boric Acid Blender to VCT Inlet Control) open.	
	BOP	(Step 3.16) Check 1NV-252A (Rx M/U Water Supply To U1 BA Blender Cntrl) open or throttled as required.	
	BOP	(Step 3.17) Check Rx M/U Water Pump start.	
	BOP	(Step 3.18) Monitor Total Make Up Flow Counter. (R.M.)	
	BOP	(Step 3.19) HOLD until one of the following occurs:	
		• Amount of reactor makeup recorded per Step 3.5 added	
		• Reactor makeup water addition manually terminated	

Op Test No.:	N16-1	Scenario #	3	Event #	1	Page	13 of 67
Event Description:		**Power Increase**					

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 3.20) Ensure dilution terminated as follows: (R.M.)	
		• IF in "AUTO", ensure the following off:	
		• 1A Rx M.U Water Pump	
		• 1B Rx M/U Water Pump	
		• Ensure the following closed:	
		• 1NV-171A (U1 Boric Acid Blender to VCT Inlet Control)	
		• 1NV-252A (Rx M/U Water Supply To U1 BA Blender Cntrl)	
	BOP	(Step 3.21) Ensure "Rx M/U Water Flow Control" in auto. (R.M.)	
	BOP	(Step 3.22) IF "Rx M/U Water Flow Control" adjusted per Step 3.9 OR Step 3.10…	
	BOP	(Step 3.23) Ensure 1NV-137A (U1 NC Filter Otlt to VCT 3-Way Diversion Cntrl) in "AUTO".	
	BOP	(Step 3.24) IF desired to flush blender, go to…	
	BOP	(Step 3.25) Select "AUTO" for "NC Sys M/U Controller".	
	BOP	(Step 3.26) Momentarily select "START" on "NC System Make Up".	
	BOP	(Step 3.27) Check "NC System Make Up" red light lit.	

Op Test No.:	N16-1	Scenario #	3	Event #	1	Page	14 of 67
Event Description:	**Power Increase**						

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 3.28) Ensure the following reset to zero:	
		• Total Make Up Flow Counter	
		• Boric Acid Flow Counter	
	BOP	(Step 3.29) Record in Narrative Log that final blender content is Rx Makeup Water.	
			NOTE: The BOP may repeat this task as needed during the power increase.
OP/1/A/6300/001A, TURBINE-GENERATOR STARTUP/SHUTDOWN ENCLOSURE 4.1, TURBINE-GENERATOR LOAD CHANGE			
	RO	(Step 3.5) Changing Turbine Load	
		(Step 3.5.1) IF Turbine in “OPERATOR AUTO”, perform the following:	
		• (Step 3.5.1.1) Ensure desired change within “Calculated Capability Curve”.	
		• (Step 3.5.1.2) IF turbine load will increase or decrease more than 10 MWs, notify Dispatcher of expected load change.	
		• (Step 3.5.1.3) Depress “LOAD RATE”.	
		• (Step 3.5.1.4) Enter desired load rate in “VARIABLE DISPLAY”.	**NOTE:** the RO will select 2-3 MWe/Min loading rate.
		• (Step 3.5.1.5) Depress “ENTER”.	
		• (Step 3.5.1.6) Depress “REFERENCE”.	
		• (Step 3.5.1.7) Enter desired load in “VARIABLE DISPLAY”.	
		• (Step 3.5.1.8) Depress “ENTER”.	
		• (Step 3.5.1.9) Depress “GO”	
		• (Step 3.5.1.10) Check load changes at selected rate.	

Op Test No.: N16-1	Scenario # 3	Event # 1	Page 15 of 67
Event Description:	**Power Increase**		

Time	Pos.	Expected Actions/Behavior	Comments
OP/1/A/6100/003, CONTROLLING PROCEDURE FOR UNIT OPERATIONS ENCLOSURE 4.1, POWER INCREASE			
	CRS	(Step 3.37.14) Continue power increase to 95% RTP.	**NOTE:** The power increase will be at 2-3 MWe/minute.
At the discretion of the Lead Examiner move to Event #2.			

Op Test No.:	N16-1	Scenario #	3	Event #	2	Page	16 of 67
Event Description:		**Pzr Level Channel 3 fails LOW**					

During the power increase, Pzr Level channel 3 will fail LOW. The DCS will automatically select a non-failed instrument to replace the failed instrument as the controlling channel, and no NCS inventory control upset will result. The operator will address Technical Specification LCO 3.3.1, "Reactor Trip System (RTS) Instrumentation."

Booth Operator Instructions: **insert XMT-NC_1NCLT5170 = 0**

Indications Available:

- MCB Annunciator 1AD-2 E8, DCS TROUBLE
- OAC Alarm M1A0976, U1 PZR LEVEL III
- 1NCP-5172, Pzr Level Channel 3 indicates 0%
- DCS Alarm Screen: PZR LVL INPUT TRBL
- Yellow Path on RCS Inventory

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The RO will likely go to HOLD on the Turbine.
			NOTE: The DCS will auto select a non-failed instrument to control the Pzr level system. The CRS will evaluate the effect of the failure on Technical specifications.
TECHNICAL SPECIFICATION 3.3.1, REACTOR TRIP SYSTEM (RTS) INSTRUMENTATION			
	CRS	LCO 3.3.1 The RTS instrumentation for each Function in Table 3.3.1-1 shall be OPERABLE.	**NOTE:** The CRS will determine that Function 9 (Pzr Water Level High) of Table 3.3.1-1 is affected by this failure.
	CRS	APPLICABILITY: According to Table 3.3.1-1.	
	CRS	ACTIONS	

Op Test No.:	N16-1	Scenario #	3	Event #	2
Page	17	of	67		
Event Description:	**Pzr Level Channel 3 fails LOW**				

Time	Pos.	Expected Actions/Behavior			Comments
		CONDITION	REQUIRED ACTION	COMPLETION TIME	
		A. One or more Functions with one or more required channels inoperable.	A.1 Enter the Condition referenced in Table 3.3.1-1 for the channel(s).	Immediately	**NOTE:** The CRS will determine that ACTION A.1 must be entered.
		M. One channel inoperable.	M.1 Place channel in trip. OR M.2 Reduce THERMAL POWER to < P-7.	72 hours 78 hours	**NOTE:** The CRS will determine that ACTION M.1 must be entered.
					NOTE: The CRS may call WCC/IAE to address. If so, **Booth Instructor** acknowledge as **WCC/IAE.**
					NOTE: The CRS will likely conduct a Focus Brief.
					NOTE: The CRS may re-initiate the power increase.

At the discretion of the Lead Examiner move to Event #3.

Op Test No.:	N16-1	Scenario #	3	Event #	3	Page	18 of 67
Event Description:		**Steam Dump Valve fails OPEN**					

After this, the Steam Dump Valve SB-27 will slowly fail to FULL OPEN due to a valve positioner failure. The crew will enter AP/1/A/5500/01, "Steam Leak," stabilize turbine load, attempt to close, and ultimately isolate the valve.	
Booth Operator Instructions:	**Insert REM-SB0027 = 1, delay = 0, ramp = 120 seconds** **Cd=X02_183_1 EQ 1 (OFF/RESET Switch to OFF), insert REM-SB0027 = 0**
Indications Available: • 1SB-27 Red status light LIT • Tavg-Tref deviation rising • Rods stepping out in AUTO • Rx Power rising	

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The RO will likely go to HOLD on the Turbine, and terminate any dilution in progress.
		CONTROL ROOM CREW EXPECTATIONS MANUAL	
	RO	Transient load changes: Manual is preferred – immediately reduce 20MWe and then reduce as needed to maintain Rx power less than pre-transient condition. After the initial 20 MWe load reduction, it is preferred that the operators use multiple and diverse indications to determine how much more load should be reduced. TPBE on the OAC updates once per minute. Other indications (PR meters and Delta T meters) will indicate reactor response more quickly and will enable the operators to control the plant even more precisely. (This combines the Operator Fundamental of Conservatism and Controlling Plant Evolutions Precisely).	**NOTE:** The crew may diagnose an overpower condition and adjust turbine load per the Crew Expectation Manual.
			NOTE: It is likely that the operator will take actions to isolate the Steam Dump Valve prior to being directed by the CRS. (Step 13)

Op Test No.:	N16-1	Scenario #	3	Event #	3	Page	19 of 67
Event Description:		**Steam Dump Valve fails OPEN**					

Time	Pos.	Expected Actions/Behavior	Comments
		AP/1/A/5500/01, STEAM LEAK	
	CRS	(Step 1) Monitor Foldout page.	
		Manual Reactor Trip Criteria: (IF any of the following occur: (1) Steam leak is jeopardizing personnel safety or plant equipment, (2) T-Avg is less than 551°F AND going down, or (3) UST level is less than 1 ft – NOT Expected).	
	RO	(Step 2) Reduce turbine load to maintain the following:	
		• Excore NI's – LESS THAN OR EQUAL TO 100%.	
		• NC Loop D/T's – LESS THAN 60°F D/T	
		• T-Avg – AT T-REF.	
	CRS	(Step 3) Check containment entry – IN PROGRESS.	**NOTE:** A Containment Entry is NOT in progress.
	CRS	(Step 3 RNO) GO TO Step 5.	
	BOP	(Step 5) Check Pzr pressure prior to event – GREATER THAN P-11 (1955 PSIG).	
	BOP	(Step 6) Check Pzr level – STABLE OR GOING UP.	
	BOP	(Step 7) IF AT ANY TIME while in this procedure Pzr level cannot be maintained stable, THEN RETURN TO Step 6.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	CRS	(Step 8) GO TO Step 12.	

Op Test No.: N16-1	Scenario # 3	Event # 3	Page 20 of 67
Event Description:	**Steam Dump Valve fails OPEN**		

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 12) Announce occurrence on paging system.	**NOTE:** CRS may ask U2 RO to make Plant Announcement. If so, **Floor Instructor** acknowledge as U2 RO.
	RO	(Step 13) Identify and isolate leak on Unit 1 as follows:	
		• (Step 13a) Check SM PORVs – CLOSED.	
	RO	• (Step 13.b) Check condenser dump valves – CLOSED.	**NOTE:** Steam Dump Valve 1SB-27 was likely closed at the onset of the event. If NOT, it will be closed here.
	RO	(Step 13b RNO) IF steam dumps required to be closed, THEN perform the following:	
		• Select "OFF RESET" on the following switches:	**NOTE:** Selecting OFF/RESET will close the valve.
		• "STEAM DUMP INTLK BYPASS CHANNEL A"	
		• "STEAM DUMP INTLK BYPASS CHANNEL B"	
		• IF valve will not close, THEN dispatch operator to CLOSE condenser dump valve isolation valve.	**NOTE:** The CRS may dispatch an operator to close the isolation valve. **Booth Instructor** acknowledge as AO. **After 2 Minutes report that the SB-27 inlet isolation valve has been CLOSED (NO LOA).**
	RO	• WHEN leaking condenser dump valve is isolated OR repaired, THEN return the following switches to "ON":	
		• "STEAM DUMP INTLK BYPASS CHANNEL A"	
		• "STEAM DUMP INTLK BYPASS CHANNEL B".	**Examiner NOTE:** This action is needed to return the Steam Dumps to operation. **Once complete, move forward to Event 4.**

Op Test No.:	N16-1	Scenario #	3	Event #	3	Page	21 of 67
Event Description:	**Steam Dump Valve fails OPEN**						

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	• (Step 13.c) Check containment conditions – NORMAL:	
		• Containment temperature	
		• Containment pressure	
		• Containment humidity	
		• Containment floor and equipment sump level.	
	RO / BOP	• (Step 13.d) Check TD CA pump – OFF.	
	BOP	• (Step 13.e) Check valves on "STEAM LINE DRAIN VALVES" board (1MC-9) – CLOSED.	**NOTE:** One or more of these valves may be cycling. The RNO will direct closing the valves.
	CRS	• (Step 13.f) Check opposite Unit (Unit 2) "STEAM HEADER PRESSURE" – GREATER THAN 200 PSIG.	**NOTE:** CRS may ask U2 RO for AS Header pressure. If so, **Floor Instructor** report as **U2 RO that U2 Steam Header pressure** is **≈1000 psig**.
		• (Step 13.g) Dispatch operator to check for leaks.	**NOTE:** The CRS may dispatch an AO to look for leaks. If so, **Floor Instructor:** acknowledge. **Booth Instructor:** Report back in 3-5 minutes that there are no leaks.
			NOTE: The CRS may NOT dispatch AOs to look for leaks because it is understood that the Steam Dump valve opening was the reason that AP-1 was entered.
	BOP	(Step 14) Check UST level – STABLE OR GOING UP.	
	CRS	(Step 15) Evaluate unit shutdown as follows:	
		• Check unit status – IN MODE 1 OR 2.	

Op Test No.: N16-1	Scenario # 3	Event # 3	Page 22 of 67
Event Description:	**Steam Dump Valve fails OPEN**		

Time	Pos.	Expected Actions/Behavior	Comments
		• Determine if unit shutdown or load reduction is warranted based on the following criteria:	**NOTE:** CRS may call WCC/Management to address the startup. If so, **Booth Instructor** acknowledge as WCC.
		• Size of leak	
		• Location of leak	
		• Rate of depletion of secondary inventory	
		• IF steam is leaking from a secondary heater relief OR MSR relief valve, THEN reducing turbine load….	**NOTE:** No Relief Valve is leaking.
		• IF turbine trip will isolate steam leak (such as feedwater heater leak or MSR leak)…	**NOTE:** A Turbine Trip is NOT needed to isolate the steam leak.
		• Check unit shutdown or load reduction – REQUIRED.	**NOTE:** Shutdown/Load Reduction will NOT be required.
	CRS	(Step 15.c RNO) Perform the following:	
		• Maintain present plant conditions until leak can be isolated or repaired.	
		• Exit this procedure.	**NOTE:** The CRS will likely conduct a Focus Brief.
			NOTE: The CRS may address Tech Specs based on plant response.
TECHNICAL SPECIFICATION 3.4.1, RCS PRESSURE, TEMPERATURE, AND FLOW DEPARTURE FROM NUCLEATE BOILING (DNB) LIMITS			
	CRS	LCO 3.4.1 RCS DNB parameters for pressurizer pressure, RCS average temperature, and RCS total flow rate shall be within the limits specified in Table 3.4.1-1.	**NOTE:** If NC System Pressure drops to < 2216 psig on the failure, then TS 3.4.1 will be entered and exited during the transient.
	CRS	APPLICABILITY: MODE 1.	

Op Test No.:	N16-1	Scenario #	3	Event #	3	Page 23 of 67
Event Description:	Steam Dump Valve fails OPEN					

Time	Pos.	Expected Actions/Behavior			Comments
	CRS	ACTIONS			
		CONDITION	REQUIRED ACTION	COMPLETION TIME	
		A. Pressurizer pressure or RCS average temperature DNB parameters not within limits.	A.1 Restore DNB parameter(s) to within limit.	2 hours	
At the discretion of the Lead Examiner move to Event #4.					

Op Test No.:	N16-1	Scenario #	3	Event #	4	Page	24 of 67
Event Description:	**Zone 1B Lockout causing Runback/Rods fail to move in AUTO/Stuck Rod**						

Next, a Zone 1B Lockout causes PCB 11 and 12 to open, as well as the 1B Main Generator Breaker to open and the turbine to automatically runback to 56%. The operator will implement AP/1/A/5500/03, “Load Rejection.” During the runback the operator will notice that the rods do not move in auto, and the operator will need to drive rods in manually. When the Control Rods are driven inward, one Control Bank D rod will stick in its original position. After stabilizing the plant, the operator will address AP/1/A/5500/14, “Rod Control Malfunction,” to address the Stuck Rod. The operator will address Technical Specification LCO 3.1.4, “Rod Group Alignment Limits,” and Technical Specification LCO 3.2.4, “Quadrant Power Tilt Ratio.”	
Booth Operator Instructions:	**insert MAL-EP003C = ACTIVE delay = 10 seconds** **insert MAL-IRE009 = FAIL_OF_AUTO** **insert MAL IRE010D12 = TRUE**

Indications Available:

- MCB Annunciator 1AD-1, D6, DEH TURBINE RUNBACK, alarms.
- Turbine Generator MWe lowering.
- Tavg-Tref deviation with no Auto Rod motion.
- MCB Annunciator 1AD-11, K3, UNIT 1 LOCKOUT, alarms.
- 1 of 2 Main Generator Breakers is OPEN.
- PCB-11 and 12 OPEN.

Time	Pos.	Expected Actions/Behavior	Comments
		AP/1/A/5500/03, LOAD REJECTION	
	RO	(Step 1) Ensure control rods in auto.	**Immediate Action** **NOTE:** While the RO will see that the Control Rods are in AUTO, it will also be observed that Rods are NOT moving, and that they are required to move. The RO will inform the CRS of the situation, and the CRS will direct that the RO control the rods in MANUAL to maintain Tavg-Tref.

Op Test No.: N16-1	Scenario # 3	Event # 4	Page 25 of 67

Event Description: **Zone 1B Lockout causing Runback/Rods fail to move in AUTO/Stuck Rod**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 2) Check Turbine Generator response as follows:	
		• Check Generator – TIED TO GRID.	
		• Check Generator output – GOING DOWN AS REQUIRED.	
	RO	(Step 3) Check control rod response as follows:	
		• Check control banks – MOVING IN AS REQUIRED.	**NOTE:** The Control Rods will NOT be moving in as required.
	RO	(Step 3a RNO) IF no rods will move in auto; THEN perform the following:	
		• Place Control Rods in manual.	
		• Insert rods to reduce T-avg equal to programmed T-Ref.	
		• If no rods will move, THEN…..	**NOTE:** The Control Rods will move in MANUAL.
	RO	• Check all rods – ALIGNED WITH ASSOCIATED BANK.	
	RO	(Step 3b RNO) IF two or more control rods are misaligned greater that 24 steps…	**NOTE:** Only one Control Rod (D12) is misaligned from Group D.
	BOP	(Step 4) Check CM system response as follows:	
		• Standby Hotwell and Condensate Booster pumps – RUNNING.	
		• 1CM-420 (Unit 1 Generator Load Rejection Bypass control) – OPEN.	

Op Test No.:	N16-1	Scenario #	3	Event #	4	Page	26 of 67
Event Description:	**Zone 1B Lockout causing Runback/Rods fail to move in AUTO/Stuck Rod**						

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 5) IF runback to 55% power in effect, THEN ensure turbine inlet pressure going down to less than or equal to 500 PSIG.	
	CRS	(Step 6) Announce: "UNIT 1 LOAD REJECTION, NON-ESSENTIAL PERSONNEL STAY OUT OF UNIT 1 TURBINE BLDG".	**NOTE:** CRS may ask U2 RO to make Plant Announcement that AP-3 has been entered. If so, **Floor Instructor** acknowledge as U2 RO.
	RO	(Step 7) Check P/R meters – LESS THAN 20%.	
	CRS / RO	(Step 7 RNO) Perform the following:	
		• Designate an operator to continuously monitor reactor power.	
		• IF AT ANY TIME reactor power is less than 20%, THEN perform Step 8 to stabilize reactor power.	**NOTE:** This is a Continuous Action. The CRS will designate the RO to observe this action.
	CRS	• GO TO Step 9.	
	RO	(Step 9) Check condenser dump valves – MODULATING OPEN.	**NOTE:** If the crew did not place Steam Dumps back in service, they will need to perform the RNO, and place Steam Dumps in the Steam Pressure Mode. Otherwise, the crew will go to Step 10.

Op Test No.:	N16-1	Scenario #	3	Event #	4	Page	27 of 67
Event Description:	**Zone 1B Lockout causing Runback/Rods fail to move in AUTO/Stuck Rod**						

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 9 RNO) IF T‑Avg is greater than 4°F above T‑Ref, THEN transfer steam dumps to steam pressure mode as follows:	**NOTE:** Depending on Tavg-Tref mismatch, the operator may or may not place the Steam Dumps in the Steam Pressure Mode.
		• Ensure "STM PRESS CONTROLLER" setpoint at 1090‑1095 PSIG.	
		• Place "STM PRESS CONTROLLER" in manual.	
		• Adjust "STM PRESS CONTROLLER" output to 0%.	
		• Using "STEAM DUMP SELECT" switch, place steam dumps in steam pressure mode.	
		• IF "STEAM HEADER PRESSURE" is greater than 1100 PSIG, THEN manually OPEN steam dumps to control pressure 1090‑1095 PSIG.	
		• Place "STM PRESS CONTROLLER" in auto.	
	BOP	(Step 10) Check “IPB AIR FLOW TROUBLE” alarm (1AD-11, J-5) – DARK.	
	RO	(Step 10 RNO) within 15 minutes of lockout initiation, restore IPB cooling as follows:	
		• IF “MAIN GENERATOR” less than 10,000 amps…	**NOTE:** The Main Generator is NOT < 10,000 amps.
	CRS	• Dispatch operator to check the following areas for signs of fire and notify Control Room of results within 5 minutes:	**NOTE:** The CRS will dispatch an AO.
		• 1A Main Step Up Transformer	
		• 1B Main Step Up Transformer	
		• Unit 1 IPB Fan Enclosure area.	

Op Test No.: N16-1 Scenario # 3 Event # 4	Page 28 of 67
Event Description:	**Zone 1B Lockout causing Runback/Rods fail to move in AUTO/Stuck Rod**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	• Record approximate time lockout occurred.	
	CRS	• Do not continue until operator has been given sufficient time (approximately 5 minutes) to complete fire inspection.	**Booth Instructor**: Within **3 minutes,** as **AO** report that **there does NOT appear to be a fire around the transformers or IPB Fan area.**
	CRS	• IF operator confirms a fire has occurred…	**NOTE:** No fire has occurred.
	CRS	• IF operator confirms no fire has occurred, THEN dispatch operator to perform the following at the Unit 1 “IPB ALARM PANEL”:	**NOTE:** The CRS will dispatch an AO.
		• Depress “LOCKOUT OVERRIDE” on the fan in “MAN”.	**Booth Instructor:** **Insert LOA-IPB003 = OVERRIDE**
		• IF IPB fan in “MAN cannot be started, …	**Booth Instructor**: Within **3 minutes,** as **AO** report that **the Lockout Override has been pressed, and the 1A IPB Fan is running.**
	CRS	• IF neither IPB fan can be started, …….	**NOTE:** The 1A IPB Fan is running.
	BOP	(Step 11) Check Pzr pressure control response as follows:	
		• Ensure Pzr heaters are in auto.	
		• Ensure Pzr spray control valves are in auto.	
		• Check Pzr PORVs – CLOSED.	

Op Test No.:	N16-1	Scenario #	3	Event #	4	Page	29 of 67
Event Description:	**Zone 1B Lockout causing Runback/Rods fail to move in AUTO/Stuck Rod**						

Time	Pos.	Expected Actions/Behavior	Comments
		• Check Pzr spray control valves - CLOSED	
	RO	(Step 12) Check load rejection – DUE TO LOSS OF CF PUMP.	**NOTE:** The load rejection was NOT due to a Loss of CF Pump.
	CRS	(Step 12 RNO) GO TO Step 15	
	RO	(Step 15) Check turbine inlet pressure – LESS THAN 340 PSIG.	**NOTE:** Turbine Inlet pressure is ≈ 470 psig.
	RO	(Step 15 RNO) Perform the following:	
		• IF AT ANY TIME turbine inlet pressure drops to less than 340 PSIG, THEN GO TO Step 16.	
	CRS	• GO TO Step 19.	
	RO	(Step 19) Check Main Generator as follows:	
		• Check Generator Breakers – EITHER GENERATOR BREAKERS CLOSED.	
		• Check Generator – TIED TO GRID.	
		• Check generator power factor – 0.9 TO 1.0 LAGGING.	
	CRS	• GO TO Step 20.	
	CRS	(Step 20) Ensure the following have been implemented:	**NOTE:** The CRS may ask OSM to address. If so, **Floor Instructor** acknowledge as OSM.
		• RP/0/A/5700/000 (Classification of Emergency)	

Op Test No.:	N16-1	Scenario #	3	Event #	4	Page	30 of 67
Event Description:	**Zone 1B Lockout causing Runback/Rods fail to move in AUTO/Stuck Rod**						

Time	Pos.	Expected Actions/Behavior	Comments
		• RP/0/A/5700/010 (NRC Immediate Notification Requirements).	
	RO	(Step 21) WHEN transient is over, THEN perform the following:	**Examiner NOTE:** The CRS may implement AP14. If so move forward to **Page 33**.
		• Check reactor power – GREATER THAN 40%.	
		• Check the following on in service CF pump(s):	
		• Low pressure governor control – IN AUTO	
		• High pressure governor control – IN AUTO.	
		• Check SM flow on all S/Gs – LESS THAN 75%.	**NOTE:** SM flow is ≈ 55%.
		• Check SM flow on all S/Gs – LESS THAN 25%.	
	RO	(Step 21d RNO) Perform the following:	
		• Check the following CF control bypass valves – CLOSED:	
		• 1CF-104AB (1A S/G CF Control Bypass) - CLOSED	
		• 1CF-105AB (1B S/G CF Control Bypass) - CLOSED	
		• 1CF-106AB (1C S/G CF Control Bypass) - CLOSED	
		• 1CF-107AB (1D S/G CF Control Bypass) - CLOSED	
	RO	• IF any CF control bypass valve is open…	**NOTE:** All CF control bypass valves are closed.
	CRS	• GO TO Step 21.f.	

Op Test No.:	N16-1	Scenario #	3	Event #	4	Page	31	of	67

Event Description: **Zone 1B Lockout causing Runback/Rods fail to move in AUTO/Stuck Rod**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	• Slowly CLOSE 1CM-420 (Unit 1 Generator Load Rejection Bypass Control) while monitoring Condensate Booster pump suction pressure.	**NOTE:** The BOP will close 1CM-420.
		• WHEN 1CM-420 is closed, THEN check load rejection signal reset (OAC turn on code “CM”).	
		• Reposition manual loader for 1CM-420 to 100% OPEN.	**NOTE:** The BOP will open 1CM-420.
		• IF thermal power is greater than 15%, THEN within 4 hours of reaching stable conditions, ensure each power range channel is within 2% of heat balance.	
		• Check T-Avg – GREATER THAN 561°F.	
		• Check “CONTROL ROD BANK LO LO LIMIT” alarm (1AD-2, B-9) – DARK.	
		• Check “CONTROL ROD BANK LO LIMIT” alarm (1AD-2, A-9) – DARK.	**NOTE:** 1AD-2, A-9 may be LIT. If so, the operator will perform Step 21.I RNO.
			NOTE: The CRS may direct the U2 BOP to conduct a SDM calculation. If so, Floor Instructor acknowledge.
	RO	(Step 21.I RNO) Ensure the “CONTROL ROD BANK LO LIMIT” alarm clears as Xenon builds in.	
	RO	(Step 22) Check load rejection – DUE TO LOSS OF CF PUMP.	**NOTE:** The load rejection was NOT due to a Loss of CF Pump.
	CRS	(Step 22 RNO) GO TO Step 24.	

Op Test No.:	N16-1	Scenario #	3	Event #	4	Page	32 of 67
Event Description:	**Zone 1B Lockout causing Runback/Rods fail to move in AUTO/Stuck Rod**						

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 24) Shutdown unnecessary running plant equipment as follows:	**NOTE:** The CRS may transition to AP-14 based on the failure of Rods to move in AUTO, and the stuck rod.
	BOP	• Condensate Booster pumps and place in auto.	**NOTE:** The BOP may stop one Condensate Booster Pump.
		• Hotwell pumps and place in auto.	**NOTE:** The BOP may stop one Hotwell Pump.
		• IF desired to secure, THEN dispatch operator to shutdown PER OP/1/B/6250/004 (Feedwater Heater Vents, Drains and Bleed System) Enclosure 4.2 (System Shutdown) the following:	
		• Unit 1 C Heater Drain Tank pumps	
		• Unit 1 G Heater Drain Tank pumps.	
	CRS	(Step 25) IF power change greater than 15% in one hour, THEN notify Primary Chemistry to perform required Tech Spec sampling.	**NOTE:** The CRS may call Chemistry to address the power decrease. If so, **Booth Instructor** acknowledge as Chemistry.
	RO	(Step 26) WHEN condenser dump valves closed AND no longer required for temperature control, THEN reset C-7A using “STEAM DUMP SELECT” switch.	
			NOTE: The CRS may transition to AP-14 based on the failure of Rods to move in AUTO, and the stuck rod, or assign the RO to perform AP14 simultaneously with AP3.

Op Test No.: N16-1 Scenario # 3 Event # 4 Page 33 of 67

Event Description: **Zone 1B Lockout causing Runback/Rods fail to move in AUTO/Stuck Rod**

Time	Pos.	Expected Actions/Behavior	Comments
		AP/1/A/5500/14, ROD CONTROL MALFUNCTION	
	RO	(Step 1) IF two or more rods are either dropped OR misaligned by great than 24 steps,…	**Immediate Action** **NOTE:** Only one Rod is misaligned during this event.
	RO	(Step 2) Place control rods in manual.	**Immediate Action** **NOTE:** The RO will place the rods in Manual.
	RO	(Step 3) Check rod movement – STOPPED.	**Immediate Action**
	RO	(Step 4) Check all rods – ALIGNED WITH ASSOCIATED BANK.	
	RO	(Step 4 RNO) Perform the following.	
		• IF misaligned rod(s) due to DRPI indication failure only,…	**NOTE:** Only one rod is misaligned.
		• IF T-Avg has gone down,…..	**NOTE:** The RO may adjust load on the Turbine to maintain Tavg-Tref = 1ºF.
		• GO TO Enclosure 1 (Response To Dropped or Misaligned Rod)	
			NOTE: The CRS will transition to Enclosure 1.
		AP/1/A/5500/14, ROD CONTROL MALFUNCTION **ENCLOSURE 1, RESPONSE TO DROPPED OR MISALIGNED ROD**	
	CRS	(Step 1) Announce occurrence on paging system.	**NOTE:** The CRS may ask U2 RO to make Plant Announcement that AP-14 has been entered. If so, **Floor Instructor** acknowledge as U2 RO.

Op Test No.:	N16-1	Scenario #	3	Event #	4	Page	34 of 67
Event Description:	**Zone 1B Lockout causing Runback/Rods fail to move in AUTO/Stuck Rod**						

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 2) Dispatch rod control system qualified IAE to perform the following:	**NOTE:** The CRS may call WCC/IAE to address. If so, **Booth Instructor** acknowledge as **WCC/IAE**. After **2-3 Minutes** call as **IAE** and report that **Control Rod D-12 has a Blown Lift Coil Fuse**.
		• Correct cause of misaligned rod.	
		• Notify Control Room operators when auto or manual rod motion is available for reactivity control.	
	RO	(Step 3) Do not move rods until IAE determines rod movement is available.	
	CRS	(Step 4) IF AT ANY TIME a runback occurs while in this procedure, THEN …..	**NOTE:** A runback has already occurred, and the Control Rods have been moved in MANUAL.
	RO	(Step 5) Check "ROD CONTROL URGENT FAILURE" alarm (1AD-2, A-10) – DARK.	
	RO	(Step 6) Use OAC point M1P1385 (Reactor Thermal Power, Best Estimate) to determine reactor power in subsequent steps.	
	RO	(Step 7) Check AFD (Tech Spec 3.2.3) – WITHIN TECH SPEC LIMITS.	
	CRS	(Step 8) REFER TO the following Tech Specs while continuing in the enclosure:	
		• Tech Spec 3.1.4 (Rod Group Alignment Limits).	**NOTE:** The CRS may check the TS now and conclude that LCO 3.1.4 must be entered.

Op Test No.:	N16-1	Scenario #	3	Event #	4	Page	35 of 67

Event Description: **Zone 1B Lockout causing Runback/Rods fail to move in AUTO/Stuck Rod**

Time	Pos.	Expected Actions/Behavior			Comments
		• Tech Spec 3.1.5 (Shutdown Bank Insertion Limits).			
		• Tech Spec 3.1.6 (Control Bank Insertion Limits).			
		• Tech Spec 3.2.4 (QPTR)			**NOTE:** The CRS may check the TS now and conclude that LCO 3.2.4 must be entered.
		• Ensure shutdown margin calculation is performed within 1 hour.			
					Examiner NOTE: It is intended that the CRS evaluate the TS at this point. If the CRS requests the WCC evaluate the TS, and continues with Enclosure 1 of AP14, move to the next event, and evaluate the TS after the exam has been completed.
TECHNICAL SPECIFICATION 3.1.4, ROD GROUP ALIGNMENT LIMITS					
	CRS	LCO 3.1.4 All shutdown and control rods shall be OPERABLE, with all individual indicated rod positions within 12 steps of their group step counter demand position.			
	CRS	APPLICABILITY: MODES 1 and 2.			
		ACTIONS			
		CONDITION	REQUIRED ACTION	COMPLETION TIME	

Op Test No.:	N16-1	Scenario #	3	Event #	4	Page	36 of 67

Event Description: **Zone 1B Lockout causing Runback/Rods fail to move in AUTO/Stuck Rod**

Time	Pos.	Expected Actions/Behavior			Comments
		B. One rod not within alignment limits.	B.1 Restore rod to within alignment limits. <u>OR</u> B.2.1.1 Verify SDM is within the limit specified in the COLR. <u>OR</u> B.2.1.2 Initiate boration to restore SDM to within limit. AND B.2.2 Reduce THERMAL POWER to ≤ 75% RTP. AND B.2.3 Verify SDM is within the limit specified in the COLR. AND B.2.4 Perform SR 3.2.1.1. AND B.2.5 Perform SR 3.2.2.1. AND B.2.6 Re-evaluate safety analyses and confirm results remain valid for duration of operation under these conditions.	1 hour 1 hour 1 hour 2 hours Once per 12 hours 72 hours 72 hours 5 days	**NOTE:** The CRS will determine that ACTION B.1, B.2.1.1, or B.2.1.2, B.2.2, B.2.3, B.2.4, B.2.5 and B.2.6 must be entered.
TECHNICAL SPECIFICATION 3.2.4, QUADRANT POWER TILT RATIO					
	CRS	LCO 3.2.4 The QPTR shall be ≤1.02.			

Op Test No.:	N16-1	Scenario #	3	Event #	4
Page	37	of	67		
Event Description:	**Zone 1B Lockout causing Runback/Rods fail to move in AUTO/Stuck Rod**				

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	APPLICABILITY: MODES 1 with THERMAL POWER >50% RTP.	
		ACTIONS	
		<table><tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr><tr><td>A. QPTR not within limit.</td><td>A.1 Reduce THERMAL POWER ≥3% from RTP for each 1% of QPTR >1.02. <u>AND</u> A.2 Perform SR 3.2.4.1 and reduce THERMAL POWER ≥3% from RTP for each 1% of QPTR >1.02. <u>AND</u> A.3 Perform SR 3.2.1.1 and SR 3.2.2.1. <u>AND</u> A.4 Reduce Power Range Neutron Flux – High Trip Setpoint ≥3% for each 1% of QPTR > 1.02. <u>AND</u> A.5 Reevaluate safety analyses and confirm results</td><td>2 hours Once per 12 hours 24 hours <u>AND</u> Once per 7 days thereafter 72 hours Prior to increasing THERMAL POWER above</td></tr></table>	**NOTE:** The CRS will determine that ACTIONs A.1 through A.7 must be entered as long as reactor power remains > 50%.

Op Test No.: N16-1	Scenario # 3	Event # 4	Page 38 of 67
Event Description:	**Zone 1B Lockout causing Runback/Rods fail to move in AUTO/Stuck Rod**		

Time	Pos.	Expected Actions/Behavior			Comments
			remain valid for duration of operation under this condition. AND A.6 Calibrate excore detectors to show zero QPT. AND A.7 Perform SR 3.2.1.1 and SR 3.2.2.1.	the more restrictive limit of Required Action A.1 or A.2 Prior to increasing THERMAL POWER above the more restrictive limit of Required Action A.1 or A.2 Within 24 hours after reaching RTP OR Within 48 hours after increasing THERMAL POWER above the more restrictive limit of Required Action A.1 or A.2	
TECHNICAL SPECIFICATION 3.1.6, CONTROL BANK INSERTION LIMITS					
	CRS	LCO 3.1.6 Control banks shall be within the insertion, sequence, and overlap limits specified in the COLR.			**NOTE:** Based on rod insertion the RIL may NOT be met (Figure 3, Control Bank Insertion Limits vs. Percent Rated Thermal Power). **If RIL is exceeded based on Step counter position and Reactor Thermal Power, the ACTION identified below is required.**
	CRS	APPLICABILITY: MODES 1 and 2 with Keff > 1.			

Op Test No.:	N16-1	Scenario #	3	Event #	4	Page	39 of 67

Event Description: **Zone 1B Lockout causing Runback/Rods fail to move in AUTO/Stuck Rod**

<table>
<tr><th>Time</th><th>Pos.</th><th colspan="3">Expected Actions/Behavior</th><th>Comments</th></tr>
<tr><td></td><td></td><td colspan="3">ACTIONS</td><td></td></tr>
<tr><td></td><td></td><td colspan="3"></td><td></td></tr>
<tr><td rowspan="2"></td><td rowspan="2"></td><td>CONDITION</td><td>REQUIRED ACTION</td><td>COMPLETION TIME</td><td rowspan="2">NOTE: The CRS will determine that ACTION A.1.1 or A.1.2, and A.2 must be entered (If RIL has been exceeded).</td></tr>
<tr><td>A. Control bank insertion limits not met.</td><td>A.1.1 Verify SDM is within the limit specified in the COLR.

<u>OR</u>

A.1.2 Initiate boration to restore SDM to within limit.

AND
A.2 Restore control bank(s) to within limits.</td><td>1 hour

1 hour

2 hours</td></tr>
<tr><td></td><td></td><td colspan="3"></td><td>NOTE: The CRS will likely conduct a Focus Brief.</td></tr>
<tr><td colspan="6">At the discretion of the Lead Examiner move to Event #5.</td></tr>
</table>

Op Test No.:	N16-1	Scenario #	3	Event #	5	Page	40 of 67
Event Description:		1KC-425 fails CLOSED					

Subsequently, 1KC-425, "NC Pumps Ret Hdr Cont Outside Isol)," will fail CLOSED. The operator will respond per OP/1/A/6100/010 G, "Annunciator Response for 1AD-6," B1, A NC PUMP UPPER MTR BRG LO KC FLO, and manually open the valve. The operator may enter AP/1/A/5500/08, "Malfunction of NC Pump."

Booth Operator Instructions: **Insert REM-KC0425A = 0**

delIA REM-KC0425A = 2, cd=X11_135_1=1

Indications Available:

- 1KC-425 Green status light LIT, Red status light OFF
- MCB Annunciator 1AD-6, B1-4, A-D NC PUMP UPPER MTR BRG LO KC FLO, alarms
- MCB Annunciator 1AD-6, D1-4, A-D NC PUMP LOWER MTR BRG LO KC FLO, alarms
- OAC Alarm M1Q1320, 1KC425A NC PMPS RET HDR CONT OUTSIDE ISOL CLOSED

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The BOP may recognize that 1KC-425A is in Mid-Position, and attempt to OPEN the valve. If so, the valve will OPEN.
		1AD-6, B1, A NC PUMP UPPER MTR BRG LO KC FLO	
	CRS	(IA Step 1) IF loss of KC, go to AP/1/A/5500/021 (Loss of KC or KC System Leak).	**NOTE:** The KC System is operating as expected.
	BOP	(IA Step 2) Check open:	
		1KC-338B (NC Pump Sup Hdr Cont Outside Isol)	
		1KC-424B (NC Pumps Ret Hdr Cont Inside Isol)	
		1KC-425A (NC Pumps Ret Hdr Cont Outside Isol)	**NOTE:** 1KC-425A has inadvertently closed.
	BOP	(IA Step 3) IF KC flow inadequate:	
		Ensure adequate number of KC Pumps running.	
		Adjust KC flow/pressure.	

Op Test No.: N16-1	Scenario # 3	Event # 5	Page 41 of 67
Event Description:	**1KC-425 fails CLOSED**		

Time	Pos.	Expected Actions/Behavior	Comments
		IF low flow still exists, go to AP/1/A/5500/008 (Malfunction of NC Pump).	**NOTE:** The crew may elect to go to AP8 to re-open the valve.
1AD-6, D1, A NC PUMP LOWER MTR BRG LO KC FLO			
	CRS	(IA Step 1) IF loss of KC, go to AP/1/A/5500/021 (Loss of KC or KC System Leak).	**NOTE:** The KC System is operating as expected.
	BOP	(IA Step 2) Check open:	
		1KC-338B (NC Pump Sup Hdr Cont Outside Isol)	
		1KC-424B (NC Pumps Ret Hdr Cont Inside Isol)	
		1KC-425A (NC Pumps Ret Hdr Cont Outside Isol)	**NOTE:** 1KC-425A has inadvertently closed.
	BOPO	(IA Step 3) IF 1KC-388 (A NC Pump Motor Lwr Brg Clr Throttle) has been closed, return valve to throttled position.	**NOTE:** 1KC-388 has NOT been closed.
	BOP	(IA Step 4) IF KC flow inadequate:	
		Ensure adequate number of KC Pumps running.	
		Adjust KC flow/pressure.	
		IF low flow still exists, go to AP/1/A/5500/008 (Malfunction of NC Pump).	**NOTE:** The crew may elect to go to AP8 to re-open the valve.
			Examiner NOTE: If at any time, the crew re-opens 1KC-425A, or decides to take action to stop the NC Pumps, MOVE to Events 6-9.

Op Test No.:	N16-1	Scenario #	3	Event #	5	Page	42 of	67
Event Description:	**1KC-425 fails CLOSED**							

Time	Pos.	Expected Actions/Behavior	Comments
		AP/1/A/5500/08, MALFUNCTION OF NC PUMP **CASE II, NC PUMP MOTOR OR MOTOR BEARING MALFUNCTION**	
	BOP	(Step 1) Check abnormal NC Pump parameter - KNOWN TO BE VALID.	
	RO/ BOP	(Step 2) Check NC Pump parameters within operating limits:	
		All NC Pump stator winding temperatures - LESS THAN 311°F	
		All NC Pump motor bearing temperatures - LESS THAN 195°F	
		All NC Pump oil reservoir level computer points - INDICATING BETWEEN (-)1.25 AND (+)1.25.	
	CRS	(Step 3) IF AT ANY TIME any operating limit in Step 2 exceeded, THEN GO TO Step 5.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	CRS	(Step 4) GO TO Step 6.	
	CRS	(Step 6) Announce occurrence on paging system.	**NOTE:** The CRS may ask U2 RO to make Plant Announcement. If so, **Floor Instructor** acknowledge as U2 RO.
	CRS	(Step 7) Correct any of the following which may affect NC Pump stator or motor bearing cooling:	
		• High ambient temperature • Abnormal NC Pump bus voltage • Interference with ventilation • Abnormal RN alignment and flow • Abnormal KC alignment and flow • High KC temperature	**NOTE:** The BOP will report that abnormal KC flow alignment and flow exists. If 1KC-425A has not been previously opened, it will be opened here.

Op Test No.:	N16-1	Scenario #	3	Event #	5	Page	43 of 67
Event Description:	**1KC-425 fails CLOSED**						

Time	Pos.	Expected Actions/Behavior	Comments
	RO/ BOP	(step 8) Check all NC Pump oil reservoir level computer alarms - CLEAR.	
	CRS	(Step 9) IF abnormal NC Pump parameter(s) still exist, THEN contact Engineering for guidance.	**NOTE:** CRS may call WCC/Engineering to address the situation. If so, **Booth Instructor** acknowledge as WCC.
	RO/ BOP	(Step 10) Monitor the following NC Pump parameters:	
		Stator winding temperatures (OAC) - STABLE OR GOING DOWN	
		Motor bearing temperatures (OAC) - STABLE OR GOING DOWN	
		Vibration – NORMAL	
		Oil reservoir levels (OAC) - STABLE.	
	BOP	(Step 11) Check NC Pumps - ANY RUNNING.	
			NOTE: The CRS will likely conduct a Focus Brief.

At the discretion of the Lead Examiner, move to Events #6-9.

Op Test No.: N16-1	Scenario # 3	Event # 6, 7, 8 & 9	Page 44 of 67				
Event Description:	**Steam Equalization Header Line Rupture/MSI fails in Auto/Manual/All MSIVs fail OPEN/1A/1B MD CA Pumps fail to start in AUTO**						

Following this a steam break will occur on the Main Steam Equalization Header in the Turbine Building. Simultaneously all four MSIVs will fail OPEN resulting in four faulted Steam Generators (Both Auto and Manual actuations of MSI have failed). Additionally, the 1A/1B MD CA Pump will fail to start automatically. The operator will be expected to manually start the 1A and 1B MD CA Pumps. The crew will enter EP/1/A/5000/E-0, "Reactor Trip or Safety Injection" and transition to EP/1/A/5000/E-2, "Faulted Steam Generator Isolation." On the other hand, due to the NCS cooldown, an Orange Path could exist on the NCS Integrity Critical Safety Function. If so, the crew will transition to EP/1/A/5000/FR-P.1, "Response to Imminent Pressurized Thermal Shock Condition." If the crew made the transition to E-2, the crew will transition to EP/1/A/5000/ECA-2.1 at Step 4 of E-2 when it is determined that all four Steam Generator pressures are lowering. On the other hand, if the crew transitions to FR-P.1, the crew will take the actions required by ECA-2.1, in FR-P.1 (i.e. reduce feed flow to each Steam Generator to 25 gpm each, depressurize NCS and terminate SI). It is expected that the crew will eventually transition to EP/1/A/5000/FR-P.1, "Response to Imminent Pressurized Thermal Shock Condition." The scenario will terminate at Step 11.c of FR-P.1 after the operator has closed 1NI-9A and 10B.

Booth Operator Instructions:

insert MAL-SM009 = 16500000
insertMAL-ISE006A = BLOCK_BOTH (MSI Fails in AUTO/MANUAL)
insertMAL-ISE006B = BLOCK_BOTH (MSI Fails in AUTO/MANUAL)
insertMAL-SM006A = TRUE 1A MSIV Fails OPEN (Cd = H_X01_094_2 EQ1 [1A Rx Trip Breaker OPEN light ON])
insertMAL-SM006B = TRUE 1B MSIV Fails OPEN (Cd = H_X01_094_2 EQ1 [1A Rx Trip Breaker OPEN light ON])
insertMAL-SM006C = TRUE 1C MSIV Fails OPEN (Cd = H_X01_094_2 EQ1 [1A Rx Trip Breaker OPEN light ON])
insertMAL-SM006D = TRUE 1D MSIV Fails OPEN (Cd = H_X01_094_2 EQ1 [1A Rx Trip Breaker OPEN light ON])

Indications Available:

- Steam flows higher than expected for current plant conditions
- Pzr pressure is lowering
- MSIVs are all OPEN
- SI Actuation

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: Crew will carry out Immediate Actions of E-0, prior to the CRS addressing the EP.

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Event Description: **Steam Equalization Header Line Rupture/MSI fails in Auto/Manual/All MSIVs fail OPEN/1A/1B MD CA Pumps fail to start in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
		EP/1/A/5000/E-0, REACTOR TRIP OR SAFETY INJECTION	
	RO/ BOP	(Step 1) Monitor Foldout page.	
		NC Pump Trip Criteria:	
		CA Suction Sources:	
		Position Criteria for 1NV‑150B and 1NV‑151A (U1 NV Pump Recirc Isol):	
		Ruptured S/G Aux Feedwater Isolation Criteria:	
		Faulted S/G Aux Feedwater Isolation Criteria:	
	RO	(Step 2) Check Reactor trip:	**Immediate Action**
		• All rod bottom lights – LIT	
		• Reactor trip and bypass breakers – OPEN	
		• I/R amps – GOING DOWN.	
	RO	(Step 3) Check Turbine Trip:	**Immediate Action**
		• All throttle valves – CLOSED.	
	BOP	(Step 4) Check 1ETA and 1ETB – ENERGIZED.	**Immediate Action**
	RO/ BOP	(Step 5) Check if S/I is actuated:	**Immediate Action**
		• “A SAFETY INJECTION ACTUATED” status light (1SI-18) – LIT.	
		• Both LOCA Sequencer Actuated status lights (1SI-14) – LIT.	

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Event Description: **Steam Equalization Header Line Rupture/MSI fails in Auto/Manual/All MSIVs fail OPEN/1A/1B MD CA Pumps fail to start in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 6) Announce "Unit 1 Safety Injection".	**NOTE:** CRS may ask U2 RO to make Plant Announcement. If so, **Floor Instructor** acknowledge as U2 RO.
	RO	(Step 7) Check all Feedwater Isolation status lights (1SI-4) – LIT.	
	BOP	(Step 8) Check Phase A "RESET" lights – DARK.	
	BOP	(Step 9) Check ESF Monitor Light Panel on energized train(s):	
		• Groups 1, 2, 5 – DARK.	
		• Group 3 – LIT.	
		• Group 4 – LIT AS REQUIRED.	
		• Group 6 - LIT	
		• GO TO Step 10	
	RO/ BOP	(Step 10) Check proper CA pump status:	
		• MD CA pumps - ON	**NOTE:** Both MDCA Pumps have failed to Auto-start.
	RO/ BOP	(Step 10.a RNO) Start pumps.	**NOTE:** The crew will be able to start the 1A/1B MDCA Pumps manually.
	RO/ BOP	• N/R level in at least 3 S/Gs – GREATER THAN 17%.	
	RO/ BOP	(Step 10.b RNO) Ensure TD CA pump on.	**NOTE:** The TD CA Pump is OOS.

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Event Description: **Steam Equalization Header Line Rupture/MSI fails in Auto/Manual/All MSIVs fail OPEN/1A/1B MD CA Pumps fail to start in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 11) Check all KC pumps – ON.	
	BOP	(Step 12) Check both RN pumps – ON.	
	CRS	(Step 13) Notify Unit 2 to perform the following:	**Floor Instructor:** As U2 RO report "2A RN Pump is running."
		• Start 2A RN pump.	
	RO	• THROTTLE Unit 2 RN flow to minimum for existing plant conditions.	**Booth Instructor:** **insert LOA-RN087 (Start 2A RN Pump)** **insert LOA-RN083 8050.000000 delay=0 ramp=10 (Unit 2 Train A Demand Flow)**
	RO	(Step 14) Check all S/G pressures – GREATER THAN 775 PSIG.	
	RO	(Step 14 RNO) Perform the following:	**NOTE:** ALL SG Pressures are decreasing uncontrollably.
		• Check the following valves closed:	
		• All MSIVs	**NOTE:** All MSIVs are OPEN, and cannot be closed.
		• All MSIV Bypass Valves	
		• All SM PORVs	
		• IF any valve open, THEN perform the following:	
		• Initiate Main Steam Isolation signal.	
		• IF any valve still open, THEN CLOSE valve.	

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Event Description: **Steam Equalization Header Line Rupture/MSI fails in Auto/Manual/All MSIVs fail OPEN/1A/1B MD CA Pumps fail to start in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
	RO/ BOP	(Step 15) Check containment pressure – HAS REMAINED LESS THAN 3 PSIG.	
	BOP	(Step 16) Check S/I flow:	
		• Check “NV PMPS TO COLD LEG FLOW” gauge – INDICATING FLOW.	
		• Check NC pressure – LESS THAN 1600 PSIG.	
		• Check NI pumps - INDICATING FLOW.	
		• Check NC pressure - LESS THAN 275 PSIG.	
	BOP	(Step 16.d RNO) Perform the following:	
		• Ensure ND pump miniflow valve on running pump(s) OPEN:	
		• 1ND-68A (1A ND Pump & Hx Mini Flow Isol)	
		• 1ND-67B (1B ND Pump & Hx Mini Flow Isol).	
		• IF valve(s) open on all running ND pumps, THEN GO TO Step 17.	
	CRS	(Step 17) Notify OSM or other SRO to perform EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 22 (OSM Actions Following an S/I) within 10 minutes.	**NOTE:** The CRS may ask OSM to address. If so, **Floor Instructor** acknowledge as OSM.
	RO/ BOP	(Step 18) Check CA flow:	
		• Total CA flow – GREATER THAN 450 GPM.	
	BOP	• Check VI header pressure – GREATER THAN 60 PSIG.	

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Event Description: **Steam Equalization Header Line Rupture/MSI fails in Auto/Manual/All MSIVs fail OPEN/1A/1B MD CA Pumps fail to start in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	• WHEN each S/G N/R level is greater than 11% (32% ACC), THEN control CA flow to maintain that S/G N/R level between 11% (32% ACC) and 50%.	

Critical Task:

Establish ≥ 450 gpm of CA Flow to the Steam Generators during the performance of E-0 such that transition to EP/1/A/5000/FR-H.1 is not required.

Safety Significance: Failure to establish a Secondary Heat Sink through the initiation of CA flow unnecessarily challenges both the HEAT SINK and the CORE COOLING Critical Safety Functions. Additionally, the FSAR Safety Analysis results are predicated on the assumption that at least one train of safeguards actuates and delivers a minimum amount of AFW flow to the Steam Generators. Failure to perform this task, when the ability to do so exists, results in a violation of the Facility License Condition and places the plant in an unanalyzed condition.

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 19) Check NC temperatures:	
		• IF all NC pumps off, THEN check NC T-Colds – STABLE OR TRENDING TO 557°F.	
	RO	(Step 19 RNO) Perform the following based on plant conditions:	**NOTE:** The CRS may assign the RO to perform this action. If so, **RO Examiner** follow actions of **Enclosure 3**. **Others** should move ahead to Step 20 on **Page 51** to continue in E-0.
		• IF temperature less than 557°F AND going down, THEN attempt to stop cooldown PER Enclosure 3 (Uncontrolled NC System Cooldown).	

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Event Description: **Steam Equalization Header Line Rupture/MSI fails in Auto/Manual/All MSIVs fail OPEN/1A/1B MD CA Pumps fail to start in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
E-0, REACTOR TRIP OR SAFETY INJECTION ENCLOSURE 3, UNCONTROLLED NC SYSTEM COOLDOWN			
	RO	(Step 1) Check steam dump valves – CLOSED.	**Examiner NOTE:** Follow the actions associated with Enclosure 3 if RO is assigned by CRS to perform.
	RO	(Step 2) Check all SM PORVs – CLOSED.	
	RO	(Step 3) Check MSR “RESET” light – LIT.	
	RO	(Step 4) Check any NC pump – ON.	
	RO	(Step 5) Check NC T-avg – GOING DOWN	
	RO	(Step 6) Control feed flow as follows:	
		• IF S/G N/R level is less than 11% (32% ACC) in all S/Gs, THEN THROTTLE feed flow to achieve the following:	
		• Minimize cooldown	
		• Maintain total feed flow greater than 450 GPM.	
		• WHEN N/R level is greater than 11% (32% ACC) in at least one S/G, THEN THROTTLE feed flow further to:	
		• Minimize cooldown	
		• Maintain at least one S/G N/R level greater than 11% (32% ACC).	
	RO	(Step 7) Check MSIVs – ANY OPEN.	**NOTE:** All MSIVs will be OPEN.

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Event Description: **Steam Equalization Header Line Rupture/MSI fails in Auto/Manual/All MSIVs fail OPEN/1A/1B MD CA Pumps fail to start in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 8) CLOSE 1SM-15 (U1 SM To MSR 2nd Stg Tube Bundles Isol).	
	RO	(Step 9) Check any NC pump - ON.	
	RO	(Step 10) Check NC T-Avg - STABLE.	
	RO	(Step 10 RNO) IF cooldown continues, THEN CLOSE the following valves:	
		• All MSIVs	**NOTE:** All MSIVs have failed OPEN.
		• All MSIV Bypass Valves.	
	RO	(Step 11) Notify Control Room Supervisor of the following:	
		• NC temperature trend	
		• Status of MSIV and Bypass Valves.	
		E-0, REACTOR TRIP OR SAFETY INJECTION	
			Examiner NOTE: Examiners NOT following RO actions in Enclosure 3, continue **HERE**.
	BOP	(Step 20) Check Pzr PORV and spray valves:	
		• All Pzr PORVs – CLOSED.	
	BOP	• Normal Pzr spray valves – CLOSED.	
		• At least one Pzr PORV isolation valve – OPEN.	
	BOP	(Step 21) Check NC subcooling based on core exit T/Cs – GREATER THAN 0°F.	
	BOP	(Step 22) Check if main steamlines intact:	

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Event Description: **Steam Equalization Header Line Rupture/MSI fails in Auto/Manual/All MSIVs fail OPEN/1A/1B MD CA Pumps fail to start in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
		• All S/G pressures – STABLE OR GOING UP	**NOTE:** All SG pressures are lowering uncontrollably.
		• All S/Gs – PRESSURIZED.	
	BOP	(Step 22 RNO) IF any S/G is faulted, THEN perform the following:	
	CRS	• Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).	
	CRS	• GO TO EP/1/A/5000/E-2 (Faulted Steam Generator Isolation).	**NOTE:** The CRS will transition to E-2.
			Examiner NOTE: If at any time, a RED or ORANGE Path on INTEGRITY occurs, proceed to the Actions of FR-P.1 on **Page 61**.
EP/1/A/5000/E-2, FAULTED STEAM GENERATOR ISOLATION			
	RO/ BOP	(Step 1) Monitor Foldout page.	
		Cold Leg Recirc Switchover Criteria:	
		CA Suction Sources:	
		Position Criteria for 1NV-150B and 1NV-151A (U1 NV Pump Recirc Isol):	
	CRS	(Step 2) Maintain any faulted S/G or secondary break isolated during subsequent recovery actions unless needed for NC System cooldown.	
	RO	(Step 3) Check the following – CLOSED:	
		• All MSIVs	**NOTE:** All MSIVs have failed OPEN.
		• All MSIV bypass valves.	
	RO	(Step 3 RNO) Perform the following:	

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Event Description:	**Steam Equalization Header Line Rupture/MSI fails in Auto/Manual/All MSIVs fail OPEN/1A/1B MD CA Pumps fail to start in AUTO**							

Time	Pos.	Expected Actions/Behavior	Comments
		• CLOSE valves.	
		• IF any valve cannot be closed, THEN initiate Main Steam Isolation signal.	
	RO	(Step 4) Check at least one S/G pressure – STABLE OR GOING UP.	**NOTE:** ALL SG pressures will be lowering.
	CRS	(Step 4 RNO) IF all S/Gs faulted, THEN GO TO EP/1/A/5000/ECA-2.1 (Uncontrolled Depressurization Of All Steam Generators).	**NOTE:** The CRS will transition to ECA-2.1.
			Examiner NOTE: If at any time, a RED or ORANGE Path on INTEGRITY occurs, proceed to the Actions of FR-P.1 on **Page 61**.
EP/1/A/5000/ECA-2.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS			
	RO/ BOP	(Step 1) Monitor Foldout page.	
		NC Pump Trip Criteria	
		S/I Reinitiation Criteria	
		E-2 Transition Criteria	
		SGTR Transition Criteria	
		Cold Leg Recirc Switchover Criteria	
		CA Suction Sources	
		Position Criteria for 1NV-150B and 1NV-151A (NV Pumps Recirculation)	
	RO/ BOP	(Step 2.a.1) Check secondary pressure boundary:	
		• For 1A S/G:	
		• Check 1A S/G MSIV - CLOSED.	**NOTE:** The MSIV has failed OPEN.

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Event Description: **Steam Equalization Header Line Rupture/MSI fails in Auto/Manual/All MSIVs fail OPEN/1A/1B MD CA Pumps fail to start in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
	RO/ BOP	(Step 2.a.1 RNO) Perform the following:	
		• CLOSE valve.	
		• IF MSIV cannot be closed, THEN dispatch operator to CLOSE valve PER Enclosure 2 (Local Closure Of MSIVs).	**NOTE:** The CRS will dispatch an AO. **Floor Instructor/Booth Instructor:** as **AO**, acknowledge.
	RO/ BOP	(Step 2.a.2-6) Check 1A S/G MSIV bypass valve - CLOSED.	
		• Check 1A SM PORV - CLOSED.	
		• Check "S/G A FDW ISOLATED" status light (1SI-4) - LIT.	
		• Check the following BB valves - CLOSED:	
		• 1BB-1B (1A S/G Blowdown Cont Outside Isol Control)	
		• 1BB-5A (A S/G BB Cont Inside Isol).	
		• CLOSE 1SM-83 (A SM Line Drain Isol).	
	RO/ BOP	(Step 2.b.1) Check secondary pressure boundary:	
		• For 1B S/G:	
		• Check 1B S/G MSIV - CLOSED.	**NOTE:** The MSIV has failed OPEN.
	RO/ BOP	(Step 2.b.1 RNO) Perform the following:	
		• CLOSE valve.	

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Event Description: **Steam Equalization Header Line Rupture/MSI fails in Auto/Manual/All MSIVs fail OPEN/1A/1B MD CA Pumps fail to start in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
		• IF MSIV cannot be closed, THEN dispatch operator to CLOSE valve PER Enclosure 2 (Local Closure Of MSIVs).	**NOTE:** The CRS will dispatch an AO. **Floor Instructor/Booth Instructor:** as **AO**, acknowledge.
	RO/ BOP	(Step 2.b.2-9) Check 1B S/G MSIV bypass valve - CLOSED.	
		• Check 1B SM PORV - CLOSED.	
		• Check "S/G B FDW ISOLATED" status light (1SI-4) - LIT.	
		• Check the following BB valves - CLOSED:	
		• 1BB-2B (1B S/G Blowdown Cont Outside Isol Control)	
		• 1BB-6A (B S/G BB Cont Inside Isol).	
		• CLOSE 1SM-89 (B SM Line Drain Isol).	
		• Check 1A or 1B CA pump - AVAILABLE.	
		• Dispatch operator to trip Unit 1 TD CA pump stop valve.	**NOTE:** The TDCA Pump is OOS.
		• Dispatch operator to unlock and CLOSE the following valves:	
		• 1SA-2 (1B S/G SM Supply to Unit 1 TD CA Pump Turb Maint Isol) (Unit 1 interior doghouse, 767+12, FF-53)	**NOTE:** The TDCA Pump is OOS.
		• 1SA-78 (1B S/G SM Supply to Unit 1 TD CA Pump Turb Loop Seal Isol) (Unit 1 interior doghouse, 767+10, FF-53).	
	RO/ BOP	(Step 2.c.1) Check secondary pressure boundary:	

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Event Description: **Steam Equalization Header Line Rupture/MSI fails in Auto/Manual/All MSIVs fail OPEN/1A/1B MD CA Pumps fail to start in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
		• For 1C S/G:	
		• Check 1C S/G MSIV - CLOSED.	**NOTE:** The MSIV has failed OPEN.
	RO/ BOP	(Step 2.c.1 RNO) Perform the following:	
		• CLOSE valve.	
		• IF MSIV cannot be closed, THEN dispatch operator to CLOSE valve PER Enclosure 2 (Local Closure Of MSIVs).	**NOTE:** The CRS will dispatch an AO. **Floor Instructor/Booth Instructor:** as **AO**, acknowledge.
	RO/ BOP	(Step 2.c.2-9) Check 1C S/G MSIV bypass valve - CLOSED.	
		• Check 1C SM PORV - CLOSED.	
		• Check "S/G C FDW ISOLATED" status light (1SI-4) - LIT.	
		• Check the following BB valves - CLOSED:	
		• 1BB-3B (1C S/G Blowdown Cont Outside Isol Control)	
		• 1BB-7A (C S/G BB Cont Inside Isol).	
		• CLOSE 1SM-95 (C SM Line Drain Isol).	
		• Check 1A or 1B CA pump - AVAILABLE.	
		• Dispatch operator to trip Unit 1 TD CA pump stop valve.	**NOTE:** The TDCA Pump is OOS.
		• Dispatch operator to unlock and CLOSE the following valves:	

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Event Description: **Steam Equalization Header Line Rupture/MSI fails in Auto/Manual/All MSIVs fail OPEN/1A/1B MD CA Pumps fail to start in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
		• 1SA-1 (1C S/G SM Supply to Unit 1 TD CA Pump Turb Maint Isol) (Unit 1 interior doghouse, 767+10, FF-53, above ladder)	**NOTE:** The TDCA Pump is OOS.
		• 1SA-77 (1C S/G SM Supply to Unit 1 TD CA Pump Turb Loop Seal Isol) (Unit 1 interior doghouse, 767+10, FF-53).	
	RO/ BOP	(Step 2.d.1) Check secondary pressure boundary:	
		• For 1D S/G:	
		• Check 1D S/G MSIV - CLOSED.	**NOTE:** The MSIV has failed OPEN.
	RO/ BOP	(Step 2.d.1 RNO) Perform the following:	
		• CLOSE valve.	
		• IF MSIV cannot be closed, THEN dispatch operator to CLOSE valve PER Enclosure 2 (Local Closure Of MSIVs).	**NOTE:** The CRS will dispatch an AO. **Floor Instructor/Booth Instructor:** as **AO**, acknowledge.
	RO/ BOP	(Step 2.d.2-6) Check 1D S/G MSIV bypass valve - CLOSED.	
		• Check 1D SM PORV - CLOSED.	
		• Check "S/G D FDW ISOLATED" status light (1SI-4) - LIT.	
		• Check the following BB valves - CLOSED:	
		• 1BB-4B (1D S/G Blowdown Cont Outside Isol Control)	
		• 1BB-8A (D S/G BB Cont Inside Isol).	

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Event Description:	**Steam Equalization Header Line Rupture/MSI fails in Auto/Manual/All MSIVs fail OPEN/1A/1B MD CA Pumps fail to start in AUTO**								

Time	Pos.	Expected Actions/Behavior	Comments
		• CLOSE 1SM-101 (D SM Line Drain Isol).	
	RO/ BOP	(Step 2.e) WHEN any S/G pressure boundary restored, THEN ensure "E-2 Transition Criteria" on foldout page is evaluated.	
	BOP	(Step 3) Reset the following:	
		• S/I.	
		• Sequencers.	
		• Phase A Isolation.	
		• Phase B Isolation.	
		• IF AT ANY TIME a B/O signal occurs, THEN restart S/I equipment previously on.	
	BOP	(Step 4) Establish VI to containment as follows:	
		• OPEN the following valves:	
		• 1VI-129B (VI Supply to A Cont Ess VI Hdr Outside Isol).	
		• 1VI-160B (VI Supply to B Cont Ess VI Hdr Outside Isol).	
		• 1VI-150B (Lwr Cont Non-Ess Cont Outside Isol).	
		• Check VI header pressure - GREATER THAN 85 PSIG.	

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Event Description: **Steam Equalization Header Line Rupture/MSI fails in Auto/Manual/All MSIVs fail OPEN/1A/1B MD CA Pumps fail to start in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 5) WHEN TSC is staffed, THEN request TSC to evaluate obtaining samples and monitor shutdown margin during cooldown as follows:	**NOTE:** The CRS may call WCC/TSC to address the samples. If so, **Booth Instructor** acknowledge as WCC and report that the TSC is NOT staffed yet.
		• Evaluate obtaining samples as follows:	
		• Consider available cooling of sample Hx's as follows:	
		• KC will remain isolated to normal sample Hx's for 10 hours, until KC is realigned to normal sample Hx's and KF per AP/1/A/5500/41 (Loss Of Spent Fuel Cooling or Level).	
		• IF sample is desired prior to aligning KC to KC aux bldg. non-essential header, AND fuel damage is not expected, THEN evaluate obtaining sample PER OP/1/A/6200/128 (Unit 1 Primary Systems Emergency Response Sampling), Enclosure 4.4 (1NC Hot Leg with KC Non-essential Header Isolated).	
		• Evaluate obtaining periodic NC System boron sample to check shutdown margin during cooldown.	
		• WHEN each NC boron sample obtained, THEN perform the following:	
		• Perform shutdown margin calculation for Cold Shutdown PER OP/0/A/6100/006 (Reactivity Balance Calculation).	
		• Check shutdown margin - ADEQUATE.	
	RO/ BOP	(Step 6) Control feed flow to minimize NC System cooldown as follows:	

Event Description: **Steam Equalization Header Line Rupture/MSI fails in Auto/Manual/All MSIVs fail OPEN/1A/1B MD CA Pumps fail to start in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
		Check all S/G N/R levels - GREATER THAN 11% (32% ACC).	**NOTE:** All S/G NR levels are likely < 11%. If not, the crew will proceed to Step 6.b.
	RO/ BOP	(Step 6 RNO) Maintain at least 25 GPM feed flow to any S/G with a N/R level less than 11% (32% ACC).	
	RO/ BOP	(Step 6.b) Check cooldown rate in NC T-Colds - LESS THAN 100°F IN AN HOUR.	
	RO/ BOP	(Step 6.b RNO) Perform the following:	
		• Reduce feed flow to 25 GPM to each S/G.	
		• GO TO Step 6.d.	

Critical Task:

Control the CA Flowrate to approximately 25 gpm per SG in order to minimize the NC Cooldown rate in ECA-2.1 or FR-P.1.

Safety Significance: Failure to control the CA flow rate to the SGs, when able to do so, leads to an unnecessary and avoidable severe or extreme challenge to the Integrity CSF. Also, failure to perform the Critical Task increases challenges to the Subcriticality Critical Safety Function which otherwise would not occur. If the action can be taken, and is not taken, this demonstrates "mis-operation" or incorrect operation that could unnecessarily challenge a fission product barrier (NCS).

Time	Pos.	Expected Actions/Behavior	Comments
			Examiner NOTE: if the crew has established 25 gpm to each S/G here, and not entered FR-P.1, terminate Exam.

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Event Description: **Steam Equalization Header Line Rupture/MSI fails in Auto/Manual/All MSIVs fail OPEN/1A/1B MD CA Pumps fail to start in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
EP/1/A/5000/FR-P.1, RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION			
			Examiner NOTE: The crew may enter this procedure at any time after exiting E-0, based on a RED or ORANGE Path on INTEGRITY.
	RO	(Step 1) Check NC pressure – GREATER THAN 275 PSIG.	
	RO/ BOP	(Step 2) Monitor Foldout Page.	
		Cold Leg Recirc Switchover Criteria:	
		CA Suction Sources:	
		Position Criteria for 1NV-150B and 1NV-151A (U1 NV Pump Recirc Isol):	
	RO	(Step 3) Check NC T-Colds – STABLE OR GOING UP.	
	RO	(Step 3 RNO) Try to stop NC System cooldown as follows:	
		• Ensure SM PORVs CLOSED.	
		• IF any SM PORV cannot be closed, THEN….	**NOTE:** The SM PORVs are CLOSED.
		• Ensure condenser dump valves CLOSED.	
		• IF ND in RHR mode, THEN …..	**NOTE:** The plant is NOT in the ND Mode.
		• Identify faulted S/G(s) as follows:	
		• Any S/G pressure going down in an uncontrolled manner.	
		OR	
		• Any S/G depressurized.	**NOTE:** All SGs are Faulted.

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Event Description: **Steam Equalization Header Line Rupture/MSI fails in Auto/Manual/All MSIVs fail OPEN/1A/1B MD CA Pumps fail to start in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
		• IF VI is not available for CA flow control in subsequent steps, THEN…	
		• Control feed flow to non-faulted S/G(s) to stop NC System cooldown as follows:	**NOTE:** All SGs are Faulted.
		• Minimize cooldown from faulted S/G(s) as follows:	
		• Ensure the following valves CLOSED for each faulted S/G:	
		• MSIV	**NOTE:** All MSIVs have failed OPEN.
		• MSIV bypass valve.	
		• IF TD CA pump is the only source of feedwater, THEN maintain steam flow to it from at least one S/G.	
		• IF S/G B or C faulted, THEN dispatch operator to unlock and CLOSE isolation valves on faulted S/G(s):	**NOTE:** BOTH the 1B and 1C SGs are Faulted.
		• S/G B:	**NOTE:** The CRS will dispatch an AO. **Floor Instructor:** as **AO**, acknowledge. **Booth Instructor: insert REM-SA0002 = 0 (Close SA-2)**
		• 1SA-2 (1B S/G SM Supply to Unit 1 TD CA Pump Turb Maint Isol) (Unit 1 interior doghouse, 767+12, FF-53)	
		• 1SA-78 (1B S/G SM Supply to Unit 1 TD CA Pump Turb Loop Seal Isol) (Unit 1 interior doghouse, 767+10, FF-53).	
		• S/G C:	**NOTE:** The CRS will dispatch an AO. **Floor Instructor:** as **AO**, acknowledge. **Booth Instructor: insert REM-SA0001 = 0 (Close SA-1)**

Op Test No.:	N16-1	Scenario #	3	Event #	6, 7, 8 & 9	Page	63 of 67

Event Description: **Steam Equalization Header Line Rupture/MSI fails in Auto/Manual/All MSIVs fail OPEN/1A/1B MD CA Pumps fail to start in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
		• 1SA-1 (1C S/G SM Supply to Unit 1 TD CA Pump Turb Maint Isol) (Unit 1 interior doghouse, 767+10, FF-53, above ladder)	
		• 1SA-77 (1C S/G SM Supply to Unit 1 TD CA Pump Turb Loop Seal Isol) (Unit 1 interior doghouse, 767+10, FF-53).	
		• CLOSE 1AS-12 (U1 SM TO AS Hdr Control Inlet Isol).	
		• IF 1AS-12 will not close AND…	
		• IF 1AS-12 will not close AND…	
		• IF all S/Gs faulted, THEN perform the following:	**NOTE:** All SGs are Faulted.
		• THROTTLE feed flow to 25 GPM to each S/G.	
		• GO TO Step 4.	
			NOTE: This action will create a Red Path on FR-H.1. The CRS is expected to address FR-H.1, and immediately return to FR-P.1.

Critical Task:

Control the CA Flowrate to approximately 25 gpm per SG in order to minimize the NC Cooldown rate in ECA-2.1 or FR-P.1.

Safety Significance: Failure to control the CA flow rate to the SGs, when able to do so, leads to an unnecessary and avoidable severe or extreme challenge to the Integrity CSF. Also, failure to perform the Critical Task increases challenges to the Subcriticality Critical Safety Function which otherwise would not occur. If the action can be taken, and is not taken, this demonstrates "mis-operation" or incorrect operation that could unnecessarily challenge a fission product barrier (NCS).

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 4) Check Pzr PORV isolation valves:	
		• Power to all Pzr PORV isolation valves – AVAILABLE.	

Op Test No.:	N16-1	Scenario #	3	Event #	6, 7, 8 & 9	Page	64 of 67
Event Description:	**Steam Equalization Header Line Rupture/MSI fails in Auto/Manual/All MSIVs fail OPEN/1A/1B MD CA Pumps fail to start in AUTO**						

Time	Pos.	Expected Actions/Behavior	Comments
		• At least one Pzr PORV isolation valve – OPEN.	
	BOP	(Step 5) Check if Pzr PORVs should be closed:	
		• Check “LOW PRESS” mode – SELECTED.	
	CRS	(Step 5.a RNO) GO TO Step 5.d.	
	BOP	• Check Pzr pressure – LESS THAN 2335 PSIG.	
		• Check all Pzr PORVs – CLOSED.	
		• IF AT ANY TIME any Pzr PORV opens due to high pressure, THEN after pressure goes below reseat pressure, ensure PORV CLOSES or is isolated.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	BOP	(Step 6) Check if S/I in service using any of the following:	
		• Any NI Pump – ON.	
		OR	
		• 1NI-9A (NC Cold Leg Inj From NV) – OPEN.	
		OR	
		• 1NI-10B (NC Cold Leg Inj From NV) – OPEN.	
	RO/ BOP	(Step 7) Check if S/I can be terminated:	
		• NC subcooling based on core exit T/Cs – GREATER THAN 50°F.	
		• Check RVLIS indication:	

Op Test No.:	N16-1	Scenario #	3	Event #	6, 7, 8 & 9	Page	65	of 67
Event Description:	**Steam Equalization Header Line Rupture/MSI fails in Auto/Manual/All MSIVs fail OPEN/1A/1B MD CA Pumps fail to start in AUTO**							

Time	Pos.	Expected Actions/Behavior	Comments
		• IF all NC pumps off, THEN check "REACTOR VESSEL LR LEVEL" – GREATER THAN 60%.	**NOTE:** The RCPs will likely be OFF.
		• IF at least one NC pump on, THEN check "REACTOR VESSEL D/P" - GREATER THAN REQUIRED DELTA P FROM TABLE BELOW:	**NOTE:** If the RCPs are ON, the CRS will evaluate the Table.
	RO/ BOP	(Step 8) Reset the following:	
		• S/I.	
		• Sequencers.	
		• Phase A Isolation.	
		• Phase B Isolation.	
		• IF AT ANY TIME a B/O signal occurs, THEN restart S/I equipment previously on.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	RO/ BOP	(Step 9) Establish VI to containment as follows:	
		• OPEN the following valves:	
	RO/ BOP	• 1VI-129B (VI Supply to A Cont Ess VI Hdr Outside Isol).	
		• 1VI-160B (VI Supply to B Cont Ess VI Hdr Outside Isol).	
		• 1VI-150B (Lwr Cont Non-Ess Cont Outside Isol).	
		• Check VI header pressure – GREATER THAN 85 PSIG.	
	RO/ BOP	(Step 10) Stop S/I pumps as follows:	
		• All but one NV pump.	
		• Both NI pumps.	

Op Test No.:	N16-1	Scenario #	3	Event #	6, 7, 8 & 9	Page	66	of	67

Event Description: **Steam Equalization Header Line Rupture/MSI fails in Auto/Manual/All MSIVs fail OPEN/1A/1B MD CA Pumps fail to start in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
		• Check running ND pumps suction – ALIGNED TO FWST.	
		• Stop both ND pumps.	
	RO/ BOP	(Step 11) Isolate NV S/I flowpath as follows:	
		• Check the following valves – OPEN.	
		• 1NV-221A (U1 NV Pump Suct From FWST Isol).	
		• 1NV-222B (U1 NV Pump Suct From FWST Isol).	
		• Check the following valves – OPEN.	
		• 1NV-150B (U1 NV Pump Recirc Isol)	
		• 1NV-151A (U1 NV Pump Recirc Isol)	
	RO/ BOP	(Step 11.b RNO) Perform the following:	**NOTE:** If 1NV-150B/151A are CLOSED, the RNO will be performed.
		• OPEN valves.	
		• IF both valves open, THEN GO TO Step 11.c.	
	RO/ BOP	• CLOSE the following valves:	
		• 1NI-9A (NC Cold Leg Inj From NV).	
		• 1NI-10B (NC Cold Leg Inj From NV).	

At the discretion of the Lead Examiner terminate the exam.

UNIT 1 STATUS:

Power Level: 75% NCS [B] 1038 ppm Pzr [B]: 1038 ppm Xe: Per OAC

Power History: At this power level for 3 days Core Burnup: 250 EFPDs

CONTROLLING PROCEDURE: OP/1/A/6100/003 Controlling Procedure for Unit Operation

OTHER INFORMATION NEEDED TO ASSUME THE SHIFT:

- The area has experienced steady light rain for the past 8 hours, with light wind from the South at 2-5 mph, and this is expected to continue throughout the shift.
- A Containment Air Release is in progress per OP/1/A/6450/17, "Containment Air Release and Addition System."

The following equipment is Out-Of-Service:

- The VUCDT Level indication is OOS. ACTION has been taken in accordance with Technical Specification LCO 3.4.15 ACTION C.
- The TDCA Pump is OOS for bearing replacement. ACTION has been taken in accordance with Technical Specification LCO 3.7.5 ACTION A.
- MCB Annunciator 1AD-12, A-4, "B RN PMP DISCHARGE LO PRESS," has alarmed spuriously several times over the last hour, and has currently failed OFF (IAE is investigating).

Crew Directions:

- The crew will raise power to 100% on this shift, starting with Step 3.37.10 of Enclosure 4.1 of OP/1/A/6100/003 Controlling Procedure for Unit Operation.
- The loading rate will be 2-3 MWe/minute.
- RE has recommended a 200 gallon initial dilution using Enclosure 4.3 (Dilute) of OP/1/A/6150/009 (Boron Concentration Control).
- RMWST Dissolved O_2 is greater than 1000 ppb.
- Blender content is Reactor Makeup Water.

Work Control SRO/Offsite Communicator **Jim**

Plant SRO **Joe (FB)**

AO's AVAILABLE

<u>Unit 1</u>	**<u>Unit 2</u>**
Aux Bldg. John	**Aux Bldg. Chris**
Turb Bldg. Bob (FB)	**Turb Bldg. Mike (FB)**
5th Rounds. Carol	

Extra(s) Bill (FB) Ed (FB) Wayne (FB) Tanya Gus (RW)

Facility: **McGuire**	Scenario No.: **4**	Op Test No.: **N16-1**	
Examiners:		Operators:	(SRO)
			(RO)
			(BOP)

Initial Conditions:	The plant is at 4% power (BOL). The area has experienced steady light rain for the past 8 hours, with light wind from the South at 2-5 mph, and this is expected to continue throughout the shift.
Turnover:	The following equipment is Out-Of-Service: The VUCDT Level indication is OOS. ACTION has been taken in accordance with Technical Specification LCO 3.4.15 ACTION C. The 1A EDG is OOS for fuel pump replacement. ACTION has been taken in accordance with Technical Specification LCO 3.8.1 ACTION B. MCB Annunciator 1AD-1, F-9, "DEH/MSR SYSTEM MALFUNCT," spuriously alarmed several times during the shift, and is currently failed OFF (IAE is investigating). The crew will hold power steady until on-going maintenance is completed, however a rod height/C_B adjustment will be made at the start of the shift at the request of Reactor Engineering.

Event No.	Malf. No.	Event Type*	Event Description
1	NA	R-RO N-BOP N-SRO	Rod Height Adjustment
2	1	I-BOP I(TS)-SRO	Power Range N-41 Upper Detector failure
3	2	C-BOP C(TS)-SRO	Ground Fault on 1ETA
4	3	C-RO C-SRO	C-9 Failure causing failure of 1B SG PORV (Manual Control avail)
5	4	C-RO C-BOP C-SRO	1A NCP Pump Bearing Oil Cooler Leak
6	5	M-RO M-BOP M-SRO	ATWS
7	6	C-BOP C-SRO	Loss of Switchyard to Unit 1/1B EDG fails to START

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

McGuire 2016 NRC Scenario #4

The plant is at 4% power (BOL). The area has experienced steady light rain for the past 8 hours, with light wind from the South at 2-5 mph, and this is expected to continue throughout the shift.

The following equipment is Out-Of-Service: The VUCDT Level indication is OOS. ACTION has been taken in accordance with Technical Specification LCO 3.4.15 ACTION C. The 1A EDG is OOS for fuel pump replacement. ACTION has been taken in accordance with Technical Specification LCO 3.8.1 ACTION B. MCB Annunciator 1AD-1, F-9, "DEH/MSR SYSTEM MALFUNCT," spuriously alarmed several times during the shift, and is currently failed OFF (IAE is investigating). The crew will hold power steady until on-going maintenance is completed, however a rod height/C_B adjustment will be made at the start of the shift at the request of Reactor Engineering.

Shortly after taking the watch, the crew will dilute in accordance with Enclosure 4.3, "Dilute" of OP/0/A/6150/009, "Boron Concentration Control", to adjust Control Bank D rod height to 132 Steps.

After this, Power Range Channel N41 Upper Detector will fail. The operator will enter AP/1/A/5500/16, "Malfunction of Nuclear Instrumentation," and perform Case III, "Power Range Malfunction." The operator will address Technical Specification 3.3.1, "Reactor Trip Instrumentation."

Following this, a ground fault will occur on 1ETA causing the bus to de-energize. The operator will enter AP/1/A/5500/07, "Loss of Electrical Power," and start the equipment on the B Train. The operator will address Technical Specification 3.8.1, "AC Sources Operating," 3.8.4, "DC Sources - Operating," and 3.8.9 "Distribution Systems - Operating."

Afterwards, the C-9 Interlock will fail causing the Steam Dump Valves to close. The SG PORVs will open to maintain Steam Generator pressure at setpoint. As these valves open, the 1B SG PORV Controller will fail such that the valve slowly opens. The operator will implement AP/1/A/5500/01, "Steam Leak" and take manual control of the 1B SG PORV.

Shortly after this, a leak will develop on the 1A NCP Upper Bearing Oil Reservoir. The operator will respond in accordance with AP/1/A/5500/08, "Malfunction of NC Pump," and the operator will be required to trip the reactor, stop the 1A NCP, and go to EP/1/A/5000/E-0, "Reactor Trip and/or Safety Injection."

When the operator attempts to manually trip the reactor, an ATWS will occur. The operator will enter EP/1/A/5000/E-0, "Reactor Trip or Safety Injection," and then transition to EP/1/A/5000/FR-S.1, "Response to Nuclear Power Generation/ATWS." During the performance of FR-S.1, the operator will continuously drive rods in manually, and successfully trip the Reactor locally.

After the crew has locally tripped the reactor but still implementing FR-S.1, a loss of the Unit 1 Switchyard will occur, and the 1B Emergency Diesel Generator will fail to start. The operator will immediately transition to EP/1/A/5000/ECA-0.0, "Loss of All AC Power." The operator will restore power to 1ETB per Unit 2 6900V busses through SATB per Enclosure 14 "Energizing Unit 1 4160V Bus From Unit 2 - SATA or SATB."

The scenario will terminate when one ESF Bus has been re-energized.

Critical Tasks:

Manually commence driving rods inward before completing the immediate actions of FR-S.1 (Step 2).

Safety Significance: failure to insert negative reactivity, under the postulated plant conditions, results in an unnecessary situation in which the reactor remains critical or returns to a critical condition. Performance of the critical task would move the reactor towards a subcritical condition to prevent a subsequent return to criticality. A failure to insert negative reactivity constitutes a mis-operation or incorrect crew performance which leads to incorrect reactivity control.

Dispatch an operator to perform Enclosure 2 of ECA-0.0 and a separate operator to perform Enclosure 3 of ECA-0.0 within 3 minutes and 4 minutes respectively, from the loss of NC Pump Seal Injection Flow (Station Blackout), in order to establish NC Pump Seal Injection flow from the SSF.

Safety Significance: Failure to Establish NC pump seal injection from the SSF within ten minutes as required by Enclosure 13.11, Initiate SSF NCP Seal Injection and Swap to the SSF, of PT/0/A/4600/113, Operator Time Critical Task Verification, when able to do so, constitutes "mis-operation" or incorrect performance which leads to degraded NC Pump Seals and may result in a Seal Failure/Small Break LOCA. Failure to perform the Critical Task may result in a needless challenge and/or degradation of a fission product barrier at the point of the intact NC Pump Seals. Since the conditions exist to dispatch both operators, not taking this action constitutes incorrect performance that leads to degradation of the RCS and/or fuel cladding fission product barriers. Dispatch by the CRS within the stated times ensure that NC Pump Seal Injection Flow can be established from the SSF within 10 minutes.

PROGRAM: McGuire Operations Training

MODULE: Initial License Operator Training Class ILC 16-1

TOPIC: NRC Simulator Exam

Scenario N16-1-4

REFERENCES:

1. OP/1/A/6100/010 N, "Annunciator Response for Panel 1AD-13" (Rev 78)
2. Technical Specification LCO 3.4.15, "RCS Leakage Detection Instrumentation" (Amendment 235/217)
3. Technical Specification 3.8.1, "AC Sources – Operating" (Amendment 221/203)
4. OP/1/A/6150/009, "Boron Concentration Control" (Rev 132)
5. AP/1/A/5500/16, "Malfunction of Nuclear Instrumentation" (Rev 15)
6. Technical Specification 3.3.1, "Reactor Trip Instrumentation" (Amendment 184/166)
7. AP/1/A/5500/07, "Loss of Electrical Power" (Rev 36)
8. EP/1/A/5000-G-1, "Generic Enclosures" (Rev 38)
9. Technical Specification 3.8.4, "DC Sources – Operating" (Amendment 274/254)
10. Technical Specification 3.8.9, "Distribution Systems – Operating" (Amendment 184/166)
11. AP/1/A/5500/12, "Loss of Letdown, Charging or Seal Injection" (Rev 24)
12. AP/1/A/5500/01, "Steam Leak" (Rev 18)
13. Technical Specification 3.7.4, "Steam Generator Power Operated Relief valves (SG PORVs)" (Amendment 221/203)
14. Technical Specification LCO 3.4.1, "RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits" (Amendment 219/201)
15. AP/1/A/5500/08, "Malfunction of NC Pump" (Rev 14)
16. EP/1/A/5000/E-0, "Reactor Trip or Safety Injection" (Rev 34)
17. EP/1/A/5000/FR-S.1, "Response to Nuclear Power Generation/ATWS" (Rev 15)
18. EP/1/A/5000/ECA-0.0, "Loss of All AC Power" (Rev 37)

Validation Time: 115 minutes

Author: David Lazarony, Essential Training & Consulting, LLC

Facility Review: ________________________

Rev. 031716

Facility:	**McGuire**	Scenario No.:	**4**	Op Test No.:	**N16-1**
Examiners:	____________	Operators:		____________	(SRO)
	____________			____________	(RO)
	____________			____________	(BOP)

Initial Conditions:	The plant is at 4% power (BOL). The area has experienced steady light rain for the past 8 hours, with light wind from the South at 2-5 mph, and this is expected to continue throughout the shift.
Turnover:	The following equipment is Out-Of-Service: The VUCDT Level indication is OOS. ACTION has been taken in accordance with Technical Specification LCO 3.4.15 ACTION C. The 1A EDG is OOS for fuel pump replacement. ACTION has been taken in accordance with Technical Specification LCO 3.8.1 ACTION B. MCB Annunciator 1AD-1, F-9, “DEH/MSR SYSTEM MALFUNCT,” spuriously alarmed several times during the shift, and is currently failed OFF (IAE is investigating). The crew will hold power steady until on-going maintenance is completed, however a rod height/C_B adjustment will be made at the start of the shift at the request of Reactor Engineering.

Event No.	Malf. No.	Event Type*	Event Description
1	NA	R-RO N-BOP N-SRO	Rod Height Adjustment
2	1	I-BOP I(TS)-SRO	Power Range N-41 Upper Detector failure
3	2	C-BOP C(TS)-SRO	Ground Fault on 1ETA
4	3	C-RO C-SRO	C-9 Failure causing failure of 1B SG PORV (Manual Control avail)
5	4	C-RO C-BOP C-SRO	1A NCP Pump Bearing Oil Cooler Leak
6	5	M-RO M-BOP M-SRO	ATWS
7	6	C-BOP C-SRO	Loss of Switchyard to Unit 1/1B EDG fails to START

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

McGuire 2016 NRC Scenario #4

The plant is at 4% power (BOL). The area has experienced steady light rain for the past 8 hours, with light wind from the South at 2-5 mph, and this is expected to continue throughout the shift.

The following equipment is Out-Of-Service: The VUCDT Level indication is OOS. ACTION has been taken in accordance with Technical Specification LCO 3.4.15 ACTION C. The 1A EDG is OOS for fuel pump replacement. ACTION has been taken in accordance with Technical Specification LCO 3.8.1 ACTION B. MCB Annunciator 1AD-1, F-9, “DEH/MSR SYSTEM MALFUNCT,” spuriously alarmed several times during the shift, and is currently failed OFF (IAE is investigating). The crew will hold power steady until on-going maintenance is completed, however a rod height/C_B adjustment will be made at the start of the shift at the request of Reactor Engineering.

Shortly after taking the watch, the crew will dilute in accordance with Enclosure 4.3, “Dilute” of OP/0/A/6150/009, “Boron Concentration Control”, to adjust Control Bank D rod height to 132 Steps.

After this, Power Range Channel N41 Upper Detector will fail. The operator will enter AP/1/A/5500/16, “Malfunction of Nuclear Instrumentation,” and perform Case III, “Power Range Malfunction.” The operator will address Technical Specification 3.3.1, “Reactor Trip Instrumentation.”

Following this, a ground fault will occur on 1ETA causing the bus to de-energize. The operator will enter AP/1/A/5500/07, “Loss of Electrical Power,” and start the equipment on the B Train. The operator will address Technical Specification 3.8.1, “AC Sources Operating,” 3.8.4, “DC Sources - Operating,” and 3.8.9 “Distribution Systems - Operating.”

Afterwards, the C-9 Interlock will fail causing the Steam Dump Valves to close. The SG PORVs will open to maintain Steam Generator pressure at setpoint. As these valves open, the 1B SG PORV Controller will fail such that the valve slowly opens. The operator will implement AP/1/A/5500/01, “Steam Leak” and take manual control of the 1B SG PORV.

Shortly after this, a leak will develop on the 1A NCP Upper Bearing Oil Reservoir. The operator will respond in accordance with AP/1/A/5500/08, “Malfunction of NC Pump,” and the operator will be required to trip the reactor, stop the 1A NCP, and go to EP/1/A/5000/E-0, “Reactor Trip and/or Safety Injection.”

When the operator attempts to manually trip the reactor, an ATWS will occur. The operator will enter EP/1/A/5000/E-0, “Reactor Trip or Safety Injection,” and then transition to EP/1/A/5000/FR-S.1, “Response to Nuclear Power Generation/ATWS.” During the performance of FR-S.1, the operator will continuously drive rods in manually, and successfully trip the Reactor locally.

After the crew has locally tripped the reactor but still implementing FR-S.1, a loss of the Unit 1 Switchyard will occur, and the 1B Emergency Diesel Generator will fail to start. The operator will immediately transition to EP/1/A/5000/ECA-0.0, “Loss of All AC Power.” The operator will restore power to 1ETB per Unit 2 6900V busses through SATB per Enclosure 14 “Energizing Unit 1 4160V Bus From Unit 2 - SATA or SATB.”

The scenario will terminate when one ESF Bus has been re-energized.

Critical Tasks:

Manually commence driving rods inward before completing the immediate actions of FR-S.1 (Step 2).

Safety Significance: failure to insert negative reactivity, under the postulated plant conditions, results in an unnecessary situation in which the reactor remains critical or returns to a critical condition. Performance of the critical task would move the reactor towards a subcritical condition to prevent a subsequent return to criticality. A failure to insert negative reactivity constitutes a mis-operation or incorrect crew performance which leads to incorrect reactivity control.

Dispatch an operator to perform Enclosure 2 of ECA-0.0 and a separate operator to perform Enclosure 3 of ECA-0.0 within 3 minutes and 4 minutes respectively, from the loss of NC Pump Seal Injection Flow (Station Blackout), in order to establish NC Pump Seal Injection flow from the SSF.

Safety Significance: Failure to Establish NC pump seal injection from the SSF within ten minutes as required by Enclosure 13.11, Initiate SSF NCP Seal Injection and Swap to the SSF, of PT/0/A/4600/113, Operator Time Critical Task Verification, when able to do so, constitutes "mis-operation" or incorrect performance which leads to degraded NC Pump Seals and may result in a Seal Failure/Small Break LOCA. Failure to perform the Critical Task may result in a needless challenge and/or degradation of a fission product barrier at the point of the intact NC Pump Seals. Since the conditions exist to dispatch both operators, not taking this action constitutes incorrect performance that leads to degradation of the RCS and/or fuel cladding fission product barriers. Dispatch by the CRS within the stated times ensure that NC Pump Seal Injection Flow can be established from the SSF within 10 minutes.

SIMULATOR OPERATOR INSTRUCTIONS

	Bench Mark	ACTIVITY	DESCRIPTION
☐	Sim. Setup	**Rod Step On**	
☐		**Reset to Temp IC 238**	**T = 0 Malfunctions:** **insert XMT-WL_1WLLT5591 = 100 (1WLL-5591, VUCDT Tank Level is OOS)** **insertMAL-EPQ001A = ACTIVE** **insertLOA-DG011 = RACKED_OUT** **insertLOA-DG020 = RACKED OUT** **insert OVR-1AD1_F09 = OFF (MCB Annunciator 1AD1/F9)** <u>**Per Lesson Plan 2016 NRC Exam Scenario 4**</u> **Insert MAL-IPE001A = TRUE (ATWS)** **Insert MAL-IPE001B = TRUE (ATWS)** **Insert MAL-IPE002A = TRUE (ATWS)** **Insert MAL-IPE002B = TRUE (ATWS)**
☐		**RUN** **Reset all SLIMs**	**Place Tagout/O-Stick on:** **1A EDG (Tagout)** **1WLL-5591 (O-stick)** **MCB Annunciator 1AD-13, C-7 (O-stick)** **MCB Annunciator 1AD-1, F-9 (O-stick)**
☐		**Update** Status Board, **Setup OAC**	**NOTE:** RMWST DO = <1000 ppb.
☐		**Freeze.**	
☐		**Update Fresh Tech. Spec. Log.**	
☐		**Fill out the AO's Available section of Shift Turnover Info.**	

	Bench Mark	ACTIVITY	DESCRIPTION
☐	Prior to Crew Briefing	**RUN**	
☐	**Crew Briefing** 1. Assign Crew Positions based on evaluation requirements 2. Review the Shift Turnover Information with the crew. 3. Provide the crew with a Blank Copy of Enclosure 4.3 (Dilute) of OP/1/A/6150/009 (Boron Concentration Control) 4. Direct the crew to Review the Control Boards taking note of present conditions, alarms.		
☐	T-0	Begin Familiarization Period	
☐	At direction of examiner	**Execute Lesson Plan for Simulator Scenario N16-1-4.**	
☐	At direction of examiner	**Event 1** **NA**	Rod Height Adjustment
☐	At direction of examiner	**Event 2** **insert MAL-ENB013A = LOSS**	Power Range N-41 Upper Detector failure
☐	At direction of examiner	**Event 3** **insert MAL-EP008A ACTIVE** **insert 1AD11_A01= ON**	Ground Fault on 1ETA **<u>AP-7 Actions</u>** **insertLOA-RN087 = ON delay = 60 seconds (Start 2A RN Pump)** **insertREM-RN0040A_1 = 0 (Close 1RN-40A)** **insert REM-KC0003A = 0 (Close 1KC-3A)** **insert REM-KC0230A = 0 (Close 1KC-230A)**
☐	At direction of examiner	**Event 4** **Insert MAL-IPE004H = FALSE** **insert XMT-SM_1SMPT55100 = 1150**	C-9 Failure causing failure of 1B SG PORV (Manual Control avail)

	Bench Mark	ACTIVITY	DESCRIPTION
☐	At direction of examiner	**Event 5** **Insert MAL-NCP007AU = TRUE**	1A NCP Pump Bearing Oil Cooler Leak
☐	Upon Attempt to Manually Trip the Rx	**Event 6** **Insert MAL-IPE001A = TRUE (ATWS)** **Insert MAL-IPE001B = TRUE (ATWS)** **Insert MAL-IPE002A = TRUE (ATWS)** **Insert MAL-IPE002B = TRUE (ATWS)**	ATWS **Note: These Malfunctions are inserted at T=0**
☐	At direction of examiner while in FR-S.1	**Event 7** **Insert MAL-EP002 AND EP002B = TRIP** **Insert MAL-DG001B = TRUE**	Loss of Switchyard to Unit 1/1B EDG fails to START
☐	**Terminate the scenario upon direction of Lead Examiner**		

Op Test No.:	N16-1	Scenario #	4	Event #	1	Page	8 of 65
Event Description:	**Rod Height Adjustment**						

Shortly after taking the watch, the crew will dilute in accordance with Enclosure 4.3, “Dilute” of OP/0/A/6150/009, “Boron Concentration Control”, to adjust Control Bank D rod height to 132 Steps.
Booth Operator Instructions: **NA**
Indications Available: **NA**

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The RO will manually insert control rods.
		OP/1/A/6150/009, BORON CONCENTRATION CONTROL **ENCLOSURE 4.3, DILUTE**	
	BOP	(Step 3.1) Evaluate all outstanding R&RS that may impact performance of this procedure.	**NOTE:** The CRS may call WCC to address the R&Rs. If so, **Booth Instructor** acknowledge as WCC, and report none.
	BOP	(Step 3.2) IF the lowest NCP seal leakoff is less than 2 gpm…	**NOTE:** All NCP Seal leakoffs are normal.
	BOP	(Step 3.3) Evaluate energizing additional pressurizer heaters per OP/1/A/6100/003 (Controlling Procedure For Unit Operation) to enhance system mixing when changing NC System boron concentration. (R.M.)	
	BOP	(Step 3.4) Determine current blender contents and evaluate any potential Reactivity effects prior to performing this enclosure:	
		• Rx Makeup Water	
		• Blend	
		• Boron	

Op Test No.:	N16-1	Scenario #	4	Event #	1	Page	9	of 65
Event Description:		Rod Height Adjustment						

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 3.5) Determine amount of reactor makeup water needed to obtain desired boron concentration using McGuire Data Book, OAC, Reactor Group Guidance, or plant parameters (T-Ave. Steam Pressure, Xenon worth, etc.). (R.M.)	**NOTE:** The BOP will add 200 gallons of MU Water.
		• Total Reactor Makeup Water:	
	BOP	(Step 3.6) Ensure the following reset to zero: (R.M.)	
		• Total Make Up Flow Counter	
		• Boric Acid Flow Counter	
	BOP	(Step 3.7) Set Total Make Up Flow Counter to value determined in Step 3.5.	
	BOP	(Step 3.8) Select “DILUTE” on “NC Sys M/U Controller”.	
	BOP	(Step 3.9) IF AT ANY TIME it is desired to adjust reactor makeup water flow, adjust “Rx M/U Water Flow Control” setpoint to achieve desired flowrate.	
	BOP	(Step 3.10) IF AT ANY TIME it is desired to manually adjust reactor makeup water flow, perform the following:	
		• Place “Rx M/U Water Flow Control” in manual.	
		• Adjust “Rx M/U Water Flow Control” output to control reactor makeup water flowrate.	
	BOP	(Step 3.11) IF AT ANY TIME it is desired to lower VCT level, perform the following:	
		• Monitor Letdown Pressure.	

Op Test No.:	N16-1	Scenario #	4	Event #	1	Page	10 of 65
Event Description:	Rod Height Adjustment						

Time	Pos.	Expected Actions/Behavior	Comments
		• Select “HUT” on 1NV-137A (U1 NC Filter Otlt to VCT 3-Way Diversion Cntrl).	
		• IF Letdown Pressure increases greater than 20 psig, notify CRS.	
		• AFTER desired level achieved, select “AUTO” on 1NV-137A (U1 NC Filter Otlt to VCT 3-Way Diversion Cntrl).	
	BOP	(Step 3.12) IF AT ANY TIME plant parameters require termination of dilution, perform the following:	
		• Place “NC System Make Up” to “STOP”. (R.M.)	
		• IF 1NV-137A (U1 NC Filter Otlt to VCT 3-Way Diversion Cntrl) placed to HUT, place to “AUTO”.	
	BOP	(Step 3.13) Momentarily select “START” on “NC System Make Up”. (R.M.)	
	BOP	(Step 3.14) Check “NC System Make Up” red light lit.	
	BOP	(Step 3.15) Check 1NV-171A (U1 Boric Acid Blender to VCT Inlet Control) open.	
	BOP	(Step 3.16) Check 1NV-252A (Rx M/U Water Supply To U1 BA Blender Cntrl) open or throttled as required.	
	BOP	(Step 3.17) Check Rx M/U Water Pump start.	
	BOP	(Step 3.18) Monitor Total Make Up Flow Counter. (R.M.)	

Op Test No.:	N16-1	Scenario #	4	Event #	1	Page	11 of 65
Event Description:	**Rod Height Adjustment**						

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 3.19) HOLD until one of the following occurs:	
		• Amount of reactor makeup recorded per Step 3.5 added	
		• Reactor makeup water addition manually terminated	
	BOP	(Step 3.20) Ensure dilution terminated as follows: (R.M.)	
		• IF in “AUTO”, ensure the following off:	
		• 1A Rx M.U Water Pump	
		• 1B Rx M/U Water Pump	
		• Ensure the following closed:	
		• 1NV-171A (U1 Boric Acid Blender to VCT Inlet Control)	
		• 1NV-252A (Rx M/U Water Supply To U1 BA Blender Cntrl)	
	BOP	(Step 3.21) Ensure “Rx M/U Water Flow Control” in auto. (R.M.)	
	BOP	(Step 3.22) IF “Rx M/U Water Flow Control” adjusted per Step 3.9 OR Step 3.10…	
	BOP	(Step 3.23) Ensure 1NV-137A (U1 NC Filter Otlt to VCT 3-Way Diversion Cntrl) in “AUTO”.	
	BOP	(Step 3.24) IF desired to flush blender, go to…	
	BOP	(Step 3.25) Select “AUTO” for “NC Sys M/U Controller”.	

Op Test No.: N16-1	Scenario # 4	Event # 1	Page 12 of 65
Event Description:	**Rod Height Adjustment**		

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 3.26) Momentarily select "START" on "NC System Make Up".	
	BOP	(Step 3.27) Check "NC System Make Up" red light lit.	
	BOP	(Step 3.28) Ensure the following reset to zero:	
		• Total Make Up Flow Counter	
		• Boric Acid Flow Counter	
	BOP	(Step 3.29) Record in Narrative Log that final blender content is Rx Makeup Water.	
			NOTE: The CRS will likely conduct a Focus Brief.

At the discretion of the Lead Examiner move to Event #2.

Op Test No.:	N16-1	Scenario #	4	Event #	2	Page	13 of 65
Event Description:		**Power Range Channel N41 Upper Detector failure**					

After this, Power Range Channel N41 Upper Detector will fail. The operator will enter AP/1/A/5500/16, "Malfunction of Nuclear Instrumentation," and perform Case III, "Power Range Malfunction." The operator will address Technical Specification 3.3.1, "Reactor Trip Instrumentation."

Booth Operator Instructions: **insert MAL-ENB013A = LOSS**

Indications Available:

- MCB Annunciator, 1AD2 A1, P/R HI FLUX RATE ALERT
- MCB Annunciator, 1AD2 A2, P/R HI FLUX LO STPT ALERT
- MCB Annunciator, 1AD2 A3, P/R HI FLUX HI STPT ALERT
- MCB Annunciator, 1AD2 B3, P/R CHANNEL DEVIATION
- MCB Annunciator, 1AD2 B8, OPDT RUNBACK RUNBACK/ROD STOP ALERT
- MCB Annunciator, 1AD2 C8, P/R OVERPOWER ROD STOP
- MCB Annunciator, 1AD6 F8, OPDT PROTECTION ALERT
- N41 indicates HIGH
- PR41 AFD is off-scale HIGH

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The CRS will enter to AP-16 Case III.
		AP/1/A/5500/16, MALFUNCTION OF NUCLEAR INSTRUMENTATION CASE III, POWER RANGE MALFUNCTION	
	RO	(Step 1) Place control rods in manual.	**NOTE:** The control rods are already in MANUAL.
	RO/ BOP	(Step 2) Check S/G levels - AT PROGRAMMED LEVEL.	
	CRS	(Step 3) Announce occurrence on paging system.	**NOTE:** CRS may ask U2 RO to make Plant Announcement. If so, **Floor Instructor** acknowledge as U2 RO.
	RO	(Step 4) Check P/R channels - ONLY ONE CHANNEL FAILED.	
	CRS	(Step 5) Secure any power increase in progress.	

Op Test No.:	N16-1	Scenario #	4	Event #	2	Page	14 of 65
Event Description:	**Power Range Channel N41 Upper Detector failure**						

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 6) Check the following interlocks ‑ IN REQUIRED STATE FOR EXISTING PLANT CONDITIONS:	
		• P‑7 Lo Power Rx Trips Blocked	**NOTE:** Status light is LIT (Correct position).
		• P‑8 Hi Pwr Lo Flo Rx Trip Blocked	**NOTE:** Status light is LIT (Correct position).
		• P‑10 Nuclear at Power.	**NOTE:** Status light is DARK (Correct position).
	BOP	(Step 7) Perform the following actions at the "MISCELLANEOUS CONTROL AND INDICATION PANEL" drawer:	
		• Place the appropriate "ROD STOP BYPASS" switch to the failed channel position.	
		• Place the "POWER MISMATCH BYPASS" switch to the failed channel position.	
	BOP	(Step 8) Perform the following actions at the "DETECTOR CURRENT COMPARATOR" drawer:	
		• Place the "UPPER SECTION" switch to the failed channel position.	
		• Check the "CHANNEL DEFEAT" light for the upper section ‑ LIT.	
		• Place the "LOWER SECTION" switch to the failed channel position.	
		• Check the "CHANNEL DEFEAT" light for the lower section ‑ LIT.	
	BOP	(Step 9) Perform the following actions at the "COMPARATOR AND RATE" drawer:	
		• Place the "COMPARATOR CHANNEL DEFEAT" switch to the failed channel position.	

Op Test No.:	N16-1	Scenario #	4	Event #	2	Page 15 of 65
Event Description:	**Power Range Channel N41 Upper Detector failure**					

Time	Pos.	Expected Actions/Behavior	Comments
		• Check the "COMPARATOR DEFEAT" light - LIT.	
	BOP	(Step 10) Trip bistables of failed channel as follows:	
		• Remove Control Power fuses from "POWER RANGE A" drawer for failed channel.	
		• IF Power Range Cabinet shows evidence of damage (i.e. visible smoke or flame), THEN remove Instrument Power fuses from "POWER RANGE B" drawer.	**NOTE:** There is no sign of damage.
	RO	(Step 11) Check the following status lights for the failed channel - LIT:	
		• "NUC OVERPOWER ROD STOP CH I(II,III,IV) BYP" (1SI-19)	
		• "P/R HI FLUX LO STPT" (1SI-2)	
		• "P/R HI FLUX HI STPT" (1SI-2)	
		• "P/R HI FLUX RATE" (1SI-3).	
	RO	(Step 12) Check the following annunciator lights - LIT:	
		• "P/R HI VOLTAGE FAILURE" (1AD-2, F-3)	
		• "P/R HI FLUX HI STPT ALERT" (1AD-2, A-3)	
		• "P/R HI FLUX RATE ALERT" (1AD-2, A-1).	
	RO	(Step 13) Check the following status lights on 1SI-18 - LIT:	
		• "P/R LO SETPOINT TRAIN A TRIP BLOCKED"	

Op Test No.:	N16-1	Scenario #	4	Event #	2	Page	16 of 65
Event Description:	**Power Range Channel N41 Upper Detector failure**						

Time	Pos.	Expected Actions/Behavior	Comments
		• "P/R LO SETPOINT TRAIN B TRIP BLOCKED".	
	RO/ CRS	(Step 13 RNO) Perform the following:	
		• Check "P/R HI FLUX LO STPT ALERT" alarm (1AD-2, A-2) - LIT.	
		• IF alarm is dark, THEN …...	
	RO/ BOP	(Step 14) Check all CF control valves - IN AUTO.	
	RO	(Step 15) Adjust control rods to maintain T-Avg at T-Ref.	
	RO	(Step 15 RNO) IF rods will not move in manual, THEN adjust turbine load to maintain T-Avg at T-Ref.	
	RO	(Step 16) WHEN T-Avg within 1°F of T-Ref, AND auto rod control desired, THEN return control rods to auto.	**NOTE:** Due to plant mode of operation the rods will be left in MANUAL.
	CRS	(Step 17) Instruct IAE to trip the following bistables associated with failed P/R channel within 72 hours of failure PER IP/1/A/3090/014 (Tripping Inoperable Protection Channels):	**NOTE:** The CRS may call WCC/IAE to address the malfunction. If so, **Booth Instructor** acknowledge as WCC.
		• OPDT	
		• OTDT.	
	CRS	(Step 18) IF AT ANY TIME failed P/R channel is repaired prior to IAE tripping bistables, THEN…..	

Op Test No.:	N16-1	Scenario #	4	Event #	2	Page	17 of 65
Event Description:	**Power Range Channel N41 Upper Detector failure**						

Time	Pos.	Expected Actions/Behavior			Comments
					NOTE: The CRS will check the Technical Specifications.
TECHNICAL SPECIFICATION 3.3.1, REACTOR TRIP SYSTEM INSTRUMENTATION					
	CRS	LCO 3.3.1 The RTS instrumentation for each Function in Table 3.3.1-1 shall be OPERABLE.			
	CRS	APPLICABILITY: According to Table 3.3.1-1			
	CRS	ACTIONS			
		CONDITION	REQUIRED ACTION	COMPLETION TIME	
		A. One or more Functions with one or more required channels inoperable.	A.1 Enter the Condition referenced in Table 3.3.1-1 for the channel(s).	IMMEDIATELY	
		D. One channel inoperable.	NOTE: One channel may be bypassed for up to 12 hours for surveillance testing and setpoint adjustment. D.1.1 NOTE: Only required to be performed when the Power Range Neutron Flux input to QPTR is inoperable Perform SR 3.2.4.2 <u>AND</u> D.1.2 Place channel in trip. <u>OR</u> D.2 Be in MODE 3.	12 hours from discovery of THERMAL POWER > 75% RTP <u>AND</u> Once per 12 hours thereafter 72 hours 78 hours	**NOTE:** The CRS will determine that Function 2.a (Power Range Neutron Flux - HIGH), 2.b (Power Range Neutron Flux - LOW), 3 (Power Range Neutron Flux Rate), 6 (Overtemperature ΔT), 7 (Overpower ΔT), and 16.d (Power Range Neutron Flux – P10) are affected. The CRS will determine that Actions D.1.1 AND D.1.2, or D.2 are required to be taken.

Op Test No.:	N16-1	Scenario #	4	Event #	2	Page	18 of 65
Event Description:	**Power Range Channel N41 Upper Detector failure**						

Time	Pos.	Expected Actions/Behavior			Comments
		E. One channel inoperable.	NOTE: One channel may be bypassed for up to 12 hours for surveillance testing. E.1 Place channel in trip. OR E.2 Be in MODE 3.	72 hours 78 hours	CRS will determine that Actions E.1 OR E.2 are required to be taken.
		S. One or more channel(s) inoperable.	S.1 Verify interlock is in required state for existing unit conditions. OR S.2 Be in MODE 3.	1 hour 7 hours	CRS will determine that Actions S.1 OR S.2 are required to be taken.
					NOTE: The CRS will likely conduct a Focus Brief.

At the discretion of the Lead Examiner move to Event #3.

Op Test No.:	N16-1	Scenario #	4	Event #	3	Page	19 of 65
Event Description:	**Ground Fault on 1ETA**						

Following this, a ground fault will occur on 1ETA causing the bus to de-energize. The operator will enter AP/1/A/5500/07, "Loss of Electrical Power," and start the equipment on the B Train. The operator will address Technical Specification 3.8.1, "AC Sources Operating," 3.8.4, "DC Sources - Operating," and 3.8.9 "Distribution Systems - Operating."

Booth Operator Instructions: **insert MAL-EP008A ACTIVE**

Insert 1AD11_A01=ON

Indications Available:

- 1SI-14 Status Light for ETA LOSS/UNDERVOLTAGE PHASE X is LIT
- 1SI-14 Status Light for ETA LOSS/UNDERVOLTAGE PHASE Y is LIT
- 1SI-14 Status Light for ETA LOSS/UNDERVOLTAGE PHASE Z is LIT
- MCB Annunciator 1AD-11/A-2U ETA 600V LC TROUBLE
- MCB Annunciator 1AD-11/A-3U ETA 600V/120V TROUBLE
- 1ETA Normal Supply Breaker Green status light is LIT

Time	Pos.	Expected Actions/Behavior	Comments
AP/1/A/5500/07, LOSS OF ELECTRICAL POWER CASE II, LOSS OF NORMAL POWER TO EITHER 1ETA OR 1ETB			
	BOP	(Step 1) Check affected bus(s) - ENERGIZED AND SEQUENCER APPLYING LOADS.	**Immediate Action**
	BOP	(Step 1 RNO) Perform the following:	**Immediate Action**
		• IF both busses deenergized…	**NOTE:** 1ETB is energized.
		• Ensure the following pumps running on energized bus:	
		• NV pump	**NOTE:** The BOP will start the 1B NV Pump.
		• KC pumps	**NOTE:** The 1B1 and 1B2 KC Pumps are running.
		• RN pump.	**NOTE:** The BOP will start the 1B RN Pump.

Op Test No.:	N16-1	Scenario #	4	Event #	3	Page	20 of 65
Event Description:	**Ground Fault on 1ETA**						

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 2) Ensure NC pump thermal barrier isolation valves on energized train(s) – OPEN.	**Immediate Action**
	RO	(Step 3) Maintain reactor power less than or equal to 100%.	
	BOP	(Step 4) Check 1ETA and 1ETB – BOTH ENERGIZED.	**NOTE:** ONLY 1ETB is energized.
	CRS	(Step 4 RNO) GO TO Step 6.	
	BOP	(Step 6) Check – S/I HAS OCCURRED DURING THIS EVENT.	**NOTE:** SI has NOT occurred.
	BOP	(Step 6 RNO) Perform the following:	
		• IF both NV pumps off,…	**NOTE:** The 1B NV is running.
	CRS	• IF any pump was manually started per AP07 Immediate Actions, THEN GO TO Step 8.	**NOTE:** The 1B NV Pump was manually started.
	CRS	(Step 8) Check D/Gs – OFF.	
	BOP	(Step 9) Check ND System status:	
		• ND System – IN RHR MODE AT TIME OF B/O.	**NOTE:** ND is NOT in RHR Mode.
	CRS	(Step 9a RNO) GO TO Step 10.	

Op Test No.:	N16-1	Scenario #	4	Event #	3	Page	21 of 65
Event Description:	**Ground Fault on 1ETA**						

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 10) Check any RN pump – RUNNING.	**NOTE:** The 1B RN Pump is running.
	BOP	(Step 11) Align KC as follows:	
		• Place recirc valve on operating train in "AUTO":	
		• 1KC-54B (Train B Recirc Isol).	
		• Ensure KC flow remains less than 4000 GPM per operating KC pump while performing next step.	
		• Ensure the following valves on energized train are OPEN:	
		• B Train:	
		• OPEN 1KC-18B (Trn B Rx Bldg Non Ess Ret Isol)	
		• OPEN 1KC-228B (Trn B Rx Bldg Non Ess Sup Isol)	
		• OPEN 1KC-364B (B NC Pump Therm Bar Otlt)	
		• OPEN 1KC-413B (D NC Pump Therm Bar Otlt).	
	BOP	(Step 12) Check any charging pump – RUNNING.	
	BOP	(Step 13) Align RN as follows:	
		• Check 1A RN pump – RUNNING.	**NOTE:** The 1A RN is OFF.
	BOP	(Step 13a RNO) Align 1B RN as follows:	
		• Ensure 1RN-187B (B KC Hx Inlet Isol) is OPEN.	
		• THROTTLE 1RN-190B (RN To B KC Hx Control) for desired KC cooling, while maintaining the following:	

Op Test No.:	N16-1	Scenario #	4	Event #	3	Page	22 of 65
Event Description:	**Ground Fault on 1ETA**						

Time	Pos.	Expected Actions/Behavior	Comments
		• 1B RN pump flow – LESS THAN 14,000 GPM.	
		• 1B RN pump discharge pressure – GREATER THAN 50 PSIG.	
	BOP	• Start all available RV pumps.	**NOTE:** Two additional RV pumps will be started.
	CRS	• GO TO Step 14.	
	CRS	(Step 14) Notify Unit 2 RO to start 2A RN pump.	**Floor Instructor:** As U2 RO report “2A RN Pump is running.” **Booth Instructor:** **insertLOA-RN087 = ON delay = 60 seconds (Start 2A RN Pump)**
	BOP	(Step 15) Check VCT makeup control system.	
		• Ensure boric acid transfer pump on energized train running.	
		• Ensure NC System makeup controller in auto.	
		• Place NC System makeup switch to start.	
	BOP	(Step 16) Check – B/O ON 1ETA.	

Op Test No.:	N16-1	Scenario #	4	Event #	3	Page	23	of	65
Event Description:	**Ground Fault on 1ETA**								

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 17) Check B and D Pzr heater group supply breakers on vertical board – CLOSED.	**Examiner NOTE:** IF NV Pump not started on B Train within 20 seconds of BO, loss of letdown/ Pzr heaters off will occur, and require RNO actions. If NV Pump started within 20 seconds, move forward to Step 18.
	BOP	(Step 17 RNO) Perform the following:	
		• IF Pzr level is less than 17%,……	**NOTE:** Pzr level is most likely > 17%.
		• IF S/I has occurred, …...	**NOTE:** SI has NOT occurred.
		• Place the following Pzr heater groups in manual:	
		• B	
		• D	
		• Close the following Pzr heater group supply breakers:	
		• B	
		• D	
		• Close C Pzr heater group supply breaker.	
		• Return the following Pzr heater groups to auto:	
		• B	
		• D	
	BOP	(Step 18) Perform one of the following to isolate RN train crosstie:	

Op Test No.:	N16-1	Scenario #	4	Event #	3	Page	24 of 65
Event Description:		**Ground Fault on 1ETA**					

Time	Pos.	Expected Actions/Behavior	Comments
		• Dispatch operator to close 1RN-40A (Train A To Non Ess Hdr Isol) (aux bldg, 716+7, GG-55 beside Unit 1 side stairway to 695 elevation).	**NOTE:** The CRS will dispatch an AO to close 1RN-40A. **Floor Instructor/Booth Instructor:** acknowledge as appropriate. **insertREM-RN0040A_1 = 0, delay = 5 min (Close 1RN-40A)** After closing valve, **Booth Instructor** report action taken to Control Room.
		OR	
		Caution: Closing 1RN-41B (Train B To Non Ess Hdr Isol) will isolate 1B Train RN flow to NC pumps and other non essential loads.	
		• Evaluate CLOSING 1RN-41B (Train B To Non Ess Hdr Isol).	
	CRS	(Step 19) WHEN RN train crosstie is isolated, THEN 1RN-190B (RN To B KC Hx Control) may be throttled further OPEN, while maintaining the following:	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
		• 1B RN pump flow – LESS THAN 14,000 GPM.	
		• 1B RN pump discharge pressure – GREATER THAN 50 PSIG.	

Op Test No.:	N16-1	Scenario #	4	Event #	3	Page	25 of 65
Event Description:		**Ground Fault on 1ETA**					

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 20) Dispatch operator to close the following valves:	**NOTE:** CRS will dispatch an AO to close 1KC-230A and 1KC-3A. **Floor Instructor/Booth Instructor:** acknowledge as appropriate. **insert REM-KC0003A = 0, delay = 5 min (Close 1KC-3A)** **insert REM-KC0230A = 0, delay = 5 min (Close 1KC-230A)** After closing valves, **Booth Instructor** report action taken to Control Room.
	BOP	• 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol) (aux bldg, 750+12, JJ-55, above north end of KC HX 1A)	
	BOP	• 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol) (aux bldg, 733+8, HH-55, north of column HH-55).	
	BOP	(Step 21) Check 1A ND Train – WAS IN RHR MODE.	
	CRS	(Step 21 RNO) GO TO Step 36.	
	BOP	(Step 36) Check normal letdown – IN SERVICE.	**NOTE:** If normal letdown is in service, the CRS will proceed to Step 37.
	CRS	(Step 36 RNO) IF desired to establish normal or excess letdown, THEN have any available operator establish letdown PER AP/1/A/5500/12 (LOSS OF LETDOWN, CHARGING OR SEAL INJECTION) while continuing with this procedure.	**Examiner NOTE:** Normal Letdown may have isolated. **If so**, the CRS may direct **BOP** to restore Letdown per AP12. If so, follow actions on **Page 34**, while **crew continues in AP7**.

Op Test No.:	N16-1	Scenario #	4	Event #	3	Page	26 of 65
Event Description:	**Ground Fault on 1ETA**						

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 37) Check any Unit 1 6900V bus - ENERGIZED.	
	CRS	(Step 38) GO TO Step 45.	
	BOP	(Step 45) Announce occurrence on paging system.	**NOTE:** CRS may ask U2 RO to make Plant Announcement that the Unit 1 has entered AP-7. If so, **Floor Instructor** acknowledge as U2 RO.
	BOP	(Step 46) Check - S/I HAS OCCURRED DURING THIS EVENT.	
	CRS	(Step 46 RNO) Perform the following:	
		• Initiate EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 13 (VC And VA System Operation) within 30 minutes of B/O.	**NOTE:** The CRS may ask U2 BOP to perform Enclosure 13. If so, **Floor Instructor** acknowledge and indicate that U2 BOP is unavailable.
			Examiner NOTE: While the BOP is at the Ventilation Panel performing Enclosure 13, the Lead Examiner may elect to insert Event 4 to ensure that the RO performs the response actions. If so, Examiner following RO MOVE to **Page 41**.
			NOTE: The CRS will likely assign the BOP to perform this action. If so, **BOP Examiner** follow actions of Enclosure 13. **Other Examiners** follow **AP-7** Actions, **Step 47**, on **Page 30**.

Op Test No.:	N16-1	Scenario #	4	Event #	3	Page	27 of 65
Event Description:		Ground Fault on 1ETA					

Time	Pos.	Expected Actions/Behavior	Comments
		EP/1/A/5000/G-1, GENERIC ENCLOSURES ENCLOSURE 13, VC AND VA SYSTEM OPERATION	
			Examiner NOTE: Follow the actions associated with Enclosure 13 if BOP is assigned by CRS to perform.
	BOP	(Step 1) Check the following HVAC annunciator alarms - LIT:	
		• "VC/YC TRAIN A SAFETY ACTUATION" (0AD-11, G-1)	
		• "VC/YC TRAIN B SAFETY ACTUATION" (0AD-11, G-2).	
	BOP	(Step 1 RNO) Depress VC/YC Safety Actuation "INITIATE" pushbutton(s).	
	BOP	(Step 2) Check the following VC equipment - ON:	
		• "B CONTROL ROOM AHU"	
		• "A CONTROL ROOM AHU"	
		• Train selected YC pump.	
	BOP	(Step 2 RNO) Start equipment.	
	BOP	(Step 3) Check train selected Control Room Area Chiller - ON.	
	BOP	(Step 3 RNO) Perform the following:	
		• IF the "STOP" pushbutton is depressed on selected train, THEN…….	
		• IF train selected chiller is off, THEN start opposite train chiller as follows:	
		• Ensure RN pump aligned to desired chiller is running.	
		• Perform one of the following:	

Op Test No.:	N16-1	Scenario #	4	Event #	3	Page	28 of 65
Event Description:	**Ground Fault on 1ETA**						

Time	Pos.	Expected Actions/Behavior	Comments
		• IF desired to start A VC/YC chiller, THEN place the "VC/YC TRN A MODE SELECT" switch to "TRN A".	
		OR	
		• IF desired to start B VC/YC chiller, THEN place the "VC/YC TRN B MODE SELECT" switch to "TRN B".	
		• Depress "START" on chiller to be started.	
		• Check chiller starts within 2 minutes.	
		• IF neither chiller can be started, THEN…..	
		• Stop undesired train by performing the following:	
		• Depress "STOP" on chiller to be stopped.	
		• WHEN chiller "ON" indication dark, THEN select "OFF" on associated VC/YC mode select switch.	
	BOP	(Step 4) Check the following VC fans - ON:	
		• "B TRAIN CR OUTSIDE AIR PRESS FAN"	
		• "A TRAIN CR OUTSIDE AIR PRESS FAN".	
	BOP	(Step 4 RNO) Start equipment.	
	BOP	(Step 5) Check "OPEN" lights on the following dampers - DARK:	
		• CRA-OAD-4 (CR Area Otsd Air Fans Damper)	
		• CRA-OAD-3 (CR Area Otsd Air Fans Damper).	

Op Test No.:	N16-1	Scenario #	4	Event #	3	Page	29 of 65
Event Description:	Ground Fault on 1ETA						

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 5 RNO) CLOSE dampers.	
	BOP	(Step 6) Check the following fans ‑ OFF.	
		• "#1 CRA OTSD AIR FAN"	
		• "#2 CRA OTSD AIR FAN".	
	BOP	(Step 7) Check the following VC equipment for train selected ‑ ON:	
		B Train:	
		• 1B SWGR AHU (1ETA Supply)	
		• 2B SWGR AHU (2ETA Supply)	
		• 1D SWGR AHU (1ETB Supply)	
		• 2D SWGR AHU (2ETB Supply)	
		• "B CR AREA AHU"	
		• "BATT ROOM B EXH FAN"	
	BOP	(Step 8) Check the following AHUs ‑ ON:	
		• 1B NS AHU	
		• 1B ND AHU	
		• 1B KF AHU	
	BOP	(Step 9) Ensure VA filter units remain in filter mode as follows:	
		• Place the following switches in "TEST":	
		• "1B VA FILTER UNITS TEST"	
		• "1A VA FILTER UNITS TEST"	
		• Check the following closed:	
		• 1ABF‑D‑3 (1B VA Filter Exh Bypass Damper)	
		• 1ABF‑D‑3 (1A VA Filter Exh Bypass Damper)	

Op Test No.: N16-1	Scenario # 4	Event # 3	Page 30 of 65
Event Description:	**Ground Fault on 1ETA**		

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 10) Restart the following EMF Sample Blowers as required:	
		• EMF 41 (Aux Bldg Ventilation)	
		• EMF-43A (Control Room Air Intake Loc A)	
		• 1EMF-35, 36, 37 (Unit Vent Particulate, Gas, Iodine)	
		• 1EMF-42 (Fuel Bldg Ventilation)	
		• EMF-43B (Control Room Air Intake Loc B).	
	BOP	(Step 11) WHEN time and manpower allow, THEN dispatch operator to ensure VA System remains in proper alignment as follows:	**NOTE:** The BOP will contact or dispatch an AO to continue the local actions. If so, **Floor Instructor/Booth Instructor** acknowledge as AO.
AP/1/A/5500/07, LOSS OF ELECTRICAL POWER CASE II, LOSS OF NORMAL POWER TO EITHER 1ETA OR 1ETB			
			Examiner NOTE: Examiners following the **CRS/RO** continue **HERE.**
	CRS	(Step 47) Have available licensed operator initiate Enclosure 7 (DC Bus Alignment) within 30 minutes of B/O.	**NOTE:** The CRS may ask WCCS for an available Licensed Operator to perform Enclosure 7. If so, **Floor Instructor** acknowledge as WCCS, and perform.
	BOP	(Step 48) Check D/G on bus that was blacked out - ON.	**NOTE:** The 1A D/G is OOS.

Op Test No.:	N16-1	Scenario #	4	Event #	3	Page	31 of 65
Event Description:	**Ground Fault on 1ETA**						

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 48 RNO) Perform the following on affected D/G:	
		• IF D/G was stopped using emergency stop pushbutton,……	**NOTE:** The 1A D/G is OOS.
		• IF bus known to be locked out, THEN GO TO Step 50.	
			NOTE: The CRS will NOT stop to look at Tech Specs while in AP-07. Tech Spec review should occur after completion of scenario. Therefore, **at the discretion of the lead examiner, move to Event 4**
TECHNICAL SPECIFICATION 3.8.1, AC SOURCES - OPERATING			
	CRS	3.8.1 AC Source - Operating	
	CRS	LCO 3.8.1 The following AC electrical sources shall be OPERABLE:	
		• Two qualified circuits between the offsite transmission network and the Onsite Essential Auxiliary Power System AND • Two diesel generators (DGs) capable of supplying the Onsite Essential Auxiliary Power Systems AND • The automatic load sequencers for Train A and Train B shall be OPERABLE.	
	CRS	APPLICABILITY: MODES 1, 2, 3, and 4.	
	CRS	ACTIONS	
	CRS	CONDITION / REQUIRED ACTION / COMPLETION TIME	

Op Test No.:	N16-1	Scenario #	4	Event #	3	Page	32	of	65
Event Description:	**Ground Fault on 1ETA**								

Time	Pos.	Expected Actions/Behavior			Comments
		A. One offsite circuit inoperable.	A.1 Perform SR 3.8.1.1 for OPERABLE offsite circuit. AND A.2 Declare required features with no offsite power available inoperable with its redundant required feature(s) is inoperable. AND A.3 Restore offsite circuit to OPERABLE status.	1 hour AND Once per 8 hours thereafter 24 hours from discovery of no offsite power to one train concurrent with inoperability of redundant required feature(s). 72 hours AND 6 days from failure to meet LCO.	**NOTE:** The CRS will determine that one offsite line and one DG are inoperable because neither are capable of supplying the Emergency Bus (TS Basis pB3.8.1-2). Consequently, ACTION A.1, A.2 and A.3 must be entered. Additionally, The CRS will determine that ACTION B.1, B.2, either B.3.1 or B.3.2 and B.4 must be entered.

Op Test No.:	N16-1	Scenario #	4	Event #	3
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Event Description:	**Ground Fault on 1ETA**				

Time	Pos.	Expected Actions/Behavior			Comments
		B. One DG inoperable.	B.1 Perform SR 3.8.1.1 for OPERABLE offsite circuit. AND B.2 Declare required features supported by the inoperable DG inoperable when its required redundant feature(s) is inoperable. AND B.3.1 Determine inoperable DG is not inoperable due to common cause failure. OR B.3.2 Perform SR 3.8.1.2 for OPERABLE DG. AND B.4 Restore DG to OPERABLE status	1 hour AND Once per 8 hours thereafter. 4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s). 24 hours 24 hours 72 hours AND 6 days from failure to meet LCO.	
TECHNICAL SPECIFICATION 3.8.4, DC SOURCES - OPERATING					
	CRS	LCO 3.8.4 The four channels of DC sources shall be OPERABLE.			
	CRS	APPLICABILITY: MODES 1, 2, 3, and 4.			
	CRS	ACTIONS			

Op Test No.:	N16-1	Scenario #	4	Event #	3	Page 34 of 65
Event Description:	**Ground Fault on 1ETA**					

Time	Pos.	Expected Actions/Behavior	Comments
		CONDITION / REQUIRED ACTION / COMPLETION TIME A.. One channel of DC source inoperable. / A.1 Restore channel of DC source to OPERABLE status. / 2 hours OR A.2.1 Verify associated bus tie breakers are closed between DC channels. / 2 hours AND A.2.2 Restore channel of DC source to OPERABLE status. / 72 hours	**NOTE:** The CRS will determine that the AC Battery Chargers are inoperable. (TS Basis pB3.8.4-3). Consequently, ACTION A.1, or A.2.1 and A.2.2 must be entered.
TECHNICAL SPECIFICATION 3.8.9, DISTRIBUTION SYSTEMS - OPERATING			
	CRS	LCO 3.8.9 Train A and Train B AC, four channels of DC, and four AC vital buses electrical power distribution subsystems shall be OPERABLE.	
	CRS	APPLICABILITY: MODES 1, 2, 3, and 4.	
	CRS	ACTIONS	
		CONDITION / REQUIRED ACTION / COMPLETION TIME A. One or more AC electrical power distribution subsystem(s) inoperable. / A.1 Restore AC electrical power distribution subsystem(s) to OPERABLE status. / 8 hours AND 16 hours from discovery of failure to meet LCO.	**NOTE:** The CRS will determine that 1ETA is inoperable. Consequently, ACTION A.1 must be entered.

Op Test No.:	N16-1	Scenario #	4	Event #	3	Page	35	of 65
Event Description:		Ground Fault on 1ETA						

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: If normal letdown is isolated, the CRS may direct the BOP to perform AP-12, while the remainder of the crew continues with AP-7. If so, **BOP Examiner** follow the AP-12 steps below.
AP/1/A/5500/12, LOSS OF LETDOWN, CHARGING OR SEAL INJECTION			
	BOP	(Step 1) Check if charging is aligned to Regenerative Hx as follows:	
		• Charging flow – GREATER THAN 20 GPM	**NOTE:** The BOP may take MANUAL control of 1NV-238 to control Charging flow.
		• 1NV-241 (U1 Seal Water Inj Flow Control) – THROTTLED OPEN	
		• 1NV-244A (U1 Charging Hdr Cont Outside Isol) - OPEN	
		• 1NV-245B (U1 Charging Hdr Cont Outside Isol) – OPEN.	
	BOP	(Step 2) Check Pzr Level – LESS THAN 96%.	
	BOP	(Step 3) Stop any power or temperature changes in progress.	
	BOP	(Step 4) Announce occurrence on paging system.	**NOTE:** CRS may ask U2 RO to make Plant Announcement that AP-12 has been entered. If so, **Floor Instructor** acknowledge as U2 RO.
	BOP	(Step 5) IF this AP entered due to loss of letdown only, THEN GO TO Step 37.	

Op Test No.:	N16-1	Scenario #	4	Event #	3	Page	36	of	65
Event Description:	Ground Fault on 1ETA								

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 37) Ensure the following valves are CLOSED:	
		• 1NV-458A (U1 75 GPM L/D Orifice Otlt Cont Isol)	
		• 1NV-457A (U1 45 GPM L/D Orifice Otlt Cont Isol)	
		1NV-35A (U1 Variable L/D Orifice Otlt Cont Isol).	
	BOP	(Step 38) Ensure NC System makeup controller is in AUTO.	
	BOP	(Step 39) Ensure charging flow going down to maintain Pzr at program level.	**NOTE:** The BOP may take MANUAL control of 1NV-238 to control Charging flow.
	BOP	(Step 40) Check “LETDN RELIEF HI TEMP” alarm (1AD-7, I-4) – HAS REMAINED DARK.	
	BOP	(Step 41) Check 1NV-21A (U1 NV Supply to U1 Aux PZR Spray Isol) – CLOSED.	
	BOP	(Step 42) Operate Pzr heaters as follows:	
		• Check A, B, and D Pzr heater group supply breakers on vertical board – CLOSED.	
		• Check normal Pzr spray – AVAILABLE.	
	BOP	Place the following Pzr heater groups in manual and “ON” to maximize spray flow:	
		• A	
		• B	
		• D	
	BOP	(Step 43) Check the following valves – OPEN:	**NOTE:** If normal Letdown has been isolated, it is likely that these valves are CLOSED.

Op Test No.:	N16-1	Scenario #	4	Event #	3	Page	37 of 65
Event Description:	**Ground Fault on 1ETA**						

Time	Pos.	Expected Actions/Behavior	Comments
		• 1NV-1A (U1 NC L/D Isol To Regenerative Hx)	
		• 1NV-2A (U1 NC L/D Isol To Regenerative Hx).	
	BOP	(Step 43 RNO) Perform the following:	
		• IF normal letdown known to be unavailable, …….	**NOTE:** If Pzr level has been restored, Normal Letdown is available.
		• Prior to opening 1NV-1A or 1NV-2A in subsequent step, attempt to evacuate all personnel from lower containment (potential water hammer event).	
		• Observe Caution prior to Step 45 and GO TO Step 45.	
	BOP	(Caution prior to Step 45) Establishing normal letdown without local pressurization may cause some water hammer.	
	BOP	Determine if conditions allow immediate restoration of normal letdown as follows:	
		• Check both 1NV-1A (U1 NC L/D Isol To Regenerative Hx) and 1NV-2A (U1 NC L/D Isol To Regenerative Hx) – OPEN WITHIN THE LAST 60 MINUTES.	
		• Check orifice isolation valves – AUTO CLOSED	
	BOP	• Determine exact time each NV letdown valve went closed on the OAC by performing the following:	
		○ Enter turn on code "ARCHIVE".	
		○ Ensure OAC automatically populates "START TIME" and STOP TIME" (previous hour).	
		○ Enter group name "AP12".	
		○ Click "F3 - VIEW PID".	

Op Test No.:	N16-1	Scenario #	4	Event #	3	Page	38	of 65
Event Description:	**Ground Fault on 1ETA**							

Time	Pos.	Expected Actions/Behavior	Comments
		• Check if orifice isolation valves reached fully closed - PRIOR TO 1NV-1A OR 1NV-2A CLOSING.	
	BOP	(Step 46) GO TO Step 49.	
	BOP	(Step 49) Establish normal letdown as follows:	
		• Ensure 1NV-459 (U1 Variable L/D Orifice Outlet Flow Cntrl) is CLOSED.	
		• Place 1NV-124 (U1 Letdown Press Control) in manual with output between 40-45% OPEN.	
		• Check OAC – IN SERVICE.	
		• Check valve position on OAC for 1NV-124 – INDICATING THROTTLED.	
		• Check the following valves – OPEN:	**NOTE:** Both valves are expected to be CLOSED.
		• 1NV-1A (U1 NC L/D Isol To Regenerative Hx)	
		• 1NV-2A (U1 NC L/D Isol To Regenerative Hs).	
		• IF time allows, THEN wait until all personnel are evacuated from lower containment.	
		• Establish cooling to Regenerative Hx by performing the following concurrently:	
	BOP	• Establish at least 65 GPM charging flow by THROTTLING OPEN 1NV-238 (U1 Charging Hdr Control) or raising PD pump speed.	**NOTE:** The BOP will take MANUAL control of 1NV-238 to control Charging flow.
		• THROTTLE 1 NV-241 (U1 Seal Water Inj Flow Control) to establish approximately 8 GPM seal injection flow to each NC pump.	
	BOP	• OPEN letdown line isolation valves as follows:	

Op Test No.:	N16-1	Scenario #	4	Event #	3	Page	39 of 65
Event Description:	**Ground Fault on 1ETA**						

Time	Pos.	Expected Actions/Behavior	Comments
		• OPEN 1NV-7B (U1 Letdown Cont Outside Isol).	
		• OPEN 1NV-1A (U1 NC L/D Isol To Regenerative Hx).	
		• OPEN 1NV-2A (U1 NC L/D Isol To Regenerative Hx).	
		• OPEN 1NV-35A (U1 Variable L/D Orifice Otlt Cont Isol).	
	BOP	• Slowly THROTTLE OPEN 1NV-459 (U1 Variable L/D Orifice Outlet Flow Cntrl) until one of the following conditions met:	
		• Letdown flow - GOES UP	
		OR	
		• 1NV-459 valve demand - AT 60%.	
	BOP	• Do not continue until one of the above conditions is met.	
	BOP	• Check letdown flow - HAS GONE UP.	
	BOP	• THROTTLE CLOSED 1NV-124 (U1Letdown Press Control) until one of the following conditions is met:	
		• Letdown pressure is between 250-350 PSIG.	
		OR	
		• 1NV-124 is 10-20% OPEN.	
	BOP	• Adjust charging flow as needed in subsequent steps while maintaining the following:	
		• NC pump seal injection flow greater than 6 GPM	
		• Regenerative Hx letdown temperature less than 380°F.	
	BOP	• Establish desired letdown flow (normally greater than or equal to 75 GPM) by completing the following concurrently:	

Op Test No.:	N16-1	Scenario #	4	Event #	3	Page	40 of 65
Event Description:	**Ground Fault on 1ETA**						

Time	Pos.	Expected Actions/Behavior	Comments
		• Slowly THROTTLE OPEN 1NV-459 (U1 Variable L/D Orifice Outlet Flow Orifice Outlet Flow Cntrl) to achieve desired letdown flow.	
		• As letdown pressure rises, THROTTLE 1NV-124 (U1 Letdown Press Control) to maintain letdown pressure between 250 PSIG and 350 PSIG.	
	BOP	• Do not continue until desired flow rate is established.	
	BOP	• Check setpoint for 1NV-124 (U1 Letdown Press Control) – SET BETWEEN 348-352 PSIG.	
	BOP	• THROTTLE 1NV-124 to obtain letdown pressure between 348-352 PSIG.	
	BOP	• Place 1NV-124 in auto.	
	BOP	• Ensure letdown pressure controlling between 348-352 PSIG.	
	BOP	• IF more letdown flow required…..	**NOTE:** Additional Letdown flow will NOT be required.
	BOP	• Adjust charging flow as desired while maintaining the following:	
		• NC pump seal injection flow greater than 6 GPM	
		• Regenerative Hx letdown temperature less than 380°F	
		• Pzr level at program level.	
	BOP	• Check 1A or 1B NV pump - SUPPLYING NORMAL CHARGING.	**NOTE:** The 1B NV Pump is running.
	BOP	• WHEN Pzr level matches program level, THEN perform the following:	
		• Place 1NV-238 (U1 Charging Hdr Control) in auto.	
		• On DCS workstation, place "PZR LEVEL MASTER" in auto.	

Op Test No.:	N16-1	Scenario #	4	Event #	3	Page	41 of 65
Event Description:	**Ground Fault on 1ETA**						

Time	Pos.	Expected Actions/Behavior	Comments
		• THROTTLE 1NV-241 (U1 Seal Water Inj Flow Control) as necessary to maintain approximately 8 GPM seal injection flow to each NC pump.	
	BOP	• Notify Chemistry that normal letdown is in service.	**NOTE:** The BOP may contact WCCS/Chemistry for this notification. If so, **Booth Instructor** acknowledge as WCCS/Chemistry.
	BOP	• Check position of 1NV-127A (U1 L/D Hx 3-Way Temp Control) - ALIGNED TO "DEMIN".	
	BOP	• Operate Pzr heaters as desired.	
	BOP	• WHEN time allows, THEN notify engineering to document the following transients:	**NOTE:** The BOP may contact WCCS/RE for this notification. If so, **Booth Instructor** acknowledge as WCCS/RE.
		• Letdown isolation	
		• Potential charging nozzle transient	
		• IF NV Aux Spray was in service, THEN spray nozzle transient.	
	BOP	• Check excess letdown - ISOLATED.	
	BOP	• RETURN TO procedure and step in effect.	**NOTE:** The BOP will inform the CRS that Normal Letdown has been restored.
At the discretion of the Lead Examiner move to Event #4.			

Op Test No.:	N16-1	Scenario #	4	Event #	4	Page	42 of 65
Event Description:	**C-9 Failure causing failure of 1B SG PORV (Manual Control avail)**						

Afterwards, the C-9 Interlock will fail causing the Steam Dump Valves to close. The SG PORVs will open to maintain Steam Generator pressure at setpoint. As these valves open, the 1B SG PORV Controller will fail such that the valve slowly opens. The operator will implement AP/1/A/5500/01, "Steam Leak" and take manual control of the 1B SG PORV.

Booth Operator Instructions: **Insert MAL-IPE004H = True**

insert XMT-SM_1SMPT5510 = 1150

Indications Available:

- OAC Alarm: 1SV1 1B SM PORV OPEN
- 1SI-18 C-9 COND AVAILABLE FOR STM DUMP
- 1SV-13AB Red status light is LIT

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: It is likely that the operator will take actions to close the 1B SG PORV prior to being directed by the CRS. (Step 13)
		AP/1/A/5500/01, STEAM LEAK	
	RO/ BOP	(Step 1) Monitor Foldout page.	
	RO	(Step 2) Reduce turbine load to maintain the following:	**NOTE:** The Turbine is NOT operating.
		• Excore NI's – LESS THAN OR EQUAL TO 100%.	
		• NC Loop D/T's – LESS THAN 60°F D/T	
		• T-Avg – AT T-REF.	
	CRS	(Step 3) Check containment entry – IN PROGRESS.	**NOTE:** A Containment Entry is NOT in progress.
	CRS	(Step 3 RNO) GO TO Step 5.	

Op Test No.:	N16-1	Scenario #	4	Event #	4	Page	43 of 65
Event Description:	**C-9 Failure causing failure of 1B SG PORV (Manual Control avail)**						

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 5) Check Pzr pressure prior to event – GREATER THAN P-11 (1955 PSIG).	
	BOP	(Step 6) Check Pzr level – STABLE OR GOING UP.	**NOTE:** Pzr level will most likely be stable.
	BOP	(Step 7) IF AT ANY TIME while in this procedure Pzr level cannot be maintained stable, THEN RETURN TO Step 6.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	CRS	(Step 8) GO TO Step 12.	
	CRS	(Step 12) Announce occurrence on paging system.	**NOTE:** CRS may ask U2 RO to make Plant Announcement that the Unit 1 has entered AP-1. If so, **Floor Instructor** acknowledge as U2 RO.
	RO	(Step 13) Identify and isolate leak on Unit 1 as follows:	
		• (Step 13a) Check SM PORVs – CLOSED.	**NOTE:** The SG PORVs may be Open.
	RO	(Step 13a RNO) IF S/G pressure is less than 1092 PSIG, THEN	
		• CLOSE affected S/G SM PORV manual loader.	**NOTE:** Closing the Manual Loader will CLOSE the valve.
		• IF SM PORV is still open, THEN…	**NOTE:** The 1B SG PORV is CLOSED.
	RO	• (Step 13.b) Check condenser dump valves – CLOSED.	
	BOP	• (Step 13.c) Check containment conditions – NORMAL:	
		• Containment temperature	
		• Containment pressure	

Op Test No.:	N16-1	Scenario #	4	Event #	4	Page	44 of 65
Event Description:	**C-9 Failure causing failure of 1B SG PORV (Manual Control avail)**						

Time	Pos.	Expected Actions/Behavior	Comments
		• Containment humidity	
		• Containment floor and equipment sump level.	
	RO / BOP	• (Step 13.d) Check TD CA pump – OFF.	
	BOP	• (Step 13.e) Check valves on "STEAM LINE DRAIN VALVES" board (1MC-9) – CLOSED.	
	CRS	• (Step 13.f) Check opposite Unit (Unit 2) "STEAM HEADER PRESSURE" – GREATER THAN 200 PSIG.	**NOTE:** CRS may ask U2 RO for AS Header pressure. If so, **Floor Instructor** report as **U2 RO that U2 Steam Header pressure** is **≈1000 psig**.
		• (Step 13.g) Dispatch operator to check for leaks.	**NOTE:** The CRS may dispatch an AO to look for leaks. If so, **Floor Instructor:** acknowledge. **Booth Instructor:** Report back in 3-5 minutes that there are no leaks.
			NOTE: The CRS may NOT dispatch AOs to look for leaks because it is understood that the SM PORV opening was the reason that AP-1 was entered.
	BOP	(Step 14) Check UST level – STABLE OR GOING UP.	
	CRS	(Step 15) Evaluate unit shutdown as follows:	
		• Check unit status – IN MODE 1 OR 2.	
		• Determine if unit shutdown or load reduction is warranted based on the following criteria:	**NOTE:** CRS may call WCC/Management to address the startup. If so, **Booth Instructor** acknowledge as WCC. If needed, as Station Management direct that the crew continue to hold at this power level.

Op Test No.: N16-1	Scenario # 4	Event # 4	Page 45 of 65
Event Description:	**C-9 Failure causing failure of 1B SG PORV (Manual Control avail)**		

Time	Pos.	Expected Actions/Behavior	Comments
		• Size of leak	
		• Location of leak	
		• Rate of depletion of secondary inventory	
		• IF steam is leaking from a secondary heater relief OR MSR relief valve THEN…	
		• IF turbine trip will isolate steam leak (such as feedwater heater leak or MSR leak THEN…	
		• Check unit shutdown or load reduction – REQUIRED.	**NOTE:** Shutdown/Load Reduction will NOT be required.
	CRS	(Step 15.c RNO) Perform the following:	
		• Maintain present plant conditions until leak can be isolated or repaired.	
		• Exit this procedure.	
			NOTE: The CRS will likely conduct a Focus Brief.
At the discretion of the Lead Examiner, move to Event #5.			

Op Test No.:	N16-1	Scenario #	4	Event #	5	Page	46 of 65
Event Description:	**1A NCP Pump Bearing Oil Cooler Leak**						

Shortly after this, a leak will develop on the 1A NCP Upper Bearing Oil Reservoir. The operator will respond in accordance with AP/1/A/5500/08, "Malfunction of NC Pump," and the operator will be required to trip the reactor, stop the 1A NCP, and go to EP/1/A/5000/E-0, "Reactor Trip and/or Safety Injection."

Booth Operator Instructions: **insert MAL-NCP007AU = TRUE**

Indications Available:

- OAC Alarm M1A1500 1A NC PUMP UPPER OIL RESERVOIR LEVEL

Time	Pos.	Expected Actions/Behavior	Comments
OAC ALARM M1A1500 1A NC PUMP UPPER OIL RESERVOIR LEVEL			
	CRS	(LO-LO Step 1) Go To AP/1/A/5500/08, Malfunction of NC Pump.	
			NOTE: The CRS will enter AP-08.
AP/1/A/5500/08, MALFUNCTION OF NC PUMP CASE II, NC PUMP MOTOR BEARING MALFUNCTION			
	BOP	(Step 1) Check abnormal NC pump parameter – KNOWN TO BE VALID.	**NOTE:** The BOP will use Enclosure 1 to determine that the parameter is known to be valid. (NOT scripted)
	BOP	(Step 2) Check NC pump parameters within operating limits:	
		• All NC pump stator winding temperatures – LESS THAN 311°F.	
		• All NC pump motor bearing temperatures – LESS THAN 195°F.	
		• All NC pump oil reservoir level computer points – INDICATING BETWEEN (-)1.25 AND (+)1.25.	**NOTE:** The oil reservoir level is NOT within band.
	BOP	(Step 2 RNO) IF trip criteria valid, THEN GO TO Step 5.	

Op Test No.:	N16-1	Scenario #	4	Event #	5	Page	47 of 65
Event Description:	**1A NCP Pump Bearing Oil Cooler Leak**						

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 5) Stop affected NC pump as follows:	
	BOP	• IF A or B NC pump is the affected pump, THEN CLOSE associated spray valve:	**NOTE:** The 1A NC Pump is the affected NC Pump.
		• 1NC-27C (A NC Loop PZR Spray Control).	
		• Check unit status – IN MODE 1 OR 2.	
	RO	• Trip reactor.	
	BOP	• WHEN reactor power less than 5%, THEN stop affected NC pump.	**NOTE:** The plant power is currently < 5%.
	CRS	• GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).	

At the discretion of the Lead Examiner, move to Events #6-7.

Op Test No.: N16-1	Scenario # 4	Event # 6 & 7	Page 48 of 65
Event Description:	**ATWS/ Loss of Switchyard to Unit 1/1B EDG fails to START**		

When the operator attempts to manually trip the reactor, an ATWS will occur. The operator will enter EP/1/A/5000/E-0, "Reactor Trip or Safety Injection," and then transition to EP/1/A/5000/FR-S.1, "Response to Nuclear Power Generation/ATWS." During the performance of FR-S.1, the operator will continuously drive rods in manually, and successfully trip the Reactor locally. After the crew has locally tripped the reactor but still implementing FR-S.1, a loss of the Unit 1 Switchyard will occur, and the 1B Emergency Diesel Generator will fail to start. The operator will immediately transition to EP/1/A/5000/ECA-0.0, "Loss of All AC Power." The operator will restore power to 1ETB per Unit 2 6900V busses through SATB per Enclosure 14 "Energizing Unit 1 4160V Bus From Unit 2 - SATA or SATB." The scenario will terminate when one ESF Bus has been re-energized.	
Booth Operator Instructions:	**Insert MAL-IPE001A = TRUE (ATWS)** **Insert MAL-IPE001B = TRUE (ATWS)** **Insert MAL-IPE002A = TRUE (ATWS)** **Insert MAL-IPE002B = TRUE (ATWS)** **NOTE: These malfunctions are entered at T=0**
Indications Available: • MCB Annunciator 1FO-1, MANUAL RX TRIP, is LIT. • Both Rx Trip Breakers are CLOSED (red status lights are LIT) • DRPI indicates that all Control Rods are NOT on the bottom of the core.	

Time	Pos.	Expected Actions/Behavior	Comments
		EP/1/A/5000/E-0, REACTOR TRIP OR SAFETY INJECTION	
	RO/ BOP	(Step 1) Monitor Foldout page.	**NOTE:** Crew will carry out Immediate Actions of E-0, prior to the CRS addressing the EP.
	RO	(Step 2) Check Reactor Trip:	**Immediate Action**
		• All rod bottom lights – LIT	
		• Reactor trip and bypass breakers – OPEN	
		• I/R amps – GOING DOWN.	
	RO	(Step 2 RNO) Perform the following:	**Immediate Action**
		• Trip reactor.	

Op Test No.:	N16-1	Scenario #	4	Event #	6 & 7	Page	49	of	65
Event Description:	**ATWS/ Loss of Switchyard to Unit 1/1B EDG fails to START**								

Time	Pos.	Expected Actions/Behavior	Comments
	RO	• IF reactor will not trip, THEN perform the following:	**NOTE:** The CRS may dispatch an AO to locally trip the reactor. If so, **Booth Instructor** After **2 Minutes insert:** **LOA-IPE011=TRIP (Rx Trip Bkr 1A)** **LOA-IPE012=TRIP (Rx Trip Bkr 1B)** **As an Alternate Insert:** **LOA-IRE001A = OPEN (MG Set 1A Gen Output Bkr)** **LOA-IRE002A = OPEN (MG Set 1B Gen Output Bkr)**
		• Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).	
	CRS	• GO TO EP/1/A/5000/FR-S.1 (Response To Nuclear Power Generation/ATWS).	**NOTE:** The CRS will transition to FR-S.1.
EP/1/A/5000/FR-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ATWS			
	RO	(Step 1) Check Reactor Trip:	**Immediate Action**
		• All rod bottom lights - LIT	
		• Reactor trip and bypass breakers - OPEN	
		• I/R amps – GOING DOWN.	
	RO	(Step 1 RNO) Perform the following:	**Immediate Action**
		• Trip the reactor.	
		• IF reactor will not trip, THEN manually insert rods.	**NOTE:** The RO will manually drive Rods inward.

Op Test No.: N16-1	Scenario # 4	Event # 6 & 7	Page 50 of 65
Event Description:	ATWS/ Loss of Switchyard to Unit 1/1B EDG fails to START		

Time	Pos.	Expected Actions/Behavior	Comments
Critical Task: **Manually commence driving rods inward before completing the immediate actions of FR-S.1 (Step 2).** Safety Significance: failure to insert negative reactivity, under the postulated plant conditions, results in an unnecessary situation in which the reactor remains critical or returns to a critical condition. Performance of the critical task would move the reactor towards a subcritical condition to prevent a subsequent return to criticality. A failure to insert negative reactivity constitutes a mis-operation or incorrect crew performance which leads to incorrect reactivity control.			
	BOP	(Step 2) Check Turbine Trip:	**Immediate Action**
		• All throttle valves – CLOSED.	
	RO/ BOP	(Step 3) Monitor Foldout page.	
		Cold Leg Recirc Switchover Criteria	
		CA Suction Sources	
		Position Criteria for 1NV‑150B and 1NV‑151A (U1 NV Pump Recirc Isol)	
	BOP	(Step 4) Check proper CA pump status:	
		• MD CA pumps – ON.	**NOTE:** The 1A MDCA Pump does not have power.
	BOP	(Step 4.a RNO) Start pumps.	**NOTE:** The BOP will NOT attempt to start the 1A MD CA Pump.
	BOP	• Check N/R Level in at least 3 S/Gs – GREATER THAN 17%.	
	BOP	(Step 5) Initiate emergency boration of NC System as follows:	
		• Ensure one NV pump - ON	

Op Test No.:	N16-1	Scenario #	4	Event #	6 & 7	Page	51 of 65
Event Description:	**ATWS/ Loss of Switchyard to Unit 1/1B EDG fails to START**						

Time	Pos.	Expected Actions/Behavior	Comments
		• Align boration flowpath as follows:	
		• Open 1NV-265B (Boric Acid To NV Pumps).	
		• Start both boric acid transfer pumps.	**NOTE:** Only the 1B Boric Acid Pump will start.
		• Check emergency boration flow – GREATER THAN 30 GPM.	
		• Check if NV flowpath aligned to NC System:	
		• 1NV-244A (Charging Line Cont Outside Isol) – OPEN.	
		• 1NV-245B (Charging Line Cont Outside Isol) – OPEN.	
		• Ensure charging flow is greater than emergency Boration flow.	
		• Check Pzr pressure – LESS THAN 2335 PSIG.	
	BOP	(Step 6) Close the following VQ valves:	
		• CLOSE 1VQ-1A (U1 Cont Air Release Inside Isol)	
		• CLOSE 1VQ-6A (U1 Cont Air Addition Inside Isol)	
		• CLOSE 1VQ-2B (U1 Cont Air Release Outside Isol)	
		• CLOSE 1VQ-5B (U1 Cont Air Addition Outside Isol)	
	BOP	(Step 7) IF AT ANY TIME while in this procedure an S/I signal exists or occurs, THEN perform the following:	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
		• Have another Licensed Operator check S/I equipment PER Enclosure 3 (Subsequent S/I Actions).	
	CRS	• Continue with this procedure.	

Op Test No.:	N16-1	Scenario #	4	Event #	6 & 7	Page	52	of	65
Event Description:	ATWS/ Loss of Switchyard to Unit 1/1B EDG fails to START								

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 8) Check if the following trips have occurred:	
		• Reactor trip.	
Booth Operator Instructions:		**Insert MAL-EP002 AND EP002B = TRIP** **Insert MAL-DG001B = TRUE**	
Indications Available: • Control Room lights dim. • 1B EDG does NOT start as required.			
			NOTE: The CRS will transition to ECA-0.0.
EP/1/A/5000/ECA-0.0, LOSS OF ALL AC POWER			
			NOTE: Crew will carry out Immediate Actions of ECA-0.0, prior to the CRS addressing the EP.
			Examiner NOTE: Record the Time of the Loss of All AC Power. **Critical Task 2 Time Start:** _______________
	CRS	(Step 1) CSF Status trees should be monitored for information only. EPs referenced by them should not be implemented.	
	RO	(Step 2) Check Reactor Trip:	**Immediate Action**
		• All rod bottom lights – LIT	**NOTE:** DRPI is NOT available on the LOOP.
		• Reactor trip and bypass breakers – OPEN	
		• I/R amps – GOING DOWN.	
	RO	(Step 3) Check Turbine Trip:	**Immediate Action**

Op Test No.:	N16-1	Scenario #	4	Event #	6 & 7	Page	53	of	65
Event Description:	**ATWS/ Loss of Switchyard to Unit 1/1B EDG fails to START**								

Time	Pos.	Expected Actions/Behavior	Comments
		• All throttle valves – CLOSED.	
	CRS	(Step 4) Establish NC pump seal injection from the SSF as follows:	
	CRS	• Immediately dispatch operator to SSF to perform the following:	**NOTE:** The CRS will dispatch an AO to complete Enclosure 2. **Booth Instructor** acknowledge as appropriate, after seven minutes **insert ECA-0.0 (Enclosure 2 SSF Actions) and report that Enclosure 2 is complete.**
		• Obtain Brown Folder at SSF and complete Enclosure 2 (Unit 1 SSF - ECA-0.0 Actions).	**Examiner NOTE:** Record the Time of the Dispatch of the Operator to perform Enclosure 2. **Critical Task 2 Time 1 Stop:** ________________ (3 Minutes)
	CRS	• Dispatch operator to 1ETA room as follows:	
		• Check if operator will enter aux bldg – FROM MG SET ROOM.	
		• Give operator dosimeter from Unit 2 SRO desk.	

Op Test No.:	N16-1	Scenario #	4	Event #	6 & 7	Page	54	of 65
Event Description:	ATWS/ Loss of Switchyard to Unit 1/1B EDG fails to START							

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	• Dispatch operator to perform Enclosure 3 (Unit 1 ETA And ETB Rooms – ECA-0.0 Actions).	**NOTE:** The CRS will dispatch an AO to complete Enclosure 3. If so, **Booth Instructor** acknowledge as appropriate. **Booth Instructor:** wait **2 minutes**, then **insert ECA-0.0 ENCLOSURE 3, then report that Enclosure 3 is complete.**
			Examiner NOTE: Record the Time of the Dispatch of the Operator to perform Enclosure 2. **Critical Task 2 Time 2 Stop:** ________________ (4 Minutes)

Critical Task:

Dispatch an operator to perform Enclosure 2 of ECA-0.0 and a separate operator to perform Enclosure 3 of ECA-0.0 within 3 minutes and 4 minutes respectively, from the loss of NC Pump Seal Injection Flow (Station Blackout), in order to establish NC Pump Seal Injection flow from the SSF.

Safety Significance: Failure to Establish NC pump seal injection from the SSF within ten minutes as required by Enclosure 13.11, Initiate SSF NCP Seal Injection and Swap to the SSF, of PT/0/A/4600/113, Operator Time Critical Task Verification, when able to do so, constitutes "mis-operation" or incorrect performance which leads to degraded NC Pump Seals and may result in a Seal Failure/Small Break LOCA. Failure to perform the Critical Task may result in a needless challenge and/or degradation of a fission product barrier at the point of the intact NC Pump Seals. Since the conditions exist to dispatch both operators, not taking this action constitutes incorrect performance that leads to degradation of the RCS and/or fuel cladding fission product barriers. Dispatch by the CRS within the stated times ensure that NC Pump Seal Injection Flow can be established from the SSF within 10 minutes.

Op Test No.:	N16-1	Scenario #	4	Event #	6 & 7	Page	55	of	65
Event Description:	**ATWS/ Loss of Switchyard to Unit 1/1B EDG fails to START**								

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	• Use any of the following to notify security to immediately dispatch officer with key to SSF to ensure operator can access SSF:	**NOTE:** The CRS will dispatch a Security Officer to the SSF. **Booth Instructor:** Acknowledge as Security.
		• Security ringdown phone (located on Unit 2 SRO desk)	
		• 2688	
		• 4900.	**Floor Instructor:** If asked, U2 does NOT have normal power, and both DGs are running.
	RO/ BOP	(Step 5) Monitor Foldout Page	
		Alternate Low Pressure Feedwater (applies after Step 8 in body of the procedure)	
		Loss of Vital Instrumentation or Control Power	
		Low Decay Heat Temperature Control	
		CA Suction Sources (applies after Step 11 in body of the procedure)	
	BOP	(Step 6) Check NC System – ISOLATED:	
	BOP	• Check the following letdown orifice isolation valves – CLOSED.	
		• 1NV-458A (U1 75 GPM L/D Orifice Outlet Cont Isol).	
		• 1NV-457A (U1 45 GPM L/D Orifice Outlet Cont Isol).	
		• 1NV-35A (U1 Variable L/D Orifice Outlet Cont Isol).	
	BOP	• CLOSE the following valves:	
		• 1NV-1A (U1 NC L/D Isol To Regenerative Hx)	

Op Test No.:	N16-1	Scenario #	4	Event #	6 & 7	Page	56 of 65
Event Description:	**ATWS/ Loss of Switchyard to Unit 1/1B EDG fails to START**						

Time	Pos.	Expected Actions/Behavior	Comments
		• 1NV-2A (U1 NC L/D Isol To Regenerative Hx).	
	BOP	• Check Pzr PORVs – CLOSED.	
	BOP	• Check the following excess letdown isolation valves – CLOSED:	
		• 1NV-24B (1C NC Loop To Excess L/D Hx Isol)	
		• 1NV-25B (1C NC Loop To Excess L/D Hx Isol).	
	BOP	• Check 1NV-121 (U1 ND Letdown Control) – CLOSED.	
	RO	(Step 7) Check total CA flow – GREATER THAN 450 GPM.	**NOTE:** it is likely that the BOP has throttled back CA flow.
	BOP	(Step 8) Try to restore power to 1ETA or 1ETB as follows:	
		• Place both trains D/G mode select switches to control room.	
		• Perform the following for any D/G(s) that are off:	
		• Depress, then release, “RESET” on sequencer.	
		• Start D/G.	
		• Check both D/Gs – RUNNING.	
	BOP	(Step 8.c RNO) Perform the following:	
		• Initiate S/I	
		• Notify Unit 2 to immediately ensure flow path for 2B RN pump PER Enclosure 5 (Unit 2 Actions).	**NOTE:** The CRS will notify U2. **Floor Instructor:** Acknowledge as U2 RO.

Op Test No.:	N16-1	Scenario #	4	Event #	6 & 7	Page	57 of 65
Event Description:	**ATWS/ Loss of Switchyard to Unit 1/1B EDG fails to START**						

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	• IF at least one D/G starts, THEN …	**NOTE:** The 1A D/G is OOS, and the 1B D/G will NOT start.
	CRS	• GO TO Step 9	
	CRS	(Step 9) Ensure the following have been implemented:	**NOTE:** The CRS may ask OSM to address. If so, **Floor Instructor** acknowledge as OSM.
		• RP/0/A/5700/000 (Classification of Emergency)	
		• RP/0/A/5700/010 (NRC Immediate Notification Requirements).	
	RO/ BOP	(Step 10) Control intact S/G levels as follows:	
		• Check N/R level in any intact S/G - GREATER THAN 11% (32% ACC).	
		• THROTTLE CA control valves to maintain all intact S/G N/R levels between 11% (32% ACC) and 50%.	
		• IF AT ANY TIME CA flow control is lost, THEN perform RNO for Step 10.b	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	CRS	(Step 11) Monitor CA Storage Tank (water tower) level and ensure CA suction source as follows:	
		• Check if external event that has the potential to damage CA Storage Tank (water tower) (such as seismic or tornado) - HAS OCCURRED.	
	CRS	(Step 11.a RNO) Observe Note prior to Step 11.c and GO TO Step 11.c.	
	BOP	(Step 11.c-e) Monitor CA Storage Tank (water tower) level using available Control Room indication.	

Op Test No.:	N16-1	Scenario #	4	Event #	6 & 7	Page	58	of	65
Event Description:	**ATWS/ Loss of Switchyard to Unit 1/1B EDG fails to START**								

Time	Pos.	Expected Actions/Behavior	Comments
		• IF AT ANY TIME CA Storage Tank (water tower) level indication is lost (invalid reading), THEN dispatch operator to locally monitor level PER EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 31 (Local CA Storage Tank (Water Tower) Level Monitoring).	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
		• Ensure CA Suction Sources is monitored on Foldout Page.	
	CRS	(Step 12) Have Unit 2 perform Enclosure 5 (Unit 2 Actions).	**NOTE:** The CRS will ask U2 to address. If so, **Floor Instructor** acknowledge as U2 BOP.
	RO	(Step 13) Check unit status - IN MODE 3.	
	RO/ BOP	(Step 14) Stabilize S/G pressures using SM PORVs as follows:	**NOTE:** Only the 1A, 1C and 1D SG PORVs are available.
		• Reset Main Steam Isolation.	
		• Reset SM PORVs.	
		• Close all SM PORV manual loaders.	
		• Place SM PORVs in manual.	
		• Control S/G pressure between 1000 and 1100 PSIG using SM PORVs.	
	BOP	(Step 15) Ensure VC/YC cooling available as follows:	
		• Check VC/YC alignment using Unit 1 status board - AT LEAST ONE OPERABLE VC/YC TRAIN ALIGNED TO AN ENERGIZED UNIT 2 4160V BUS.	
		• Notify an available operator to initiate EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 13 (VC and VA System Operation) within 30 minutes of loss of power.	**NOTE:** The CRS will likely direct the BOP to check this.

Op Test No.:	N16-1	Scenario #	4	Event #	6 & 7	Page	59 of 65
Event Description:	**ATWS/ Loss of Switchyard to Unit 1/1B EDG fails to START**						

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 16) IF event has occurred that could have caused damage to mechanical systems internal to plant (seismic, tornado, etc), THEN….	**NOTE:** No such event has occurred.
	RO/ BOP	(Step 17) Check if S/I is actuated as follows:	**NOTE:** SI was actuated in an attempt to start the 1B D/G.
		• "SAFETY INJECTION ACTUATED" status light (1SI-18) - LIT.	
		• Reset S/I.	
	CRS	(Step 18) Dispatch operator to open the following breakers to sequencer DC control power:	**NOTE:** The CRS will dispatch an AO. **Booth Instructor** acknowledge as appropriate, **after three minutes insert MAL-EQB002A and EQB002B = FAILURE and report that the Sequencer DC Control Breakers have been opened.**
		• A Train - 1EVDA Breaker 6	
		• B Train - 1EVDD Breaker 8.	
	CRS	(Step 19) IF AT ANY TIME operator dispatched to perform Enclosure 3 (Unit 1 ETA And ETB Rooms - ECA-0.0 Actions) determines that lockout exists, THEN perform the following:	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
		• Have IAE clear or isolate fault from bus.	
		• WHEN fault cleared or isolated from bus, THEN reset lockout.	**NOTE:** The CRS will dispatch an AO. **Booth Instructor** acknowledge as appropriate, **after one minute report that the there is a Lockout on 1ETA and there is NOT a lockout on 1ETB.**

Op Test No.:	N16-1	Scenario #	4	Event #	6 & 7	Page	60	of	65
Event Description:	**ATWS/ Loss of Switchyard to Unit 1/1B EDG fails to START**								

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 20) Restore power to 1ETA or 1ETB using any of the following while continuing with this procedure:	
		• Local reset and start of D/G PER Enclosure 12 (Energizing Unit 1 4160V Bus With D/G)	
		OR	
		• Unit 1 offsite power PER Enclosure 13 (Energizing Unit 1 4160V Bus From Unit 1)	
		OR	
		• Unit 2 6900V busses through SATA or SATB PER Enclosure 14 (Energizing Unit 1 4160V Bus From Unit 2 - SATA or SATB).	**NOTE:** This is the only option for re-powering 1ETB.
			The CRS will address Enclosure 14, or hand the Enclosure off to the BOP, and continue in ECA-0.0 with the RO.
EP/1/A/5000/ECA-0.0, LOSS OF ALL AC POWER ENCLOSURE 14, ENERGIZING UNIT 1 4160V BUS FROM UNIT 2 – SATA OR SATB			
	CRS	(Step 1) Perform one of the following:	
		• IF 1ETA is to be energized from Unit 2, THEN observe Note prior to Step 22 and GO TO Step 22.	
		OR	
		• IF 1ETB is to be energized from Unit 2, THEN observe Note prior to Step 2 and GO TO Step 2.	
	BOP	(Step 2) Ensure SATB is not supplying Unit 2 2ETB.	**NOTE:** The CRS/BOP will ask U2 to address. If so, **Floor Instructor** acknowledge as U2 BOP, and report that Unit 2 SATB Feeder Breaker is not supplying Unit 2 2ETB.

Op Test No.:	N16-1	Scenario #	4	Event #	6 & 7	Page	61 of 65
Event Description:	**ATWS/ Loss of Switchyard to Unit 1/1B EDG fails to START**						

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 3) Check the following 4160V breakers - OPEN.	
		• 1ETB Normal Breaker	
		• 1ETB Standby Breaker	
		• 1ETB Emergency Breaker.	
	CRS	(Step 4) Have Unit 2 RO check Unit 2 SATB Feeder Breaker - CLOSED.	**NOTE:** The CRS will ask U2 to address. If so, **Floor Instructor** acknowledge as U2 BOP, and report that Unit 2 SATB Feeder Breaker is CLOSED.
	CRS	(Step 5) GO TO Step 8.	
	CRS	(Step 8) Dispatch operator to 1ETB room to perform the following:	**NOTE:** The CRS will dispatch an AO. **Booth Instructor** acknowledge as appropriate, **after three minutes** insert **ECA-0.0 (Enclosure 14) and report that 1ETB-1 has been racked out, and 1ETB-2 has been racked in.**
		• Obtain a copy of OP/0/A/6350/008 (Operation of Station Breakers), Enclosure 4.2 (Operation of 4.16KV Essential Switchgear Breakers) to bring to 1ETB room.	
		• Check 1ETB-1 (Incoming Breaker Fed From Norm Transf. No. 1ATD) - RACKED IN.	
		• Rack out 1ETB-1 PER OP obtained in Step 8.a.	
		• Remove kirk-key from 1ETB-1 as follows:	
		• Push plunger (located below kirk-key) toward back of cubicle and hold.	
		• Rotate kirk-key to extend bolt.	
		• Remove kirk-key.	

Op Test No.:	N16-1	Scenario #	4	Event #	6 & 7	Page	62	of	65
Event Description:	**ATWS/ Loss of Switchyard to Unit 1/1B EDG fails to START**								

Time	Pos.	Expected Actions/Behavior	Comments
		• Release plunger.	
		• Insert kirk-key (removed from 1ETB-1) into 1ETB-2 (Incoming Breaker Fed From Stby. Transf. No. SATB), making sure number on key matches number on lock.	
		• Check kirk-keys in 1ETB-2 - TWO INSERTED.	
		• Operate kirk-key device inside 1ETB-2 as follows:	
		• Push plunger (located below kirk-keys) toward back of cubicle and hold.	
		• Rotate both kirk-keys to retract bolt.	
		• Release plunger and allow it to move outward.	
		• Pull plunger outward as necessary to ensure fully extended.	
		• Rack in 1ETB-2 breaker PER OP obtained in step 8.a.	
	CRS	(Step 9) Do not continue until the following is performed:	
		• Ensure Steps 2 through 8 are completed.	
		• Ensure operators are away from breakers.	
	CRS	(Step 10) Have Unit 2 RO check Unit 2 SATB Feeder Breaker - CLOSED.	**NOTE:** The CRS will ask U2 to address. If so, **Floor Instructor** acknowledge as U2 BOP, and report that Unit 2 SATB Feeder Breaker is CLOSED.
	BOP	(Step 11) Check if S/I is actuated as follows:	
		• "SAFETY INJECTION ACTUATED" status light (1SI-18) - LIT.	**NOTE:** SI was previously reset.
	CRS	(Step 11.a RNO) GO TO Step 12.	

Op Test No.:	N16-1	Scenario #	4	Event #	6 & 7	Page	63	of	65
Event Description:	ATWS/ Loss of Switchyard to Unit 1/1B EDG fails to START								

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 12) Check "SEQ B LOSS OF CONTROL PWR" alarm (1AD-11, E-2) - LIT.	
	BOP	(Step 13) Open 1B CA pump breaker.	
	BOP	(Step 13 RNO) Open breaker by depressing 1B CA pump "START" and "STOP" at same time.	
	RO/ BOP	(Step 14) Open the remaining pump breakers:	
		• 1B NV pump	
		• 1B ND pump	
		• 1B NI pump	
		• 1B1 KC pump	
		• 1B2 KC pump	
		• 1B RN pump	
		• 1B KF pump	
		• 1B NS pump	
	BOP	(Step 15) Open the following 600 V essential load center feeder breakers:	
		• 1ELXB	
		• 1ELXD	
		• 1ELXF	
	BOP	(Step 16) Check 1B D/G Mode Select switch - IN CONTROL ROOM POSITION.	
	BOP	(Step 17) Close 1ETB Standby Breaker.	
	BOP	(Step 18) Place 1B D/G Mode Select switch to "AUTO" position.	

Op Test No.:	N16-1	Scenario #	4	Event #	6 & 7	Page	64 of 65
Event Description:	**ATWS/ Loss of Switchyard to Unit 1/1B EDG fails to START**						

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 19) Check 1ETB bus - ENERGIZED.	
	BOP	(Step 20) Notify Control Room Supervisor to GO TO Step 47 in body of this procedure.	
At the discretion of the Lead Examiner terminate the exam.			

UNIT 1 STATUS:

Power Level: 4% NCS [B] 1988 ppm Pzr [B]: 1988 ppm Xe: Per OAC

Power History: At this power level for 2 hours Core Burnup: 25.1 EFPDs

CONTROLLING PROCEDURE: OP/1/A/6100/003 Controlling Procedure for Unit Operation

OTHER INFORMATION NEEDED TO ASSUME THE SHIFT:

- The area has experienced steady light rain for the past 8 hours, with light wind from the South at 2-5 mph, and this is expected to continue throughout the shift.
- The crew will hold power steady until on-going maintenance is completed, however a rod height/C_B adjustment will be made at the start of the shift at the request of Reactor Engineering.

The following equipment is Out-Of-Service:

- The VUCDT Level indication is OOS. ACTION has been taken in accordance with Technical Specification LCO 3.4.15 ACTION C.
- The 1A Emergency Diesel Generator is OOS for bearing replacement. ACTION has been taken in accordance with Technical Specification LCO 3.5.2 ACTION A.
- MCB Annunciator 1AD-1, F-9, “DEH/MSR SYSTEM MALFUNCT,” spuriously alarmed several times during the shift, and is currently failed OFF (IAE is investigating).

Crew Directions:

- The crew will hold power steady until on-going maintenance is completed.
- RE has requested that the Control Rods be placed at 132 Steps on Bank D, and recommended a 200 gallon dilution to adjust C_B to 1984 ppm.
- Blender content is Reactor Makeup Water.

Work Control SRO/Offsite Communicator **Jim**

Plant SRO **Joe (FB)**

AO's AVAILABLE

Unit 1	**Unit 2**
Aux Bldg. John	**Aux Bldg. Chris**
Turb Bldg. Bob (FB)	**Turb Bldg. Mike (FB)**
5th Rounds. Carol	

Extra(s) Bill (FB) Ed (FB) Wayne (FB) Tanya Gus (RW)

SIM JPM A

Facility:	McGuire	Task No.:	
Task Title:	Emergency Borate the Reactor Coolant System Using the PD Pump	JPM No.:	2016 Systems - Control Room JPM A (Alternate Path)
K/A Reference:	EPE 029 EA2.10 (3.1/3.4)		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: ______ Actual Performance: __X__

Classroom ______ Simulator __X__ Plant ________

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Ensure Handout 1 is on CRS Desk.

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 2.

Initial Conditions:

- Unit 1 was at 100% power with “A” NV pump and the “A” Boric Acid Transfer Pump tagged for maintenance.
- A lockout occurred on Zone “1B”.
- Due to a relaying failure, busses 1TB and 1TD failed to swap to their alternate power source.
- The “1B” Diesel Generator started and loaded 1ETB.
- The reactor coolant pumps tripped on under frequency.
- An automatic reactor trip FAILED to occur. EP/1/A/5000/FR-S.1 (Response To Nuclear Power Generator/ATWS) has been implemented and completed through Step 4.
- Normal Letdown has just automatically isolated.
- The reactor has just been tripped locally.

Initiating Cue:	The CRS has directed you to emergency borate the NC System in accordance with Step 5 of EP/1/A/5000/FR-S.1, Response To Nuclear Generation/ATWS.
Task Standard:	The operator will attempt to start the 1B NV Pump, and when it fails to start, start the PD Pump, and then commence emergency boration with the 1B Boric Acid Transfer Pumps running and 30 gpm or greater emergency boration flow indicated.
Required Materials:	None
General References:	EP/1/A/5000/FR-S.1 (Response To Nuclear Power Generation/ATWS), Rev 15 EP/1A/5000/G-1 (Generic Enclosure -17, PD Pump Start), Rev 38
Handouts:	Handout 1: Control Room Copy of EP/1/A/5000/FR-S.1, Response To Nuclear Power Generation/ATWS, marked up for place-keeping through Step 4. Handout 2: Blank copy of Step 5 of EP/1/A/5000/FR-S.1 (Pages 3-4 of 29). Handout 3: Laminated copy (Control Room Copy) of Generic Enclosure -17, PD Pump Start
Time Critical Task:	NO
Validation Time:	18 minutes

Critical Step Justification	
Step 1	This step is critical because pressing the START pushbutton for the 1B NV Pump is necessary to attempt to start the 1B NV Pump.
Step 25	This step is critical because depressing the 1NV-265B OPEN pushbutton is necessary to commence emergency boration with the 1A Boric Acid Transfer Pumps running and 30 gpm or greater emergency boration flow indicated.
Step 29	This step is critical because using the UP arrow on the PD Pump SLIMs is necessary to commence emergency boration with the 1A Boric Acid Transfer Pumps running and 30 gpm or greater emergency boration flow indicated.
Alternate Path Critical Step Justification	
Step 7	This step is critical because depressing the 1RN-252B and 1RN-277B CLOSE pushbuttons is necessary to start the PD Pump.
Step 14	This step is critical because depressing the 1RN-63B and 1RN-64A OPEN pushbuttons is necessary to start the PD Pump.
Step 20	This step is critical because depressing the PD Pump START pushbutton is necessary to start the PD Pump.
Step 22	This step is critical because using the UP arrow on the PD Pump SLIMs is necessary to adjust flow of the PD Pump to maximum.

SIMULATOR OPERATIONAL GUIDELINES

1. Reset to IC # 39, 100% Power, MOL. Go to RUN.

2. Insert:

   a. MALF-IPE001A = TRUE Failure of Auto Reactor Trips – Train A
   MALF-IPE001B = TRUE Failure of Auto Reactor Trips – Train B

   b. MALF-IPE002A = TRUE Failure of Manual Reactor Trips – Train A
   MALF-IPE002B = TRUE Failure of Manual Reactor Trips – Train B

   c. LOA-NV046 = RACKED OUT Rack out 1A NV pump
   LOA-NV046A = RACKED OUT Rack out 1A NV Pump Control Power

   d. MALF-EP006B = ACTIVE Failure of 1TB to auto swap
   MALF-EP006D = ACTIVE Failure of 1TD to auto swap

   e. MALF-EP003C = ACTIVE Zone 1B Lockout

   f. LOA-NV043 = RACKED OUT 1A BA Transfer Pump Breaker Rackout

3. Go To RUN and execute

4. Insert MALF-NV029B = TRUE NV pump trips on over current

5. Perform steps 1 through 4 of EP/1/A/5000/FR-S.1.

6. Trip the reactor 1 minute after starting the JPM by deleting:
   - MALF-IPE001A, Failure of Auto Reactor Trips – Train A
   - MALF-IPE001B, Failure of Auto Reactor Trips – Train B

7. Ensure Letdown isolated.

8. Allow plant time to stabilize and then Freeze Simulator.

OR

1. Reset Simulator to Temporary Snap IC-242 (October, 2015).
2. Momentarily place Simulator in Run to acknowledge alarms/Reset SLIMS.
3. Leave Simulator in FREEZE until operator is ready to begin.
4. Place Control Board Sticker on 1A NV Pump.

NOTE: **During the performance of this JPM, the simulator operator will need to control CA flow to avoid NCS Cooldown and SI actuation.**

(Denote Critical Steps with an asterisk*)

Ensure Handout 1 is on CRS Desk.

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 2.

START TIME: ____________

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
Simulator Instructor NOTE: Leave Simulator in FREEZE until operator is ready to begin.				
*1	(Step 5) Initiate emergency boration of the NC System: (Step 5.a) Ensure one NV Pump – ON.	The operator presses the START pushbutton for the 1B NV Pump, and observes that the Green status light remains LIT, and the Red status light is OFF. The operator recognizes that there are no NV Pumps operating and proceeds to Step 5.a RNO **(Alternate Path)**.		
2	(Step 5.a RNO) Place PD pump in service PER EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 17 (PD Pump Startup).	The operator obtains EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 17. **CUE:** **WHEN the operator has located Generic Enclosure 17, provide Handout 3.**		
3	(Enclosure 17, Step 1) Check power to PD pump – AVAILABLE.	The operator observes that the Green status light is LIT, and determines that power is available to the PD Pump.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
4	(Steps 2.a-d) Reset the following: S/I Sequencers Phase B Isolation If at any time a B/O signal occurs then start S/I equipment previously on.	The operator observes that the SI reset lights are LIT. The operator observes that the A Train Sequencer reset light is LIT. The operator depresses the B Train Sequencer reset pushbutton and observes that the Sequencer reset light is LIT. The operator observes that the Phase B Isolation reset lights are LIT.		
5	(Step 3) Close the following: Close 1RN-279B (AB Vent Sys Return Isol). Close 1RN-299A (AB Vent Sys Return Isol). Close 1RV-79A (U1 VU AHUS RV Cont Outside Supply Hdr Isol). Close 1RV-101A (U1 VU AHUS RV Cont Inside Return Hdr Isol). Close 1RV-32A (U1 VL/VT AHUS RV Cont Outside Supply Hdr Isol).	The operator observes the 1RN-279B Green status light LIT, Red status light OFF. The operator depresses the 1RN-299A CLOSE pushbutton and observes Green status light LIT, Red status light OFF. The operator depresses the 1RV-79A CLOSE pushbutton and observes Green status light LIT, Red status light OFF. The operator depresses the 1RV-101A CLOSE pushbutton and observes Green status light LIT, Red status light OFF. The operator depresses the 1RV-32A CLOSE pushbutton and observes Green status light LIT, Red status light OFF.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
5 (Cont'd)	Close 1RV-76A (U1 VL/VT AHUS RV Cont Inside Return Hdr Isol).	The operator depresses the 1RV-76A CLOSE pushbutton and observes Green status light LIT, Red status light OFF.		
	Close 1RV-80B (U1 VU AHUS RV Cont Inside Supply Hdr Isol).	The operator depresses the 1RV-80B CLOSE pushbutton and observes Green status light LIT, Red status light OFF.		
	Close 1RV-102B (U1 VU AHUS RV Cont Outside Return Hdr Isol).	The operator depresses the 1RV-102B CLOSE pushbutton and observes Green status light LIT, Red status light OFF.		
	Close 1RV-33B (U1 VL/VT AHUS RV Cont Inside Supply Hdr Isol).	The operator depresses the 1RV-33B CLOSE pushbutton and observes Green status light LIT, Red status light OFF.		
	Close 1RV-77B (U1 VL/VT AHUS RV Cont Outside Return Hdr Isol).	The operator depresses the 1RV-77B CLOSE pushbutton and observes Green status light LIT, Red status light OFF.		
		Note: **Since these steps are bulleted, the operator need not wait for the valve to completely cycle before taking action with the next valve.**		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
6	(Step 4) Check any NC pump -ON	The operator observes the NC Pump Safety breakers Green status light LIT, Red status lights OFF, determines that no NC pumps are on and proceeds to the Step 4 RNO.		
*7	(Step 4 RNO) Close the following: 1RN-252B (RB Non Ess Sup Cont Outside Isol) 1RN-277B (RB Non Ess Ret Cont Outside Isol)	The operator depresses the 1RN-252B CLOSE pushbutton and observes Green status light LIT, Red status light OFF. The operator depresses the 1RN-277B CLOSE pushbutton and observes Green status light LIT, Red status light OFF.		
8	(Step 5) Place the following RF pumps in "MAN" and ensure they are off: A Jockey pump B Jockey pump	The operator depresses the A RF Jockey Pump MAN pushbutton and observes the Green status light is LIT, Red status light OFF. The operator depresses the B RF Jockey Pump MAN pushbutton and observes the Green status light is LIT, Red status light OFF.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
9	(Step 6) Dispatch operator to close 2RL-267 (Unit 2 6900V Swgr Room AHU Supply From RN Inlet Isol) (service bldg, 739+5, U-31, NE corner of service bldg over pit, near KR storage tank).	The operator contacts an AO and directs that 2RL-267 be closed. **BOOTH Instructor:** **When asked, report an operator has been dispatched to close 2RL-267.**		
10	(Caution prior to Step 7) Both trains RN valves must be aligned in Step 7 unless specified otherwise, even if power is lost.	The operator reads Caution and proceeds to Note prior to Step 7.		
11	(Note prior to Step 7) If OAC is unavailable to check any deenergized valve positions, RNO contains required actions if position unknown.	The operator reads Note and proceeds to Step 7.		
12	(Steps 7/7.a) Align RN to “AB Non Essential Header” as follows: Ensure 1A RN pump – ON.	The operator observes that the 1A RN Pump Red Breaker status light is LIT.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
13	(Step 7.b) Check at least one of the following valves - CLOSED: 1RN-41B (Train B To Non Ess Hdr Isol) OR 1RN-43A (Train B To Non Ess Hdr Isol).	The operator observes that the Green status light is LIT, and the Red status light is OFF. The operator observes that the Red status light is LIT, and the Green status light is OFF (May not be performed if 1RN-41B is observed first).		
14 * *	(Step 7.c.1-4) Open the following valves: Open 1RN-40A (Train A to Non Ess Hdr Isol) Open 1RN-42A (AB Non Ess Supply Isol) Open 1RN-63B (AB Non Ess Return Isol) 1RN-64A (AB Non Ess Return Isol)	The operator observes the 1RN-40A Red status light LIT, Green status light OFF. The operator observes the 1RN-42A Red status light LIT, Green status light OFF. The operator depresses the 1RN-63B OPEN pushbutton and observes Red status light LIT, Green status light OFF. The operator depresses the 1RN-64A OPEN pushbutton and observes Red status light LIT, Green status light OFF.		
15	(Step 7.d) GO TO Step 8.	The operator proceeds to Step 8.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
16	(Step 8) Check if NV S/I flow path is open as follows: 1NI-9A (NC Cold Leg Inj From NV) - OPEN OR 1NI-10B (NC Cold Leg Inj From NV) - OPEN	The operator observes the Green status light LIT for both valves, determines that neither valve is OPEN, and proceeds to the Step 8 RNO.		
17	(Step 8 RNO a-b) Perform the following: IF 1A AND 1B NV pumps OFF, THEN open 1NV-241 (Seal Inj Flow Control) GO TO step 10.	The operator observes that the 1B NV Pump Green status light is LIT, Red status lights are OFF. The operator adjusts the 1NV-241 controller output to 100% (Both Red and Black Needles to 100%). **Note:** **The operator may use the OAC to check 1NV-241 valve position.** The operator proceeds to Step 10.		
18	(Step 10) ADJUST PD pump speed control output to 0%.	The operator observes the PD Pump Speed Controller in MANUAL and selects output on the SLIMs to be 0%.		
19	(Step 11) Open 1NV-1047A (U1 PD PUMP Recirc Isol)	The operator depresses the 1NV-1047A OPEN pushbutton and observes Red status light LIT, Green status light OFF.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*20	(Step 12) Start the PD Pump.	The operator depresses the PD Pump START pushbutton and observes the Red status light LIT, Green status light OFF.		
21	(Step 13) Ensure 1NV-1047A (U1 NV PD Pump Recirc Isol) closes after 2 minutes.	After two minutes, the operator observes that the 1NV-1047 Green status light is LIT, Red status light is OFF.		
*22	(Step 14) WHEN 1NV-1047A (U1 NV PD Pump Recirc Isol) is closed, THEN slowly raise PD Pump speed, taking at least 45 seconds to reach desired speed, to establish charging flow.	The operator uses the UP arrow on the PD Pump SLIMs, over at least a 45 second period, and observes Charging flow is increasing. **Cue:** **IF asked, indicate that desired Charging flow is 90 gpm (Otherwise, any flow is acceptable).**		
23	(Note prior to Step 15) Cooling water for areas in next step was isolated by Step 6.	The operator reads Note and proceeds to Step 15.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
24	(Step 15) Notify station management to monitor temperature in both units 6900v switchgear room, turbine bldg, and service bldg areas.	The operator notifies the CRS. **Cue:** **Station Management has been notified.** The operator returns to EP/1/A/5000/FR-S.1, Step 5.b.		
*25	(EP/1/A/5000/FR-S.1/Step 5.b/.b1) Align boration flowpath: OPEN 1NV-265B (U1 NV Boric Acid Sup Isol).	The operator depresses the 1NV-265B OPEN pushbutton and observes Red status light LIT, Green status light OFF.		
26	(Step 5.b.2) Start both boric acid transfer pumps.	The operator observes the 1A Boric Acid Transfer Red and Green status light OFF. The operator observes the 1B Boric Acid Transfer Pump Red status light LIT, Green status light OFF.		
27	(Step 5.b.3) Check emergency boration flow - GREATER THAN 30 GPM	The operator observes boration flow on 1NVP-5440 to be 70-80 gpm.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
28	(Step 5.c) Check if NV flowpath aligned to NC System 1NV-244A (Charging Line Cont Isol Outside Isol) - OPEN 1NV-245B (Charging Line Cont Outside Isol) - OPEN	The operator observes 1NV-244A Red status light LIT, Green status light OFF. The operator observes 1NV-245B Red status light LIT, Green status light OFF.		
*29	(Step 5.d) Ensure charging flow is greater than emergency boration flow.	The operator uses the UP arrow on the PD Pump SLIMs, as needed, and observes Charging flow is increasing. **Cue:** **"If asked for desired emergency boration flowrate, ask them for their recommendation and use it. Anything greater than the EB flowrate is acceptable."**		
30	(Step 5.e) Check Pzr pressure - LESS THAN 2335 PSIG	The operator observes that Pzr Pressure is less than 2335 psig on 1NCP-5161 (or equivalent).		

Terminating Cue: **Another Operator will continue with the procedure.**

STOP TIME: ______________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 Systems - Control Room JPM A

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

INITIAL CONDITIONS:

- Unit 1 was at 100% power with “A” NV pump and the “A” Boric Acid Transfer Pump tagged for maintenance.
- A lockout occurred on Zone “1B”.
- Due to a relaying failure, busses 1TB and 1TD failed to swap to their alternate power source.
- The “1B” Diesel Generator started and loaded 1ETB.
- The reactor coolant pumps tripped on under frequency.
- An automatic reactor trip FAILED to occur. EP/1/A/5000/FR-S.1 (Response To Nuclear Power Generator/ATWS) has been implemented and completed through Step 4.
- Normal Letdown has just automatically isolated.
- The reactor has just been tripped locally.

INITIATING CUE:

The CRS has directed you to emergency borate the NC System in accordance with Step 5 of EP/1/A/5000/FR-S.1, Response To Nuclear Generation/ATWS.

SIM JPM B

Facility:	McGuire	Task No.:	
Task Title:	CA Suction Source Realignment	JPM No.:	2016 Systems - Control Room JPM B (Alternate Path)
K/A Reference:	061 A2.07 (3.4/3.5)		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: ______ Actual Performance: __X__

Classroom ______ Simulator __X__ Plant ________

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 1.

Initial Conditions:

- Unit 1 has just tripped from 100% power, due to seismic activity.
- The crew is now implementing EP/1/A/5000/ES-0.1 (Reactor Trip Response).
- The CA Storage Tank has developed a leak, and level has lowered to 1.5 feet.

Initiating Cue: The CRS has directed you to perform EP/1/A/5000/G-1, Generic Enclosure 20 (CA Suction Source Realignment), while the crew continues with ES-0.1.

Task Standard: The operator will realign the suction of the CA Pumps from the non-safety related to the safety-related source (RN). During the course of this action, the operator will recognize that RN Supply to the 1B MDCA Pump cannot be established, and stop the pump.

Required Materials: None

General References:	EP/1/A/5000/E-0 (Reactor Trip or Safety Injection), Rev 34 EP/1/A/5000/ES-0.1 (Reactor Trip Response), Rev 42 EP/1/A/5000/G-1 (Generic Enclosures), Rev 37 OMP 4-3 (Use of Abnormal and Emergency Procedures), Rev 42
Handouts:	Handout 1: Enclosure 20 (CA Suction Source realignment) of EP/1/A/5000/G-1 (Generic Enclosures).
Time Critical Task:	NO
Validation Time:	8 minutes

Critical Step Justification	
Step 4	This step is critical because pressing the 1RN-69A OPEN pushbutton is necessary to realign the suction of the CA Pumps from the non-safety related to the safety-related source.
Step 5	This step is critical because pressing the 1CA-15A OPEN pushbutton is necessary to realign the suction of the CA Pumps from the non-safety related to the safety-related source.
Step 6	This step is critical because pressing the 1CA-86A OPEN pushbutton is necessary to realign the suction of the CA Pumps from the non-safety related to the safety-related source.
Alternate Path Critical Step Justification	
Step 12	This step is critical because pressing the STOP pushbutton for the 1B MDCA Pump is necessary to stop the 1B MDCA pump.
Step 15	This step is critical because pressing the 1CA-11A CLOSE pushbutton is necessary to realign the suction of the CA Pumps from the non-safety related to the safety-related source.
Step 19	This step is critical because pressing the 1CA-7AC CLOSE is necessary to to realign the suction of the CA Pumps from the non-safety related to the safety-related source.

SIMULATOR OPERATIONAL GUIDELINES

1. Reset simulator to IC-39 (100%).
2. Place Simulator in RUN.
3. Ensure that the B Train of RN is in operation.
4. Insert REM-CA0018B=0 to ensure that 1CA-18B (1B CA Pump Suction from 1B RN Isol) will not OPEN.
5. Adjust CACST to less than 30%, but greater than 0%.
6. Insert (CA) PLP-078 = 1.48 – (Simulates Leak in CAST).
7. Override ON OBE Exceeded Annunciator (1AD-13 E-7). (1AD13_E07 = ON)
8. Manually trip the reactor and perform the actions of EP/1/A/5000/E-0, and transition to EP/1/A/5000/ES-01.
9. Ensure both MDCA Pumps are running, acknowledge and silence all annunciators, and Freeze the Simulator.

OR

1. Reset to IC-243 (October, 2015)
2. Momentarily go to RUN to acknowledge Alarms then place Simulator in FREEZE.
3. Leave Simulator in FREEZE until operator is ready to begin.

NOTE: **The Booth/Floor Instructor will need to control BOP during the performance of this JPM and ENSURE that SI Actuation is NOT needed.**

(Denote Critical Steps with an asterisk*)

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 1.

START TIME: ____________

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
Simulator Instructor NOTE: Leave Simulator in FREEZE until operator is ready to begin.				
1	(Enclosure 20, Step 1/1.a) Check if RN assured CA suction should be immediately aligned as follows: Check if failure (causing leak) of CA Storage Tank (water tower) or associated CA suction piping - KNOWN TO EXIST.	The operator recognizes from the Initial Conditions that a CAST leak exists, and proceeds.		
2	(Step 1.b) GO TO Step 4.	The operator proceeds to Step 4.		
3	(Step 4) Align A train RN to CA suction as follows: (Step 4.a) Start 1A RN pump.	The operator observes the 1A RN Pump Red status light LIT, Green status light OFF; and motor amps at ≈ 88 amps, and determines the 1A RN Pump is running.		
*4	(Step 4.b) OPEN 1RN-69A (1A RN Assured Supply To U1 CA Isol).	The operator presses the 1RN-69A OPEN pushbutton and observes the Red status light LIT, Green status light OFF. The operator will acknowledge alarm on 1AD-5.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*5	(Step 4.c) OPEN 1CA-15A (1A CA Pump Suction From 1A RN Isol)	The operator presses the 1CA-15A OPEN pushbutton and observes the Red status light LIT, Green status light OFF. The operator will acknowledge alarm on 1AD-5.		
*6	(Step 4.d) OPEN 1CA-86A (U1 TD CA Pump Suction From 1A RN Isol).	The operator presses the 1CA-86A OPEN pushbutton and observes the Red status light LIT, Green status light OFF. The operator will acknowledge alarm on 1AD-5.		
7	(Step 5) Align B train RN to CA suction as follows: (Step 5.a) Start 1B RN pump.	The operator observes the 1B RN Pump Red status light LIT, Green status light OFF; and motor amps at ≈ 88 amps, and determines the 1B RN Pump is running.		
8	(Step 5.b) OPEN 1RN-162B (1B RN Assured Supply To U1 CA Isol).	The operator presses the 1RN-162B OPEN pushbutton and observes the Red status light LIT, Green status light OFF. The operator will acknowledge alarm on 1AD-5.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
9	(Step 5.c) OPEN 1CA-18B (1B CA Pump Suction From 1B RN Isol).	The operator presses the 1CA-18B OPEN pushbutton and observes the Green status light remains LIT, Red status light OFF (**Alternate Path**). The operator proceeds to the RNO.		
10	(Step 5.c RNO) IF 1B CA pump is on, THEN stop 1B MD CA pump as follows: (Step 5.c RNO 1) Reset S/I.	The operator may press the RESET Pushbuttons and observes RESET status lights LIT for both Train A and B SI. (Already RESET)		
11	(Step 5.c RNO 2) Reset 1B Sequencer.	The operator may press the Sequencer RESET and observes RESET status lights LIT Pushbuttons for both Train A and B. (Already RESET)		
*12	(Step 5.c RNO 3) Stop 1B CA pump.	The operator presses the STOP pushbutton for the 1B MDCA Pump and observes the Green status light LIT, Red status light OFF; and that motor amps drop to 0.		
13	(Step 5.c RNO 4) IF 1B CA pump still on,….	The operator observes that the 1B MDCA Pump is OFF, and proceeds.		
14	(Step 5.d) OPEN 1CA-116B (U1 TD CA Pump Suction From 1B RN Isol).	The operator presses the 1CA-116B OPEN pushbutton and observes the Red status light LIT, Green status light OFF. The operator will acknowledge alarm on 1AD-5.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*15	(Step 6) Isolate non-safety CA suction sources from MD CA pumps as follows: (Step 6.a) CLOSE 1CA-11A (1A CA Pump Suction Isol).	The operator presses the 1CA-11A CLOSE pushbutton and observes the Green status light LIT, Red status light OFF.		
16	(Step 6.b) CLOSE 1CA-9B (1B CA Pump Suction Isol).	The operator presses the 1CA-9B CLOSE pushbutton and observes the Green status light LIT, Red status light OFF.		
17	(Step 7) Isolate non-safety CA suction sources from TD CA pump as follows: (Step 7.a) Check the following valves - OPEN: 1RN-69A (1A RN Assured Supply To U1 CA Isol) 1CA-86A (U1 TD CA Pump Suction From 1A RN Isol).	The operator observes the 1RN-69A Red status light LIT, Green status light OFF. The operator observes the 1CA-86A Red status light LIT, Green status light OFF.		
18	(Step 7.b) GO TO Step 7.d.	The operator proceeds to Step 7.d.		
*19	(Step 7.d) CLOSE 1CA-7AC (U1 TD CA Pump Suction Isol).	The operator presses the 1CA-7AC CLOSE pushbutton and observes the Green status light LIT, Red status light OFF.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
20	(Step 7) WHEN time allows, THEN….	**Cue:** **Another operator will complete the remaining steps.**		

Terminating Cue: **Evaluation on this JPM is complete.**

STOP TIME: ______________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 Systems - Control Room JPM B

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Result: SAT ______ UNSAT _______

Examiner's Signature: ________________________________ Date: ____________________

INITIAL CONDITIONS:

- Unit 1 has just tripped from 100% power, due to seismic activity.
- The crew is now implementing EP/1/A/5000/ES-0.1 (Reactor Trip Response).
- The CA Storage Tank has developed a leak, and level has lowered to 1.5 feet.

INITIATING CUE:

The CRS has directed you to perform EP/1/A/5000/G-1, Generic Enclosure 20 (CA Suction Source Realignment), while the crew continues with ES-0.1.

SIM JPM C

Facility:	McGuire	Task No.:	
Task Title:	Establish Excess Letdown following a loss of Normal Letdown in Mode 4	JPM No.:	2016 Systems - Control Room JPM C (Alternate Path)
K/A Reference:	004 A4.06 (3.6/3.1)		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom ______ Simulator X Plant ________

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Ensure Handout 1 is placed on CRS Desk.

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM).

Initial Conditions:	• Unit 1 is performing a plant shutdown and cooldown to Mode 5. • The plant is currently at 345°F and 600 psig. • The crew has entered AP/1/A/5500/12, Loss of Letdown, Charging or Seal Injection, due to a loss of Normal Letdown. • It is not expected that the crew will be able to re-establish Normal Letdown without corrective maintenance.

Initiating Cue:	The CRS has directed you to establish Excess Letdown per AP/1/A/5500/12 starting with Step 52, and maintain Pressurizer level between 85-96%.

Task Standard:	The operator will attempt to place Excess Letdown in service in accordance with Step 52 of AP/1/A/55/12; and then after recognizing that Excess Letdown cannot be placed in service, establish letdown to the PRT using the Rx Head Vessel Vents in accordance with Step 53 of AP/1/A/5500/12 and maintain Pressurizer level between 85-96%.

Required Materials: None

General References: OP/1/A/6100/SD-4 (Cooldown to 240 Degrees F), Rev 68
OP/1/A/6100/SD-2 (Cooldown to 400 Degrees F), Rev 54
AP/1/A/5500/12 (Loss of Letdown, Charging or Seal Injection), Rev 24

Handouts: Handout 1: AP/1/A/5500/12 (Loss of Letdown, Charging or Seal Injection) marked up through Step 43 RNO, open on the CRS Desk.

Time Critical Task: NO

Validation Time: 8 minutes

Critical Step Justification	
Step 3	This step is critical because pressing the 1KC-315B and 305B OPEN pushbutton is necessary to attempt to place Excess Letdown in service in accordance with Step 52 of AP/1/A/55/12.
Step 10	This step is critical because pressing the 1NV-24B OPEN pushbutton is necessary to attempt to place Excess Letdown in service in accordance with Step 52 of AP/1/A/55/12.
Alternate Path Critical Step Justification	
Step 10	This step is critical because recalling that IF AT ANY TIME excess letdown cannot be established, THEN observing Note prior to Step 53 is necessary to establish letdown to the PRT using the Rx Head Vessel Vents in accordance with Step 53 of AP/1/A/5500/12.
Step 16	This step is critical because pressing the 1NC-272AC and 1NC-273AC, or the 1NC-274B and 1NC-275B OPEN pushbutton is necessary to establish letdown to the PRT using the Rx Head Vessel Vents in accordance with Step 53 of AP/1/A/5500/12.
Step 17	This step is critical because knowing that Pzr level must be lowered to 85% is necessary to establish letdown to the PRT using the Rx Head Vessel Vents in accordance with Step 53 of AP/1/A/5500/12 while minimizing the cycling of the Rx Head Vents.

SIMULATOR OPERATIONAL GUIDELINES

1. Reset the Simulator to a Mode 4 IC (prior to placing ND in service)

2. Adjust plant parameters such that:

   NCS Temperature is 345±3°F
   NCS pressure is ≈ 500-700 psig
   Pzr Level is ≈ 85%

3. Allow plant conditions to stabilize as needed.

   4. Insert REM-NV0024B = 0 (1NV-24B (C NC LOOP TO EXS L/D HX ISOL) is stuck CLOSED).

5. Insert REM-NV0001A = 0 (1NV-1A (NC L/D ISOL TO REGEN HX) spuriously closes and cannot be opened).

6. Perform AP/1/A/5500/12 through Step 43 RNO (Handout 1).

7. Allow pressurizer level to rise to 95 %.

8. Stabilize plant conditions and Freeze the Simulator

OR

1. Reset Simulator to Temporary Snap IC-244 (October, 2015)
2. Momentarily place Simulator in Run to acknowledge alarms.
3. Leave Simulator in FREEZE until operator is ready to begin.

NOTE: **During the performance of this JPM, the Simulator Instructor will need to monitor unrelated alarms and silence as needed.**

(Denote Critical Steps with an asterisk*)

Ensure Handout 1 is placed on CRS Desk.

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM).

START TIME: ____________

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
Simulator Instructor NOTE: Leave Simulator in FREEZE until operator is ready to begin.				
1	(Step 52) Establish excess letdown as follows: (Step 52.a) Adjust charging to minimum while maintaining the following: • NC pump seal injection flow greater than 6 GPM • Pzr level at program level.	The operator observes seal injection flow to be greater than 6 GPM. The operator observes that Pressurizer level is 95% and slowly rising. The operator observes that charging flow is adjusted to minimum.		
2	(Step 52.b) IF AT ANY TIME excess letdown cannot be established, THEN observe Note prior to Step 53 and GO TO Step 53 to establish letdown using Rx Vessel Head Vents.	The operator reads the conditional step, and proceeds.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*3	(Step 52.c) OPEN the following valves: 1KC-315B (U1 Excess L/D Hx KC Ret Hdr Cont Otsd Isol). 1KC-305B (U1 KC To Excess L/D Hx Cont Outside Isol).	The operator presses the 1KC-315B OPEN pushbutton, and observes the Red status light is LIT, Green status light is OFF. The operator presses the 1KC-305B OPEN pushbutton, and observes the Red status light is LIT, Green status light is OFF.		
4	(Step 52.d) Ensure 1NV-27B (U1 Excess L/D Hx Outlet 3-Way Cntrl) selected to "VCT" position.	The operator observes the 1NV-27B White VCT status light is LIT, White NCDT status light is OFF.		
5	(Note prior to Step 52.e) Opening and then closing 1NV-26B (U1 Excess L/D Hx Outlet Cntrl) in the next steps will reduce the possibility of water hammer by ensuring that the excess letdown line is filled with water.	The operator reads the Note, and proceeds.		
6	(Step 52.e) OPEN 1NV-26B (U1 Excess L/D Hx Outlet Cntrl).	The operator rotates the Manual Loader control knob clockwise until both the Black and Red needles indicate 100%.		
7	(Step 52.f) Wait 2 minutes.	The operator takes no additional action for 2 minutes. **Cue:** **Two minutes have elapsed.**		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
8	(Step 52.g) CLOSE 1NV-26B (U1 Excess L/D Hx Outlet Cntrl).	The operator rotates the Manual Loader control knob counter-clockwise until both the Black and Red needles indicate 0%.		
9	(Step 52.h) Check the following valves - OPEN: • 1NV-94AC (U1 NC Pumps Seal Water Return Cont Inside Isol) • 1NV-95B (U1 NC Pumps Seal Water Return Cont Outside Isol).	The operator observes the 1NV-94AC Red status light is LIT, Green status light is OFF. The operator observes the 1NV-95B Red status light is LIT, Green status light is OFF.		
*10	(Step 52.i) OPEN 1NV-24B (1C NC Loop To Excess L/D Hx Isol).	The operator presses the 1NV-24B OPEN pushbutton, and observes the Green status light remains LIT, Red status light is OFF. **(Alternate Path)** The operator recalls that IF AT ANY TIME excess letdown cannot be established, THEN observe Note prior to Step 53 and GO TO Step 53 to establish letdown using Rx Vessel Head Vents. The operator proceeds to Step 53.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
11	(Note prior to Step 53) The following step is performed in conjunction with OP/1/A/6150/004 (Pressurizer Relief Tank), Enclosure 4.3 (PRT Cooling).	The operator reads the Note, and proceeds. **Cue:** **Another operator will perform Enclosure 4.3 of OP/1/A/6150/004.**		
12	(Step 53) Establish letdown to PRT using Rx Vessel Head Vents as follows: (Step 53.a) Check unit status - IN MODE 3, 4 OR 5.	The operator observes NCS temperature and the Rx Trip Breakers and determines that the plant is in Mode 4.		
13	(Step 53.b) IF AT ANY TIME normal letdown OR excess letdown available, THEN perform one of the following: Establish normal letdown PER Steps 43 through 49. OR Establish excess letdown PER Step 52.	The operator reads the conditional step, and proceeds.		
14	(Caution prior to Step 53.c) PRT rupture disk relieves at 100 psig.	The operator reads the Caution, and proceeds.		
15	(Note prior to Step 53.c) Cycling of head vents in the following step should be minimized due to water hammer concerns in vent line.	The operator reads the Note, and proceeds.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*16	(Step 53.c) IF AT ANY TIME Pzr level approaches 96%, THEN perform the following: (Step 53.c.1) OPEN one train of head vent valves: Train A: • 1NC-272AC (U1 A Train Head Vent to PRT Isol) • 1NC-273AC (U1 A Train Head Vent to PRT Isol). OR Train B: • 1NC-274B (U1 B Train Head Vent to PRT Isol) • 1NC-275B (U1 B Train Head Vent to PRT Isol).	The operator reads the conditional step, and observes Pressurizer level to be ≥ 96%. The operator presses the 1NC-272AC OPEN pushbutton, and observes the Red status light is LIT, Green status light is OFF. The operator presses the 1NC-273AC OPEN pushbutton, and observes the Red status light is LIT, Green status light is OFF. OR The operator presses the 1NC-274B OPEN pushbutton, and observes the Red status light is LIT, Green status light is OFF. The operator presses the 1NC-275B OPEN pushbutton, and observes the Red status light is LIT, Green status light is OFF.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*17	(Step 53.c.2) WHEN Pzr at desired level, THEN CLOSE head vent valves opened above.	The operator observes Pressurizer level to be lowering toward 96%, and then continues to lower Pressurizer level toward 85%. **Cue:** **Another operator will continue with this procedure.**		

Terminating Cue: **Evaluation on this JPM is complete.**

STOP TIME: _______________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 Systems - Control Room JPM C

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________________ Date: ____________________

INITIAL CONDITIONS:

- Unit 1 is performing a plant shutdown and cooldown to Mode 5.
- The plant is currently at 345°F and 600 psig.
- The crew has entered AP/1/A/5500/12, Loss of Letdown, Charging or Seal Injection, due to a loss of Normal Letdown.
- It is not expected that the crew will be able to re-establish Normal Letdown without corrective maintenance.

INITIATING CUE:

The CRS has directed you to establish Excess Letdown per AP/1/A/5500/12 starting with Step 52, and maintain Pressurizer level between 85-96%.

SIM JPM D

Facility:	McGuire	Task No.:	
Task Title:	Remove Pressurizer Heaters from Service	JPM No.:	2016 Systems - Control Room JPM D (Alternate Path)
K/A Reference:	010 A4.02 (3.6/3.4)		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom ______ Simulator X Plant ________

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 1.

Initial Conditions:	• Unit 1 has just increased reactor power to 100% per OP/1/A/6100/003 (Controlling Procedure for Unit Operation). • Chemistry has confirmed that the Boron Concentration difference between the Pzr and the NC System is 4 ppm.

Initiating Cue:	• The CRS has directed you to remove Pzr Heater Groups A, B and D from service per Enclosure 4.6 (Operation of Pzr Heaters) of OP/1/A/6100/003, and ensure that NC System pressure is being controlled normally at 2235 psig. • All outstanding R&Rs that may impact performance of Enclosure 4.6 have been evaluated.

Task Standard: The operator will remove the A, B and D Pzr Heater Groups from service in accordance with Step 3.4.4 of Enclosure 4.6, and then after responding to the failure of the C Pzr Heater Group, manually control pressure by re-energizing at least one heater group. The operator will place at least one Pzr Heater Group in service in accordance with Step 3.3.1 (or equivalent) of Enclosure 4.6, before MCB Annunciator 1AD-6, C6 alarms.

Required Materials:	None
General References:	OP/1/A/6100/003 (Controlling Procedure for Unit Operation), Rev. 197 OP/1/A/6100/010G (Annunciator Response for Panel 1AD-6), Rev. 68 AD-HU-ALL-0004 (Procedure and Work Instruction Use and Adherence), Rev. 3
Handouts:	Handout 1: Enclosure 4.6 (Operation of Pzr Heaters) of OP/1/A/6100/003 (Controlling Procedure for Unit Operation)
Time Critical Task:	NO
Validation Time:	12 minutes

Critical Step Justification	
Step 7	This step is critical because rotating either the A, B or D Pzr Htr Mode Select Switch counter - clockwise to AUTO is necessary to remove the 1st Pzr Heater group from service.
Step 10	This step is critical because rotating either the A, B or D Pzr Htr Mode Select Switch counter - clockwise to AUTO is necessary to remove the 2nd Pzr Heater group from service.
Step 16	This step is critical because rotating either the A, B or D Pzr Htr Mode Select Switch counter - clockwise to AUTO is necessary to remove the 3rd Pzr Heater group from service.
Step 18	This step is critical because selecting Pzr Pressure Master and selecting “M” is necessary to remove the A, B and D Pzr Heater Groups from service in accordance with Step 3.4.4 of Enclosure 4.6.
Step 19	This step is critical because adjusting the Master Pressure Controller the error signal is < 15 psig is necessary to remove the A, B and D Pzr Heater Groups from service in accordance with Step 3.4.4 of Enclosure 4.6.
Step 20	This step is critical because selecting Pzr Pressure Master and selects “A” is necessary to remove the A, B and D Pzr Heater Groups from service in accordance with Step 3.4.4 of Enclosure 4.6.
Alternate Path Critical Step Justification	
Step 21	This step is critical because observing MCB Annunciator 1AD6/D6 and addressing the ARP is necessary to recognize that all Pressurizer Heaters are OFF.
Step 24	This step is critical because re-energizing at least one set of Pressurizer heaters is necessary to place at least one Pzr Heater Group in service in accordance with Step 3.3.1 (or equivalent) of Enclosure 4.6, before MCB Annunciator 1AD-6, C6 alarms.
Step 25	This step is critical because re-energizing at least one set of Pressurizer heaters is necessary to place at least one Pzr Heater Group in service in accordance with Step 3.3.1 (or equivalent) of Enclosure 4.6, before MCB Annunciator 1AD-6, C6 alarms.

SIMULATOR OPERATIONAL GUIDELINES

1. Reset simulator to IC-39 (100%)

2. Ensure Simulator reflects having been completed through Step 3.38.10.3 of OP/1/A/6100/003, Enclosure 4.1 (Power Increase).

3. Ensure that Pzr Heater groups A, B, and D are energized.

4. Acknowledge Alarms and Freeze Simulator

5. Create Lesson Plan NRC JPM D (Failure of Pzr Variable Heaters).
   (ANN) 1AD6-D06 = ON
   Insert X10_190_1 = False (0) (C heaters energize/de-energize Red Status light – OFF)

<u>OR</u>

1. Reset Simulator to Temporary Snap IC-245 (October, 2015).
2. Execute Lesson Plan NRC JPM C (Failure of Pzr Variable Heaters).
3. Momentarily place Simulator in Run to acknowledge alarms.
4. Leave Simulator in FREEZE until operator is ready to begin.

NOTE: **During the performance of this JPM, the simulator operator will need to execute failure at Step 20 of the JPM.**

(Denote Critical Steps with an asterisk*)

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 1.

START TIME: ____________

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
Simulator Instructor NOTE: Leave Simulator in FREEZE until operator is ready to begin.				
1	(Enclosure 4.6, Step 3.1) Evaluate all outstanding R&Rs that may impact performance of this procedure.	The operator recognizes that this step has already been performed (Initial Conditions), and proceeds.		
2	(Note prior to Step 3.2) During steady state conditions, Pzr Htr Groups are normally OFF and in AUTO.	The operator reads the Note and proceeds.		
3	(Step 3.2) Perform the following sections as applicable: • Section 3.3, Placing A, B, D Pzr Heater Groups in Service. • Section 3.4, Removing A, B, D Pzr Heater Groups form Service. • Section 3.5, Placing C Pzr Heater Group in Service. • Section 3.6, Removing C Pzr Heater Group from Service. • Section 3.7, Manual Operation of A, B, D Pzr Heater Groups	The operator recognizes that Section 3.4 is the applicable section and proceeds to Section 3.4.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
4	(Step 3.4) Removing A, B, D Pzr Heater Groups From Service (Caution prior to Step 3.4.1) Pzr Htr Groups and Pzr Spray Controls should be operated with extreme caution to prevent NC System pressure transients. (Step 3.4.1) Ensure Boron Concentration difference between Pzr and NC System less than 50 ppm.	The operator reads the Caution and proceeds. The operator recognizes that this condition is already met (Initial Conditions), and proceeds.		
5	(Step 3.4.2) IF three Pzr Htr Groups in service AND desire to operate with two Pzr Htr Groups in service…..	The operator recognizes that this step is NOT applicable and proceeds.		
6	(Step 3.4.3) IF three Pzr Htr Groups in service AND desire to operate with one Pzr Htr Group in service…..	The operator recognizes that this step is NOT applicable and proceeds.		
*7	(Step 3.4.4) IF three Pzr Htr Groups in service AND desire to remove all Pzr Htr Groups from service, perform the following: (Step 3.4.4.1) Place one of the following in AUTO: A Pzr Htr Mode Select B Pzr Htr Mode Select D Pzr Htr Mode Select	The operator rotates either the A, B or D Pzr Htr Mode Select Switch counter - clockwise to AUTO.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
8	(Step 3.4.4.2) Check associated Pzr Htr Group in OFF. A Pzr Htr Group B Pzr Htr Group D Pzr Htr Group	The operator observes the Green status light LIT and the Red status light OFF for the heater group, whose Mode Select Switch was moved to AUTO in the previous step.		
9	(Step 3.4.4.3) Monitor Pzr pressure for 2 minutes.	The operator observes actual Pressurizer Pressure and Spray Valve position (Or equivalent) for 2 minutes and determines that Pzr Pressure has stabilized. **Examiner Cue:** **If pressure is stabilized, Two minutes has elapsed.**		
*10	(Step 3.4.4.4) Place second Pzr Htr Mode Select Switch in AUTO: A Pzr Htr Mode Select B Pzr Htr Mode Select D Pzr Htr Mode Select	The operator rotates either the A, B or D Pzr Htr Mode Select Switch counter-clockwise to AUTO.		
11	(Step 3.4.4.5) Check associated Pzr Htr Group in OFF. A Pzr Htr Group B Pzr Htr Group D Pzr Htr Group	The operator observes the Green status light LIT and the Red status light OFF for the heater group, whose Mode Select Switch was moved to AUTO in the previous step.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
12	(Step 3.4.4.6) Monitor Pzr pressure for 2 minutes.	The operator observes actual Pressurizer Pressure and Spray Valve position (Or equivalent) for 2 minutes and determines that Pzr Pressure has stabilized. **Examiner Cue:** **If pressure is stabilized, Two minutes has elapsed.**		
13	(Note prior to Step 3.4.4.7) Placing Pzr Press Master in manual makes automatic operation of 1NC-34A (Pzr PORV) unavailable and should be evaluated using Electronic Risk Assessment Tool. This assessment should be performed prior to placing Pzr Press Master in manual.	The operator reads the Note and proceeds.		
14	(Step 3.4.4.7) IF time allows AND Unit 1 in Modes 1-4, evaluate unavailability of 1NC-34A (Pzr PORV) using Electronic Risk Assessment Tool.	The operator informs the CRS. **Examiner Cue:** **As the CRS/STA, indicate that the ERAT has been evaluated with no issues.**		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
15	(Note prior to Step 3.4.4.8) Steps 3.4.4.8 – 3.4.4.10 C should be performed without delay.	The operator reads the Note and proceeds.		
*16	(Step 3.4.4.8) Place third Pzr Htr Mode Select in AUTO: A Pzr Htr Mode Select B Pzr Htr Mode Select D Pzr Htr Mode Select	The operator rotates either the A, B or D Pzr Htr Mode Select Switch counter-clockwise to AUTO.		
17	(Step 3.4.4.9) Check associated Pzr Htr Group in OFF. A Pzr Htr Group B Pzr Htr Group D Pzr Htr Group	The operator observes the Green status light LIT and the Red status light OFF for the heater group, whose Mode Select Switch was moved to AUTO in the previous step.		
*18	(Step 3.4.4.10) On the DCS Work Station, Pressurizer and PRT graphic, perform the following: (Step 3.4.4.10 A) Place PZR PRESS MASTER in manual.	The operator observes the NC-Pressurizer and PRT DCS Screen and observes Pressurizer pressure. The operator selects Pzr Pressure Master and selects “M” (Turns RED).		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*19	(Step 3.4.4.10 B) Adjust PZR PRESS MASTER output until the following occurs: C Pzr Htr Group begins cycling 1NC-27C (A Loop Pzr Spray Control) Closes 1NC-29C (B Loop Pzr Spray Control) Closes	Using the NC-Pressurizer and PRT DCS Screen, the operator adjusts Pzr Press Master output (**DOWN**) until the error signal is < 15 psig. The operator observes C Pzr Heater Group Red Status light cycling ON and OFF, and determines that the C Pzr Htr Group is cycling. The operator observes the 1NC-27C SLIMs Limit Switch and determines that 1NC-27C is CLOSED. The operator observes the 1NC-29C SLIMs Limit Switch and determines that 1NC-29C is CLOSED.		
*20	(Step 3.4.4.10 C) Place PZR PRESS MASTER in auto.	Using the NC-Pressurizer and PRT DCS Screen, the operator selects Pzr Pressure Master and selects “A” (Turns GREEN).		

Simulator Instructor NOTE: Execute & Activate Lesson Plan (Failure of Pzr Variable Heaters) (Alternate Path)

It is expected that MCB Annunciator 1AD6/D6 (PZR HTR CONTROLLER TROUBLE) will alarm.

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*21	(Step 3.4.4.11) Monitor Pzr pressure for 2 minutes.	The operator observes actual Pressurizer Pressure and Spray valve Position (Or equivalent) and determines that Pzr Pressure is lowering. The operator observes MCB Annunciator 1AD6/D6 and addresses ARP.		
22	(OP/1/A/6100/010 G, Immediate Action 1) Remove Group C Heater Group from automatic control by opening supply breaker.	The operator observes the C Pzr Heater Group Green and Red Breaker Status light are OFF. The operator may observe the OAC indicating a demand on the C Pzr Heater Group (Red Heater lines), and depress the C Pzr Heater Group OPEN pushbutton (No effect, both status lights are OFF).		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
23	(OP/1/A/6100/010 G, Immediate Action 2) Manually control pressure using other heater groups.	The operator recognizes that no Pzr htrs are energized and proceeds to Enclosure 4.6, Step 3.3.1 (Or Equivalent) to place one Pzr Htr Group in service. **Examiner Note:** **The operator may use one or more Pzr Heater Groups to maintain NC System Pressure within the normal band.** **The operator MUST place at least one Pzr Htr Group in service to complete the Critical nature of this task.** **The operator should realize the need to get one set of htrs on for pressure control and MAY start one set of htrs based on ARP guidance to manually control pressure. If NOT, the required OP Steps of Section 3.3.1 are scripted.** **However, Section 3.7 of Enclosure 4.6 may be used as well.**		
		Examiner Note: **IF MCB Annunciator 1AD-6, C6, alarms before the operator energizes one set of Heaters, the Critical Step is Failed.**		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*24	(Enclosure 4.6, Step 3.3) Placing A, B, D Pzr Heater Groups in service. (Caution prior to Step 3.3.1) Pzr Htr Groups and Pzr Spray Controls should be operated with extreme caution to prevent NC System pressure transients. (Step 3.3.1) IF desired to operate with one Pzr Htr group in service, perform the following: (Step 3.3.1.1) Place of the following in MAN: A Pzr Htr Mode Select B Pzr Htr Mode Select D Pzr Htr Mode Select	 The operator reads the Caution, and proceeds. The operator rotates either the A, B or D Pzr Htr Mode Select Switch clockwise to MAN.		
*25	(Step 3.3.1.2) Place the associated Pzr Htr Group in ON: A Pzr Htr Group B Pzr Htr Group D Pzr Htr Group	The operator depresses the ON pushbutton for the heater group, whose Mode Select Switch was moved to MAN in the previous step, and observes the Red status light LIT and the Green status light OFF.		
26	(Step 3.3.1.3) Monitor Pzr pressure for 2 minutes.	The operator observes Pressurizer Pressure and Spray valve Position (Or equivalent) for 2 minutes and determines that Pzr Pressure has stabilized at 2235 ±15 psig.		

Terminating Cue: **Evaluation on this JPM is complete.**

STOP TIME: ______________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 Systems - Control Room JPM D

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Result: SAT ______ UNSAT _______

Examiner's Signature: ________________________________ Date: ____________________

INITIAL CONDITIONS:

- Unit 1 has just increased reactor power to 100% per OP/1/A/6100/003 (Controlling Procedure for Unit Operation).
- Chemistry has confirmed that the Boron Concentration difference between the Pzr and the NC System is 4 ppm.

INITIATING CUE:

- The CRS has directed you to remove Pzr Heater Groups A, B and D from service per Enclosure 4.6 (Operation of Pzr Heaters) of OP/1/A/6100/003, and ensure that NC System pressure is being controlled normally at 2235 psig.
- All outstanding R&Rs that may impact performance of Enclosure 4.6 have been evaluated.

SIM JPM E

Facility:	McGuire	Task No.:	
Task Title:	Depressurize NCS During Natural Circulation Cooldown	JPM No.:	2016 Systems - Control Room JPM E (Alternate Path)
K/A Reference:	EPE E09 EA1.1 (3.5/3.5)		

Examinee:		NRC Examiner:	
Facility Evaluator:		Date:	

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom ______ Simulator X Plant ______

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Ensure Handout 1 is placed on CRS Desk.

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 2.

Initial Conditions:	• Unit 1 has tripped from 100% power due to a Loss of Off-Site Power. • The crew is currently implementing EP/1/A/5000/ES-0.2 (Natural Circulation Cooldown), and is currently at Step 15. • Normal Letdown is in service.
Initiating Cue:	The CRS has directed you to depressurize the NC system to 1905 PSIG using aux spray per Generic Enclosures, Enclosure 3 (Establishing NV Aux Spray).
Task Standard:	The operator will place Auxiliary Spray in service and lower Pzr Pressure to 2030 psig; and after diagnosing a loss of Normal Letdown immediately remove Aux Spray from service.
Required Materials:	None

General References: EP/1/A/5000/E-0 (Reactor Trip or Safety Injection), Rev 34
EP/1/A/5000/ES-0.1 (Reactor Trip Response), Rev 42
EP/1/A/5000/ES-0.2 (Natural Circulation Cooldown), Rev 12
EP/1/A/5000/G-1 (Generic Enclosures), Rev 38
OP/1/A/6200/001 A (Chemical and Volume Control System Letdown), Rev 53

Handouts: Handout 1: EP/1/A/5000/ES-0.2 (Natural Circulation Cooldown) marked up for this JPM.
Handout 2: Generic Enclosure 3 (Establishing NV Aux Spray)
Handout 3: Enclosure 4.7 (Operator Action With NV Aux Spray In Service) of OP/1/A/6200/001 A (Chemical and Volume Control System Letdown)

Time Critical Task: NO

Validation Time: 12 minutes

Critical Step Justification	
Step 9	This step is critical because pressing the 1NV-21A OPEN pushbutton is necessary to place Auxiliary Spray in service and lower Pzr Pressure to 2030 psig.
Step 10	This step is critical because pressing the 1NV-16A CLOSE pushbutton is necessary to place Auxiliary Spray in service and lower Pzr Pressure to 2030 psig.
Step 11	This step is critical because adjusting the 1NV-238 controller and 1NV-241 manual loader to ensure that Regenerative Hx letdown temperature remains less than 380°F, and Pzr spray water delta T remains less than 320°F is necessary to place Auxiliary Spray in service and lower Pzr Pressure to 2030 psig.
Alternate Path Critical Step Justification	
Step 13	This step is critical because pressing the 1NV-13B OPEN pushbutton and the 1NV-21A CLOSE pushbutton is necessary to remove Aux Spray from service after diagnosing a loss of Normal Letdown.

SIMULATOR OPERATIONAL GUIDELINES

1. Reset Simulator to IC-39 (100% power)

2. Insert MALF EP002A and EP002B (Loss of Off-site Power)

3. Implement E-0, ES-0.1 and ES-0.2 through Step 15.

4. Ensure NCS System parameters as follows:

   - Thots - < 550°F
   - Pzr Level – at Setpoint
   - Pzr Pressure ≈ 2335 psig
   - SG NR Levels ≈ 39%

5. Ensure Normal Letdown is in service.

6. Ensure that all available Pzr Heaters are ON.

7. Place REM-NV0007B=0 cd H_X10_125_1 LT 2030 and on TRIGGER #1 (1NV-7B inadvertently closed).

8. Freeze Simulator.

OR

1. Reset Simulator to Temporary Snap IC-246 (October, 2015).

NOTE: During the performance of the JPM, the Simulator Instructor will be required to:

- **Acknowledge spurious alarms unrelated to the task being performed.**

- **The Letdown isolation is triggered to occur at 2030 psig. If Normal Letdown isolation does NOT occur as expected, Operate TRIGGER #1 at Step 12-13 of JPM when Pzr Pressure has lowered to 2030 psig.**

(Denote Critical Steps with an asterisk*)

Ensure Handout 1 is placed on CRS Desk.
Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 2.

START TIME: ____________

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
Simulator Instructor NOTE: Leave Simulator in FREEZE until operator is ready to begin.				
1	(Enclosure 3, Step 1) IF S/I has occurred, THEN….	The operator recognizes that SI has NOT occurred, and proceeds.		
2	(Step 2) REFER TO OP/1/A/6200/001 A (Chemical and Volume Control System Letdown), Enclosure 4.7 (Operator Actions with NV Aux Spray in Service).	The operator seeks a copy of Enclosure 4.7 of OP/1/A/6200/001 A. **Cue:** **Provide operator with Handout 3.** The operator reviews the Enclosure, and proceeds.		
3	(Caution prior to Step 3) Raising charging flow will raise NV aux spray water delta T and raise spray flowrate.	The operator reads the Caution, and proceeds.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
4	(Notes prior to Step 3) Pzr spray water delta T can be determined by subtracting "REGEN HX CHARGING TEMP" from "PZR VAPOR SPACE TEMP". Controlling flow through 1NV-241 (U1 Seal Water Inj Flow Control) also controls NV aux spray flow.	The operator reads the Notes, and proceeds.		
5	(Step 3) Control charging and letdown flow in subsequent steps as required to: Maintain Pzr spray water delta T less than 320°F. Maintain Regenerative Hx letdown temperature less than 380°F.	The operator reads the Step, and proceeds.		
6	(Step 4) IF AT ANY TIME normal letdown is lost, THEN immediately isolate NV aux spray.	The operator reads the conditional Step, and proceeds.		
7	(Step 5) CLOSE the following normal Pzr spray valves and leave closed while NV aux spray is used: 1NC-27C (1A NC Loop PZR Spray Control) 1NC-29C (1B NC Loop PZR Spray Control).	The operator observes the 1NC-27C SLIMS and observes the output to be 0%, and that the Red closed light is LIT. The operator observes the 1NC-29C SLIMS and observes the output to be 0%, and that the Red closed light is LIT.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
8	(Caution prior to Step 6) The number of times the following valves are cycled should be kept to minimum, to limit the number of thermal transients on charging nozzle.	The operator the Caution, and proceeds.		
*9	(Step 6) Establish NV aux spray as follows: (Step 6.a) OPEN 1NV-21A (U1 NV Supply to U1 Aux PZR Spray Isol).	The operator presses the 1NV-21A OPEN pushbutton and observes the Red status light is LIT, and the Green status light is OFF.		
10 *	(Step 6.b) CLOSE the following valves: 1NV-13B (U1 NV Supply To 1A NC Loop Isol) 1NV-16A (U1 NV Supply To 1D NC Loop Isol).	The operator observes the 1NV-13B Green status light is LIT, and the Red status light is OFF. The operator presses the 1NV-16A CLOSE pushbutton and observes the Green status light is LIT, and the Red status light is OFF.		
*11	(Step 7) Slowly control charging flow as desired to control depressurization rate.	The operator adjusts the 1NV-238 controller and 1NV-241 manual loader to ensure that Regenerative Hx letdown temperature remains less than 380°F, and Pzr spray water delta T remains less than 320°F. The operator observes Pzr Pressure is slowly lowering.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
12	(Caution prior to Step 8) If excessive depressurization occurs, the following step may need to be performed immediately.	The operator reads the Caution, and proceeds.		

Simulator Instructor NOTE: If Normal Letdown is NOT already isolated when Pzr Pressure is 2030 psig, Operate TRIGGER #1.

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
Note: **When the operator determines that normal Letdown is lost, the operator will either perform Step 8 of Enclosure 3 (JPM Step 13 scripted BELOW), or its equivalent step on Enclosure 4.7 of OP/1/A/6200/001 A (Handout 3 provided to the operator in JPM Step 2). If the equivalent Step is performed (Step 3.2 of Enclosure 4.7) the operator will:** • **Close 1NV-21A** • **OPEN *either* 1NV-13B or 1NV-16A**				
*13	(Step 8) IF AT ANY TIME NV aux spray must be stopped, THEN perform the following: (Step 8.a) OPEN 1NV-13B (U1 NV Supply To 1A NC Loop Isol). (Step 8.b) IF 1NV-13B will not open, THEN ….. (Step 8.c) CLOSE 1NV-21A (U1 NV Supply to U1 Aux PZR Spray Isol). (Step 8.d) WHEN desired to restore NV aux spray, THEN RETURN TO Step 1.	The operator observes Letdown flow at 0 gpm or responds to Group 4 C5, 1NV-7B LETDOWN CONT ISOL OTSD CLOSED, annunciator on the ESF Monitor Status Panel **(Alternate Path)**. The operator presses the 1NV-13B OPEN pushbutton and observes the Red status light is LIT, and the Green status light is OFF. The operator presses the 1NV-21A CLOSE pushbutton and observes the Green status light is LIT, and the Red status light is OFF.		

Terminating Cue: **Another Operator will continue with this procedure.**

STOP TIME: ______________

Job Performance Measure No.: 2016 Systems - Control Room JPM E

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

INITIAL CONDITIONS:

- Unit 1 has tripped from 100% power due to a Loss of Off-Site Power.
- The crew is currently implementing EP/1/A/5000/ES-0.2 (Natural Circulation Cooldown), and is currently at Step 15.
- Normal Letdown is in service.

INITIATING CUE:

The CRS has directed you to depressurize the NC system to 1905 PSIG using aux spray per Generic Enclosures, Enclosure 3 (Establishing NV Aux Spray).

<u>SIM JPM F</u>

Facility:	McGuire	Task No.:	
Task Title:	Perform the 1A Annulus Ventilation Operability Test	JPM No.:	2016 Systems - Control Room JPM F
K/A Reference:	027 A4.01 (3.3/3.3)		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom ______ Simulator X Plant ________

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 1.

Initial Conditions:	• Unit 1 is operating at 100% power and the Unit 1 VE System is aligned for Engineered Safeguards Operation. • PT/1/A/4450/003 A (Annulus Ventilation System Train 'A' Operability Test) is on the Operations schedule for today. • AO John has been briefed on the performance of this Surveillance, and is standing by to assist in the operation.
Initiating Cue:	The CRS has directed you to perform PT/1/A/4450/003 A (Annulus Ventilation System Train 'A' Operability Test).
Task Standard:	The operator will place the 1A VE Fan in Recirculation Mode with the cross connect from B Train closed. The 1A VE Fan will be shut down after flow verification and returned to normal alignment.
Required Materials:	None
General References:	PT/1/A/4450/003 A (Annulus Ventilation System Train 'A' Operability Test) Rev 26

Handouts: Handout 1: PT/1/A/4450/003 A (Annulus Ventilation System Train 'A' Operability Test) marked up as follows:
Step 7.1 – Initialed
Step 8.1 – Initialed
Step 12.1 - Initialed

Time Critical Task: NO

Validation Time: 12 minutes

Note: This JPM should be pre-briefed in the Briefing Room.

Critical Step Justification	
Step 1	This step is critical because rotating the 1AVS-D-3 Mode Select switch clockwise to MAN is necessary to place the 1A VE Fan in Recirculation Mode with the cross connect from B Train closed.
Step 2	This step is critical because pressing the 1AVS-D-3 CLOSE pushbutton is necessary to place the 1A VE Fan in Recirculation Mode with the cross connect from B Train closed.
Step 3	This step is critical because rotating the 1AVS-D-2 Mode Select switch clockwise to MAN is necessary to place the 1A VE Fan in Recirculation Mode with the cross connect from B Train closed.
Step 4	This step is critical because pressing the 1AVS-D-2 CLOSE pushbutton is necessary to place the 1A VE Fan in Recirculation Mode with the cross connect from B Train closed.
Step 6	This step is critical because rotating the 1A VE Fan Control Switch clockwise to ON is necessary to place the 1A VE Fan in Recirculation Mode with the cross connect from B Train closed.
Step 15	This step is critical because rotating the 1A VE Fan Control Switch counter-clockwise to RESET is necessary to shut down the 1A VE Fan and return the system a to normal alignment.
Step 19	This step is critical because rotating the 1AVS-D-3 Mode Select switch counter-clockwise to AUTO is necessary to return the system a to normal alignment.
Step 21	This step is critical because rotating the 1AVS-D-2 Mode Select switch counter-clockwise to AUTO is necessary to return the system a to normal alignment.

SIMULATOR OPERATIONAL GUIDELINES

1. Reset the Simulator to IC-39 (100% Power)
2. Allow conditions to stabilize.
3. Freeze the Simulator

<u>OR</u>

1. Reset Simulator to Temporary Snap IC-247 (October, 2015).
2. Momentarily place Simulator in Run to acknowledge alarms.

(Denote Critical Steps with an asterisk*)

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 1.

START TIME: ____________

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*1	(Step 12.2) Place "1AVS-D-3 Mode Select" in "MAN".	The operator rotates the 1AVS-D-3 Mode Select switch clockwise to MAN.		
*2	(Step 12.3) Close 1AVS-D-3 (1A VE Disch Damper to Unit Vent).	The operator presses the 1AVS-D-3 CLOSE pushbutton and observes Green status light is LIT, Red status light is OFF.		
*3	(Step 12.4) Place "1AVS-D-2 Mode Select" in "MAN".	The operator rotates the 1AVS-D-2 Mode Select switch clockwise to MAN.		
*4	(Step 12.5) Open 1AVS-D-2 (1A VE Disch Damper to Annulus).	The operator presses the 1AVS-D-2 OPEN pushbutton and observes Red status light is LIT, Green status light is OFF.		
5	(Step 12.6) Ensure 1AVS-D-9 (1B VE Fan Suct X-Connect) closed.	The operator observes the 1AVS-D-9 Green status light is LIT, Red status light is OFF.		
*6	(Step 12.7) Start 1A VE Fan.	The operator rotates the 1A VE Fan Control Switch clockwise to ON and observes Red status light is LIT, Green status light is OFF.		
7	(Step 12.8) Check "RESET" lit for "1A VE Train Preheat Hi Temp Reset".	The operator observes the Yellow 1A VE Train Preheat Hi Temp Reset light is LIT.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
8	(Note prior to Step 12.9) Heater operability and compliance with McGuire Tech Spec requirements (Reference 2.1) is determined by PT/1/A/4450/003 D (Annulus Filter 1A Heater Dissipation Test).	The operator reads the Note and proceeds.		
9	(Step 12.9) Check: • "A VE Preheater No. 1 On" • "A VE Preheater No. 2 On" • Positive D/P across any filter within Filter Package	The operator observes the White 1A A VE Preheater No. 1 On light is LIT. The operator observes the White 1A A VE Preheater No. 2 On light is LIT. The operator observes the four DP gages indicate between 1-3 inches H_2O.		
10	(Step 12.10) Record date and time of test start: Date: _______________ Time: _______________	The operator records the current date and time.		
11	(Step 12.11) HOLD until test is run for at least 10 hours.	The operator identifies that the test must continue for the next ten hours. **Cue:** **Using Time Compression, ten hours have elapsed.**		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
12	(Note prior to Step 12.12) Heater operability and compliance with McGuire Tech Spec requirements (Reference 2.1) is determined by PT/1/A/4450/003 D (Annulus Filter 1A Heater Dissipation Test).	The operator reads the Note and proceeds.		
13	(Step 12.12) Check the following: • "A VE Preheater No. 1 On" • "A VE Preheater No. 2 On" • Positive D/P across any filter within Filter Package	The operator observes the White 1A A VE Preheater No. 1 On light is LIT. The operator observes the White 1A A VE Preheater No. 2 On light is LIT. The operator observes the four DP gages indicate between 1-3 inches H_2O.		
14	(Note prior to Step 12.13) Heaters may cause an HVAC 0AD12 annunciator to alarm and "Carbon Bed Temp >190°F" status light to actuate after the 1A VE Fan is stopped.	The operator reads the Note and proceeds.		
*15	(Step 12.13) Stop 1A VE Fan by rotating "1A VE Fan" to "RESET".	The operator rotates the 1A VE Fan Control Switch counter-clockwise to RESET and observes Green status light is LIT, Red status light is OFF.		
16	(Step 12.14) Check "1A VE Fan" returns to "AUTO".	The operator releases the 1A VE Fan Control Switch and observes that the switch spring-returns to AUTO.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
17	(Step 12.15) Record date and time of test completion: Date: ______________ Time: ______________	The operator records the current date and time.		
18	(Note prior to Step 12.16) Train 1A VE Dampers will reposition when damper mode select switches are positioned to "AUTO".	The operator reads the Note and proceeds.		
*19	(Step 12.16) Place "1AVS-D-3 Mode Select" in "AUTO".	The operator rotates the 1AVS-D-3 Mode Select switch counter-clockwise to AUTO.		
20	(Step 12.17) Check 1AVS-D-3 (1A VE Disch Damper to Unit Vent) "OPEN".	The operator observes the 1AVS-D-3 Red status light is LIT, Green status light is OFF.		
*21	(Step 12.18) Place "1AVS-D-2 Mode Select" in "AUTO".	The operator rotates the 1AVS-D-2 Mode Select switch counter-clockwise to AUTO.		
22	(Step 12.19) Check 1AVS-D-2 (1A VE Disch Damper to Annulus) "CLOSED".	The operator observes the 1AVS-D-2 Green status light is LIT, Red status light is OFF.		
23	(Step 12.20) Ensure 1AVS-D-9 (1B VE Fan Suct X-Connect) closed.	The operator observes the 1AVS-D-9 Green status light is LIT, Red status light is OFF.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
24	(Notes prior to Step 12.21) 5 to 10 minutes may need to pass after 1A VE Fan is stopped to obtain the "RESET" indication for "1A VE Train Preheat Hi Temp Reset". "RESET" indication for "1A VE Train Preheat Hi Temp Reset" must be obtained to ensure VE operability.	The operator reads the Notes and proceeds.		
25	(Step 12.21) Depress "RESET" for "1A VE Train Preheat Hi Temp Reset".	The operator presses the 1A VE Train Preheat Hi Temp Reset pushbutton (Status light is already LIT).		
26	(Step 12.22) Check "RESET" lit for "1A VE Train Preheat Hi Temp Reset".	The operator observes the 1A VE Train RESET status light is LIT.		
27	(Note prior to Step 12.23) Annulus doors must be closed to ensure Reactor Building operability. (McGuire Tech Spec. 3.6.16)	The operator reads the Note and proceeds.		
28	(Step 12.23) Evaluate 1A VE operability.	The operator notifies the CRS to evaluate 1A VE operability. **Cue:** **The CRS acknowledges and indicates that another operator will continue with this procedure.**		

Terminating Cue: **Evaluation on this JPM is complete.**

STOP TIME: ______________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 Systems - Control Room JPM F

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

INITIAL CONDITIONS:

- Unit 1 is operating at 100% power and the Unit 1 VE System is aligned for Engineered Safeguards Operation.
- PT/1/A/4450/003 A (Annulus Ventilation System Train 'A' Operability Test) is on the Operations schedule for today.
- AO John has been briefed on the performance of this Surveillance, and is standing by to assist in the operation.

INITIATING CUE:

The CRS has directed you to perform PT/1/A/4450/003 A (Annulus Ventilation System Train 'A' Operability Test).

SIM JPM G

Facility: McGuire

Task No.:

Task Title: Restore Power to 6900V Buses

JPM No.: 2016 Systems - Control Room JPM G

K/A Reference: 062 A2.05 (2.9/3.3)

Examinee:

NRC Examiner:

Facility Evaluator:

Date:

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom ______ Simulator X Plant ________

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 1.

Initial Conditions:

- A total loss of Offsite Power has occurred to the Unit 1 Switchyard.
- Unit 1 tripped from 100% power.
- The Electrical Grid has remained energized throughout this event.
- Unit 1 has implemented AP/1/A/5500/07 (Loss of Electrical Power), Case I (Loss of Normal Power to 1ETA and 1ETB).
- Power has been restored to the Unit 1 Switchyard.
- The crew is preparing to restore power to the 6900VAC Buses, and is complete through Step 43.p.

Initiating Cue:

- The CRS has directed you to restore power to the 6900V buses starting with Step 43.q of AP/1/A/5500/07 (Loss of Electrical Power), Case I (Loss of Normal Power to 1ETA and 1ETB) using the Normal Supply breakers.
- Toddville has indicated that all Unit 1 Switchyard PCBs are available, and has given permission to close them as needed.

Task Standard: The operator will re-energize all four 6900V Buses per AP/1/A/5500/07 Steps 43.q-r.3.

Required Materials: None

General References: AP/1/A/5500/07 (Loss of Electrical Power), Rev 36
EP/1/A/5000/E-0 (Reactor Trip or Safety Injection), Rev 34
EP/1/A/5000/ES-0.1 (Reactor Trip Response), Rev 42

Handouts: Handout 1: Step 43 of Case I (Loss of Normal Power to Both 1ETA and 1ETB) of AP/1/A/5500/07 (Loss of Electrical Power) marked up for this JPM.

Time Critical Task: NO

Validation Time: 7 minutes

Critical Step Justification	
Step 1	This step is critical because pressing the CLOSE pushbutton for PCB8 AND pressing the CLOSE pushbutton for PCB12 are necessary to re-energize all four 6900V Buses per AP/1/A/5500/07 Steps 43.q-r.3.
Step 3	This step is critical because pressing the CLOSE pushbutton for 1TA, 1TB, 1TC and 1TD normal breakers are necessary to re-energize all four 6900V Buses per AP/1/A/5500/07 Steps 43.q-r.3.
Step 4	This step is critical because placing the 1TA, 1TB, 1TC, and 1TD Mode Select Switch to AUTO is necessary to re-energize all four 6900V Buses per AP/1/A/5500/07 Steps 43.q-r.3.

SIMULATOR OPERATIONAL GUIDELINES

1. Reset to IC-39 (100% Steady-state)
2. Insert the following malfunctions:

   MALF-EP001 Station Blackout

3. Place Simulator in Run and acknowledge Annunciator Alarms.
4. Implement EP/1/A/5000/E-0, EP/1/A/5000/ES-0.1 and AP/1/A/5500/07, Case I through Step 43.n.
5. Stabilize plant.
6. Remove MALF-EP001
7. Insert LOA-EP172, 173 and 174 (Switchyard Lockout Reset).
8. Acknowledge alarms and Freeze the Simulator.

OR

1. Reset Simulator to Temporary Snap IC-248 (October, 2015).

NOTE: **During the performance of the JPM, the Simulator Instructor will be required to acknowledge spurious alarms unrelated to the task being performed.**

(Denote Critical Steps with an asterisk*)

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 1.

START TIME: ____________

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
Simulator Instructor NOTE: Leave Simulator in FREEZE until operator is ready to begin.				
1	(Step 43.q) Close available PCBs as directed by Toddville TCC.			
*	• PCB8	The operator presses the CLOSE pushbutton for PCB8 and observes the Red status light LIT and Green status light OFF (The 1A Transformer voltage will rise to 24KV).		
	• PCB9	The operator presses the CLOSE pushbutton for PCB9 and observes the Red status light LIT and Green status light OFF.		
	• PCB11	The operator presses the CLOSE pushbutton for PCB11 and observes the Red status light LIT and Green status light OFF (The 1B Transformer voltage will rise to 24KV).		
*	• PCB12	The operator presses the CLOSE pushbutton for PCB12 and observes the Red status light LIT and Green status light OFF.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
2	(Step 43.r) WHEN busline energized, THEN energize 6900V busses as follows: (Step 43.r.1) Check electrical grid – HAS REMAINED ENERGIZED DURING THIS EVENT.	The operator observes that Electrical Grid has remained energized throughout this event (Initial Conditions), and proceeds.		
*3	(Step 43.r.2) Close the normal or standby breaker on de-energized busses: • 1TA • 1TB • 1TC • 1TD.	The operator presses the CLOSE pushbutton for 1TA normal breaker and observes the Red status light LIT, Green status light OFF. The operator presses the CLOSE pushbutton for 1TB normal breaker and observes the Red status light LIT, Green status light OFF. The operator presses the CLOSE pushbutton for 1TC normal breaker and observes the Red status light LIT, Green status light OFF. The operator presses the CLOSE pushbutton for 1TD normal breaker and observes the Red status light LIT, Green status light OFF.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*4	(Step 43.r.3) Place the mode select switches for the following 6900V busses in auto: • 1TA • 1TB • 1TC • 1TD.	The operator places the 1TA Mode Select Switch to AUTO. The operator places the 1TB Mode Select Switch to AUTO. The operator places the 1TC Mode Select Switch to AUTO. The operator places the 1TD Mode Select Switch to AUTO.		

Terminating Cue: **Evaluation on this JPM is complete.**

STOP TIME: ______________

Job Performance Measure No.: 2016 Systems - Control Room JPM G

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

INITIAL CONDITIONS:

- A total loss of Offsite Power has occurred to the Unit 1 Switchyard.
- Unit 1 tripped from 100% power.
- The Electrical Grid has remained energized throughout this event.
- Unit 1 has implemented AP/1/A/5500/07 (Loss of Electrical Power), Case I (Loss of Normal Power to 1ETA and 1ETB).
- Power has been restored to the Unit 1 Switchyard.
- The crew is preparing to restore power to the 6900VAC Buses, and is complete through Step 43.p.

INITIATING CUE:

- The CRS has directed you to restore power to the 6900V buses starting with Step 43.q of AP/1/A/5500/07 (Loss of Electrical Power), Case I (Loss of Normal Power to 1ETA and 1ETB) using the Normal Supply breakers.
- Toddville has indicated that all Unit 1 Switchyard PCBs are available, and has given permission to close them as needed.

SIM JPM H

Facility:	McGuire	Task No.:	
Task Title:	Isolate the Circulating Water System During Turbine Building Flooding	JPM No.:	2016 Systems - Control Room JPM H
K/A Reference:	075 A2.02 2.5/2.7		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom ______ Simulator X Plant ______

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Ensure Handout 1 is placed on CRS Desk.

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 2.

Initial Conditions:

- With Unit 1 at 100% power, massive RC System Flooding occurred in the Unit 1 Turbine Building.
- The crew has implemented AP/0/A/5500/44 (Plant Flooding) Enclosure 1 (Unit 1 Turbine Bldg Flooding), and an operator has just been dispatched to check the flood doors closed.
- The crew has just manually tripped the reactor.
- An operator has locally closed the breaker for 1RC-21.
- The U-1 Turbine Building Rounds AO (Bob) is standing by via radio.

Initiating Cue: The CRS has directed you to isolate the RC System by continuing with Enclosure 1 (Unit 1 Turbine Bldg Flooding) of AP/0/A/5500/44 (Plant Flooding), step 5.d, while the crew continues with EP/1/A/5000/E-0 (Reactor Trip and/or Safety Injection).

Task Standard: The operator will take actions to isolate the Unit 1 RC System in accordance with Enclosure 1 of AP/0/A/5500/44.

Required Materials:	None
General References:	AP/0/A/5500/44 (Plant Flooding), Rev 18 EP/1/A/5000/E-0 (Reactor Trip or Safety Injection), Rev 34 EP/1/A/5000/ES-0.1 (Reactor Trip Response), Rev 42
Handouts:	Handout 1: AP/0/A/5500/44 (Plant Flooding) marked up for place-keeping through Step 3. Handout 2: Enclosure 1 (Unit 1 Turbine Bldg Flooding) of AP/0/A/5500/44 (Plant Flooding) marked up for place-keeping through Step 5.c RNO c.3.
Time Critical Task:	NO
Validation Time:	12 minutes

Critical Step Justification	
Step 1	This step is critical because depressing the Vacuum Breaker OPEN pushbutton is necessary to attempt to isolate the Unit 1 RC System in accordance with Enclosure 1 of AP/0/A/5500/44.
Step 2	This step is critical because depressing the 1A, 1B, and 1C RC Pump STOP pushbutton is necessary to attempt to isolate the Unit 1 RC System in accordance with Enclosure 1 of AP/0/A/5500/44.
Step 5	This step is critical because depressing the 1RC-5 CLOSE pushbutton is necessary to attempt to isolate the Unit 1 RC System in accordance with Enclosure 1 of AP/0/A/5500/44.
Step 6	This step is critical because depressing the 1RC-21 CLOSE pushbutton is necessary to attempt to isolate the Unit 1 RC System in accordance with Enclosure 1 of AP/0/A/5500/44.
Step 7	This step is critical because depressing the 1RC-79, 80 and 81 CLOSE pushbutton is necessary to attempt to isolate the Unit 1 RC System in accordance with Enclosure 1 of AP/0/A/5500/44.
Step 9	This step is critical because depressing the 1RC-9, 10, 11, 12, 13 and 14 CLOSE pushbutton is necessary to attempt to isolate the Unit 1 RC System in accordance with Enclosure 1 of AP/0/A/5500/44.
Step 11	This step is critical because depressing the 1RC-15, 16, 17, 18, 19 and 20 CLOSE pushbutton is necessary to attempt to isolate the Unit 1 RC System in accordance with Enclosure 1 of AP/0/A/5500/44.

SIMULATOR OPERATIONAL GUIDELINES

1. Reset simulator to IC-39, 100% Power
2. Place in RUN and allow time to stabilize
3. Override MCB Annunciator 1AD8/C4, TURB ROOM SUMP UNIT 1 HI-HI LEVEL to ON.
4. Manually trip reactor.
5. Complete EP/1/A/5000/E-0 through Step 6, and EP/1/A/5000/ES-0.1 through Step 16.
6. Close Breaker for RC-21.
7. Acknowledge all alarms.
8. Freeze the Simulator.

OR

1. Reset to Temp IC-249 (October, 2015).
2. Place Simulator in Run and acknowledge alarms/Reset SLIMS.

NOTE: Simulator Instructor will need to silence all alarms associated with the Reactor Trip response.

(Denote Critical Steps with an asterisk*)

Ensure Handout 1 is placed on CRS Desk.

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 2.

START TIME: ____________

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
Simulator Instructor NOTE: Leave Simulator in FREEZE until operator is ready to begin.				
*1	(Step 5.d) Open Main condenser "VACUUM BREAKER".	The operator depresses the Vacuum Breaker OPEN pushbutton and observes the Red status light LIT, and Green status light OFF.		
2	(Step 5.e) Stop the following Unit 1 RC pumps:			
*	• 1A RC pump	The operator depresses the 1A RC Pump STOP pushbutton and observes the Green status light LIT, and Red status light OFF (Amps indicate 0).		
*	• 1B RC pump	The operator depresses the 1B RC Pump STOP pushbutton and observes the Green status light LIT, and Red status light OFF (Amps indicate 0).		
*	• 1C RC pump	The operator depresses the 1C RC Pump STOP pushbutton and observes the Green status light LIT, and Red status light OFF (Amps indicate 0).		
	• 1D RC pump	The operator observes the 1D RC Pump Green status light LIT, and Red status light OFF (Amps indicate 0).		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
3	(Step 5.f) On Unit 1 OAC RC graphic, check 1RC‑22 (U1 RC Crossover To U2 RC Disch Isol) ‑ OPEN.	The operator calls up the RC graphic on the OAC. The operator observes that 1RC-22 is RED (open) on the RC Graphic.		
4	(Step 5.g) Check 1RC-7 (U1 RC Crossover To U2 RC Supply Isol) - OPEN.	The operator observes the 1RC-7 Red status light LIT, and Green status light OFF (Or uses the RC Graphic on the OAC).		
*5	(Step 5.h) Press CLOSE pushbutton for 1RC-5 (U1 RC Crossover Supply Isol).	The operator depresses the 1RC-5 CLOSE pushbutton and observes the Green status light LIT, and Red status light OFF.		
*6	(Step 5.i) WHEN breaker for 1RC-21 is closed, THEN press CLOSE pushbutton for 1RC-21 (U1 RC Crossover Disch Isol)	The operator observes the 1RC-21 Red status light LIT, and Green status light OFF. The operator depresses the 1RC-21 CLOSE pushbutton and observes the Green status light LIT, and Red status light OFF.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*7	(Step 5.j) Press CLOSE pushbutton on the following Unit 1 RC discharge gates: • 1RC-79 (1A Main Condenser Discharge Gate) • 1RC-80 (1B Main Condenser Discharge Gate) • 1RC-81 (1C Main Condenser Discharge Gate)	The operator depresses the 1RC-79 CLOSE pushbutton. The operator depresses the 1RC-80 CLOSE pushbutton. The operator depresses the 1RC-81 CLOSE pushbutton.		
8	(Step 5.k) Record time.	The operator records the time in the space provided.		
*9	(Step 5.l) Press CLOSE pushbutton for the following waterbox inlet valves: • 1RC-9 (1A1 Main Condenser Waterbox Inlet Isol)	**Examiner Note:** **The operator may NOT wait for these valves to complete stroking, prior to proceeding (Bulleted Sub-steps), The procedure checks their position later.** The operator depresses the 1RC-9 CLOSE pushbutton and observes the Green status light LIT, and Red status light OFF.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*9 (Cont'd)	• 1RC-10 (1A2 Main Condenser Waterbox Inlet Isol)	The operator depresses the 1RC-10 CLOSE pushbutton and observes the Green status light LIT, and Red status light OFF.		
	• 1RC-11 (1B1 Main Condenser Waterbox Inlet Isol)	The operator depresses the 1RC-11 CLOSE pushbutton and observes the Green status light LIT, and Red status light OFF.		
	• 1RC-12 (1B2 Main Condenser Waterbox Inlet Isol)	The operator depresses the 1RC-12 CLOSE pushbutton and observes the Green status light LIT, and Red status light OFF.		
	• 1RC-13 (1C1 Main Condenser Waterbox Inlet Isol)	The operator depresses the 1RC-13 CLOSE pushbutton and observes the Green status light LIT, and Red status light OFF.		
	• 1RC-14 (1C2 Main Condenser Waterbox Inlet Isol)	The operator depresses the 1RC-14 CLOSE pushbutton and observes the Green status light LIT, and Red status light OFF.		
10	(Note prior to Step 5.m) Waterbox isolation valves take 1-2 minutes to close.	The operator reads the Note and proceeds.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*11	(Step 5.m) CLOSE the following waterbox outlet valves: • WHEN 1RC-9 is closed, THEN close 1RC-15 (1A1 Main Condenser Waterbox Outlet Isol). • WHEN 1RC-10 is closed, THEN close 1RC-16 (1A2 Main Condenser Waterbox Outlet Isol). • WHEN 1RC-11 is closed, THEN close 1RC-17 (1B1 Main Condenser Waterbox Outlet Isol). • WHEN 1RC-12 is closed, THEN close 1RC-18 (1B2 Main Condenser Waterbox Outlet Isol). • WHEN 1RC-13 is closed, THEN close 1RC-19 (1C1 Main Condenser Waterbox Outlet Isol). • WHEN 1RC-14 is closed, THEN close 1RC-20 (1C2 Main Condenser Waterbox Outlet Isol).	The operator, after observing the associated Waterbox Inlet Valve Green status light LIT, depresses the associated Waterbox Outlet Valve CLOSE pushbutton and observes the Green status light LIT, and Red status light OFF, for each valve.		
12	(Step 5.n) Check 1RC-5 (U1 RC Crossover Supply Isol) - CLOSED.	The operator observes the 1RC-5 Green status light LIT, and Red status light OFF.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
13	(Step 5.o) Check 1RC-21 (U1 RC Crossover Disch Isol) - CLOSED.	The operator observes the 1RC-21 Green status light LIT, and Red status light OFF.		
14	(Step 5.p) Place 1RL-18 (Unit 1 LT Coolers Control) in manual and CLOSE.	The operator places the 1RL-18 Controller in MANUAL, and adjusts so that 1RL-18 is CLOSED (Output = 0).		

Terminating Cue: **Evaluation on this JPM is complete.**

STOP TIME: _______________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 Systems - Control Room JPM H

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Result: SAT ______ UNSAT _______

Examiner's Signature: ________________________________ Date: ____________________

INITIAL CONDITIONS:

- With Unit 1 at 100% power, massive RC System Flooding occurred in the Unit 1 Turbine Building.
- The crew has implemented AP/0/A/5500/44 (Plant Flooding) Enclosure 1 (Unit 1 Turbine Bldg Flooding), and an operator has just been dispatched to check the flood doors closed.
- The crew has just manually tripped the reactor.
- An operator has locally closed the breaker for 1RC-21.
- The U-1 Turbine Building Rounds AO (Bob) is standing by via radio.

INITIATING CUE:

The CRS has directed you to isolate the RC System by continuing with Enclosure 1 (Unit 1 Turbine Bldg Flooding) of AP/0/A/5500/44 (Plant Flooding), step 5.d, while the crew continues with EP/1/A/5000/E-0 (Reactor Trip and/or Safety Injection).

IN-PLANT JPM I

Facility: McGuire Task No.:

Task Title: Transfer of 1EMXA-4 To SSF During A Loss Of All AC on Unit 1 JPM No.: 2016 Systems – In-Plant JPM I

K/A Reference: 055 EA2.03 (3.9/4.7)

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: X Actual Performance: ______

Classroom ______ Simulator ______ Plant X

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

NOTE: Dispatch is from Aux Bldg side of CAD Door 509

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 1.

Initial Conditions:

- A Station Blackout has occurred at Unit 1.
- The crew is currently in EP/1/A/5000/ECA-0.0 (Loss of All AC Power).
- The CRS has dispatched an operator to the SSF to complete Enclosure 2 (Unit 1 SSF ECA-0.0 Actions).

Initiating Cue: The CRS has directed you to perform Enclosure 3 (Unit 1 ETA and ETB Rooms - ECA-0.0 Actions).

A PORTION OF THIS JPM IS TIME CRITICAL

Task Standard: The operator will transfer 1EXMA-4 to its alternate power supply within 3 minutes from dispatch (Start of the JPM), and identify that the 1ETA-2 Lockout Relay has tripped.

Required Materials: PPE (Hardhat, Safety Glasses, Hearing Protection, Safety Shoes etc.)

General References: EP/1/A/5000/ECA-0.0 (Loss of All AC Power), Rev 37
PT/0/A/4600/113 (Operator Time Critical Task Verification), Rev 20

Handouts: Handout 1: Blank Copy of Enclosure 3 (Unit 1 ETA and ETB Rooms - ECA-0.0 Actions).

Time Critical Task: **Yes - 3 Minutes from time of dispatch (See Enclosure 13.10 of PT/0/A/4600/113)**

Seal injection from standby makeup pump can be initiated within 10 minutes of a loss of all AC power event or an App R fire event. This requires completion of actions at SSF to start SBMUP within 7 minutes of dispatch, and completion of actions in ETA room to swap EMXA-4 within 4 minutes of dispatch. To support the local actions, the following dispatches must be initiated: Operator dispatched to ETA room to swap EMXA-4 within 4 minutes of loss of all NCP seal cooling. (This ensures NV valve controls are swapped to SSF prior to operator at SSF aligning SBMUP. After dispatch, it takes 1 minute to get dosimetry and leave control room through side door, and 3 additional minutes from aux bldg door at MG set room to perform local action. Valve control will then be swapped to SSF 2 minutes before the operator at SSF must align and start SBMUP).

NOTE: Dispatch is from Aux Bldg side of CAD Door 509

Validation Time: 10 minutes

Critical Step Justification	
Step 2	This step is critical because rotating the 1EMXA4-1A Breaker counterclockwise is necessary to transfer 1EXMA-4 to its alternate power supply within 4 minutes from dispatch.
Step 3	This step is critical because removing the Kirk Key from the 1EMXA4-1A Breaker is necessary to transfer 1EXMA-4 to its alternate power supply within 4 minutes from dispatch.
Step 4	This step is critical because inserting the Kirk Key in Breaker 1EMXA4-3A and rotating the 1EMXA4-3A Breaker clockwise is necessary to transfer 1EXMA-4 to its alternate power supply within 4 minutes from dispatch.
Step 5	This step is critical because observing the 1ETA-2 Breaker and interpreting the meaning of the Breaker Handle is pointing towards 2 O'clock and an ORANGE target is visible at 12 O'clock is necessary to identify that the 1ETA-2 Lockout Relay has tripped.

(Denote Critical Steps with an asterisk*)

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 1.

START TIME: ____________

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
1	(Notes prior to Step 1) The fastest pathway to 1ETA room from Control Room is: Exit Fire Door 926A (CAD 507) (Unit 1 Submarine Door to C/R Electrical Pen Rm; Elev. 767). Emergency egress Fire Door 925E (CAD 509) (C/R Electrical Pen Rm; Elev. 767; Door to Unit 1 aux bldg stairway). Enter cable room (from stairwell). Enter 1ETA room through swgr AHU room.	The operator reads the Notes and proceeds.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
2	(Step 1) At 1EMXA4 (located north wall 1ETA room), swap 1EMXA4 to its alternate power supply (SMXG) as follows: (Caution prior to Step 1.a) It may be necessary to apply pressure on the breaker rotary switch in the counterclockwise direction while opening the kirk key device(s).	The operator reads the Caution, and proceeds.		
*	(Step 1.a) Open breaker 1EMXA4-1A (1EMXA4 Incoming Bkr (Normal) From 1EMXA2 MCC).	The operator rotates the 1EMXA4-1A Breaker counterclockwise. **Cue:** **The Breaker is rotated counterclockwise.**		
*3	(Step 1.b) Remove kirk key from 1EMXA4-1A.	The operator removes the Kirk Key from the 1EMXA4-1A Breaker. **Cue:** **The Kirk Key is removed.**		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*4	(Step 1.c) Use kirk key and close breaker 1EMXA4-3A (1EMXA4 Incoming Bkr (Alternate) From SMXG MCC).	The operator inserts the Kirk Key in Breaker 1EMXA4-3A.		
		Cue: **The Kirk Key is inserted.**		
		The operator rotates the 1EMXA4-3A Breaker clockwise.		
		Cue: **The Breaker is rotated clockwise.**		
		Stop Time for Time Critical Step: ---------------------------		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*5	(Step 2) Check for tripped lock-out relays on the following cabinets in 1ETA Room:	The operator observes the 1ETA-1 Breaker.		
	• 1ETA-1 (Normal Incoming Bkr From 1ATC Xfmr (6900/4160v))	**Cue:** **There is NO Orange Target visible.**		
	• 1ETA-2 (Alternate Incoming Bkr From SATA Xfmr (6900/4160v))	The operator observes the 1ETA-2 Breaker.		
		Cue: **There is an Orange Target visible.**		
		The operator determines that the 1ETA-2 Lockout Relay is tripped. The operator observes the 1ETA-15 Breaker.		
	• 1ETA-15 (1A Diesel Generator Auxiliary Instrumentation for 1ETA-14)	**Cue:** **There is NO Orange Target visible.**		
		The operator observes the 1ERNCADGRC1A Breaker.		
	• 1ERNCADGRC1A (D/G Relay Cabinet 1A).	**Cue:** **There is NO Orange Target visible.**		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
6	(Step 3) Check for tripped lock-out relays on the following cabinets in 1ETB Room: • 1ETB-1 (Normal Incoming Bkr From 1ATD Xfmr (6900/4160v)) • 1ETB-2 (Alternate Incoming Bkr From SATB Xfmr (6900/4160v)) • 1ETB-15 (1B Diesel Generator Auxiliary Instrumentation for 1ETB-14) • 1ERNCADGRC1B (D/G Relay Cabinet 1B).	The operator proceeds to the 1ETB Room. **Cue:** **Another operator has checked the relays in 1ETB and reports to you that none are tripped.**		
7	(Step 4) Notify Control Room Supervisor status of relays checked above.	The operator uses radio or phone to inform CRS that ONLY the 1ETA-2 Lockout Relay (Alternate Incoming Bkr From SATA Xfmr (6900/4160v)) is tripped. **Cue:** **CRS acknowledges message and directs you to return to the control room.**		

Terminating Cue: **Evaluation on this JPM is complete.**

STOP TIME: ______________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 Systems – In-Plant JPM I

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

INITIAL CONDITIONS:

- A Station Blackout has occurred at Unit 1.
- The crew is currently in EP/1/A/5000/ECA-0.0 (Loss of All AC Power).
- The CRS has dispatched an operator to the SSF to complete Enclosure 2 (Unit 1 SSF ECA-0.0 Actions).

INITIATING CUE:

The CRS has directed you to perform Enclosure 3 (Unit 1 ETA and ETB Rooms - ECA-0.0 Actions).

A PORTION OF THIS JPM IS TIME CRITICAL

NOTE: No plant equipment should be operated during the performance of this JPM. All actions must be SIMULATED.

IN-PLANT JPM J

Facility:	McGuire	Task No.:	
Task Title:	Locally Trip Unit 2 Main Turbine and Both Unit 2 FWPT's	JPM No.:	2016 Systems – In-Plant JPM J
K/A Reference:	068 AA1.23 (4.3/4.4)		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: X Actual Performance: ______

Classroom ______ Simulator ______ Plant X

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 1.

Initial Conditions:

- A loss of control room has occurred. AP/2/A/5500/17 (Loss Of Control Room) has been implemented and is complete through step 10.b.
- You have been dispatched to standby at the Unit 2 Main Turbine.
- Communications have been established between you and the SRO at the Unit 2 Aux. Shutdown panel.

Initiating Cue: The SRO at the Unit 2 Aux. Shutdown panel has directed you to perform the local actions of Step 10.c.1-3 of AP/1/A/550/17 (Loss of Control Room).

Task Standard: The operator will trip the Unit 2 Main Turbine locally, and trip any of the available "trip" mechanisms on both FWPT's such that 2SP-1 and 2SP-2 are closed.

Required Materials: PPE (Hardhat, Safety Glasses, Hearing Protection, Safety Shoes etc.)

General References: AP/2/A/5500/17 (Loss of Control Room), Rev 25

Handouts:	Handout 1: Page 6 of 41 of AP/2/A/5500/17 (Loss of Control Room)
Time Critical Task:	NO
Validation Time:	10 minutes

Critical Step Justification	
Step 2	This step is critical because manipulating the trip lever at front end standard to trip turbine is necessary to trip the Unit 2 Main Turbine locally.
Step 3	This step is critical because depressing the manual trip pushbutton on the supervisory panel, opening 2LP-4 and/or 14 on each FWPT supervisory panel, OR depressing the mechanical Trip Knob located at each FWPT's Governor Pedestal is necessary to trip both Unit 2 both FWPT's.
Step 4	This step is critical because rotating the handwheel for 2SP-1 and 2SP-2 in the clockwise direction is necessary to trip both Unit 2 both FWPT's.

(Denote Critical Steps with an asterisk*)

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 1.

START TIME: ____________

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
1	(Step 10.c.1) Check all throttle valves - CLOSED.	The operator observes the four throttle valves. **Cue:** **Springs are contracted; yellow tape is NOT aligned on any of the Throttle Valves.** The operator determines the Turbine is NOT TRIPPED and informs SRO at Aux. Shutdown panel that turbine is not tripped.		
*2.	(Step 10.c.1 RNO) Trip main turbine.	The operator manipulates trip lever at front end standard to trip turbine. **Cue:** **Throttle Valve springs are expanded, yellow tape is aligned on each Throttle Valve.** The operator informs the SRO at the ASP that the Main Turbine is tripped.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*3	(Step 10.c.2) Trip both Unit 2 CF pumps.	The operator proceeds to the FWPTs then manually trips both turbines by: Depressing the manual trip pushbutton on the supervisory panel. **Provide the appropriate Cue:** **Pushbutton depressed, reset light is DARK, RPMs are decreasing.** **OR** Opening 2LP-4 and/or 14 on each FWPT supervisory panel. **Cue:** **Handle lever rotated counterclockwise, reset light is DARK, RPMs are decreasing.** **OR** Depressing the mechanical Trip Knob located at each FWPT's Governor Pedestal. **Cue:** **Mechanical Trip Knob at FWPTs Governor Pedestal depressed, reset light is DARK, RPMs are decreasing.** The operator informs the SRO at the ASP that both FWPTs are tripped.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*4	(Step 10.c.3) CLOSE the following valves: 2SP-1 (Main Steam to 2A CF Pump Turb Isol) (Unit 2 turbine bldg, 760+14, 2H-26, east of CF pump 2A) 2SP-2 (Main Steam to 2B CF Pump Turb Isol) (Unit 2 turbine bldg, 760+14, 2H-26, east of CF pump 2A).	The operator locates both valves. NOTE: The valve locations are contained in the AP. If the operator cannot locate the valves and indicates that he/she would ask the SRO for further guidance then give the location as a cue.		
		Cue: <u>(Only if needed)</u> **2SP-1 (Main Steam to 1A CF Pump Turb Isol) (Unit 2 turbine bldg, 760+14, 2H-26, east of CF pump 2A)**		
		Cue: <u>(Only if needed)</u> **2SP-2 (Main Steam to 2B CF Pump Turb Isol) (Main Steam to 2B CF Pump Turb Isol) (Unit 2 turbine bldg, 760+14, 2H-26, east of CF pump 2A).**		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*4 (Cont'd)		The operator rotates the handwheel for 2SP-1 in the clockwise direction.		
		Cue: **The handwheel stops moving and the stem is fully in.**		
		The operator rotates the handwheel for 2SP-2 in the clockwise direction.		
		Cue: **The handwheel stops moving and the stem is fully in.**		

Terminating Cue: **Evaluation on this JPM is complete.**

STOP TIME: ______________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 Systems – In-Plant JPM J

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Result: SAT ______ UNSAT _______

Examiner's Signature: ________________________________ Date: ____________________

INITIAL CONDITIONS:

- A loss of control room has occurred. AP/2/A/5500/17 (Loss Of Control Room) has been implemented and is complete through step 10.b.
- You have been dispatched to standby at the Unit 2 Main Turbine.
- Communications have been established between you and the SRO at the Unit 2 Aux. Shutdown panel.

INITIATING CUE:

The SRO at the Unit 2 Aux. Shutdown panel has directed you to perform the local actions of Step 10.c.1-3 of AP/1/A/550/17 (Loss of Control Room).

NOTE: No plant equipment should be operated during the performance of this JPM. All actions must be SIMULATED.

IN-PLANT JPM K

Facility:	McGuire	Task No.:	
Task Title:	Emergency Borate the Reactor Coolant System Locally Using 2NV-269	JPM No.:	2016 Systems – In-Plant JPM K
K/A Reference:	APE 024, AA1.04 (3.6/3.7)		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: X Actual Performance: ______

Classroom ______ Simulator ______ Plant X

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 1.

Initial Conditions:

- Unit 2 was at 100% power when a Boron dilution event occurred.
- AP/2/A/5500/38 (Emergency Boration and Response to Inadvertent Dilution) was entered.
- While attempting to open 2NV-265B (Boric Acid To NV Pumps), the RO discovered that 2NV-265B was de-energized.

Initiating Cue: The CRS has directed you to emergency borate the NC System by performing Step 12.d RNO of AP/2/A/5500/38 (Emergency Boration and Response to Inadvertent Dilution).

A Portion of this JPM is TIME CRITICAL

Task Standard: The operator will attempt to open 2NV-265B, and when this fails open 2NV-269 within ten (10) minutes of dispatch.

Required Materials: PPE (Hardhat, Safety Glasses, Hearing Protection, Safety Shoes etc.)
Dosimetry

General References: AP/2/A/5500/38 (Emergency Boration and Response to Inadvertent Dilution), Rev 11

PT/0/A/4600/113 (Operator Time Critical Task Verification), Enclosure 13.3 (Stop Dilution and Borate During a Dilution Event), Rev 20

Handouts: Handout 1: Step 12.d RNO (Page 8 of 19) of AP/2/A/5500/38 (Emergency Boration and Response to Inadvertent Dilution) marked up for place-keeping.

Time Critical Task: YES – Enclosure 13.3 of PT/0/A/4600/113

Modes 1 and 2: Operators will stop dilution and initiate boration within 15 minutes. This may involve time critical local actions to open NV-265 or NV-269 (10 minutes from dispatch) per AP-38. Time starts when rods reach insertion limit (automatic rod control), or when reactor trips (manual rod control). (If you stop the dilution prior to going below rod insertion limit or reactor trip, emergency boration is not required.)

Only securing dilution within times above is required by the safety analysis, but UFSAR 15.4.6 states that operators can also initiate boration in these stated times. Operators will therefore be required to meet times for both securing dilution and initiating boration. The stated times are long enough for operators to perform actions. Note that UFSAR Section 15.4.6 states that operators have "at least 15 minutes" (Modes 1 and 2). The actual limiting times per UFSAR Table 15-19 are 16.6 minutes when rods are in manual (after trip), and 25.9 minutes when rods are in auto (after reaching rod insertion limit).

Validation Time: 8 minutes

NOTE: Start this JPM from the hallway outside of the Ops kitchen area.
Record the Time Critical Completion Time (in JPM step number 2) when 2NV-269 is open.

Critical Step Justification	
Step 1	This step is critical because locating 2NV-265B, pressing downward on the Motor handwheel clutch, and rotating the handwheel in the counter-clockwise direction is necessary to attempt to open 2NV-265B.
Step 2	This step is critical because locating 2NV-269, removing the locking device, and rotating the handwheel in the counter-clockwise direction is necessary to manually open 2NV-269.

(Denote Critical Steps with an asterisk*)

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 1.

START TIME: ____________

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*1	(Step 12.d RNO) Perform the following: (Step 12.d RNO 1) Dispatch operator to OPEN 2NV-265B (aux bldg, 733+3, JJ-57, near chemical addition tank).	The operator locates 2NV-265B, presses downward on the Motor handwheel clutch, and rotates the handwheel in the counter-clockwise direction. **Cue:** **Handwheel clutch engaged** **Force applied in the counter clockwise direction** **Handwheel is <u>NOT</u> moving** The operator recognizes that valve cannot be opened and continues.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
2 *	(Step 12.d RNO 2) IF 2NV-265B cannot be opened, THEN: (Step 12.d RNO 2.a) Dispatch operator to unlock and open 2NV-269 (Unit 2 NV Pump Boric Acid Supply Isol) (aux bldg, 733+4, JJ-58, near chemical addition tank).	The operator locates 2NV-269, removes the locking device, and rotates the handwheel in the counter-clockwise direction within ten minutes of dispatch. **Cue:** **Lock removed, Handwheel rotated fully counter-clockwise.** **Stop Time for Time Critical Task:** ____________________		
3	(Step 12.d RNO 2.b) OPEN 2NV-267A (Boric Acid To Blender Control).	The operator calls the Control Room to report 2NV-269 Open and requests that the BOP Open 2NV-267A. **Cue:** **The Control Room operator acknowledges that 2NV-269 and 2NV-267A is open.**		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
4	(Step 12.d RNO 3) Do not continue until 2NV-265B or 2NV-269 flowpath above is aligned.	The operator recognizes that 2NV-269 is OPEN, and indicates that the task is complete.		

Terminating Cue: **Evaluation on this JPM is complete.**

STOP TIME: _______________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 Systems – In-Plant JPM K

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Result: SAT ______ UNSAT _______

Examiner's Signature: ________________________________ Date: ____________________

INITIAL CONDITIONS:

- Unit 2 was at 100% power when a Boron dilution event occurred.
- AP/2/A/5500/38 (Emergency Boration and Response to Inadvertent Dilution) was entered.
- While attempting to open 2NV-265B (Boric Acid To NV Pumps), the RO discovered that 2NV-265B was de-energized.

INITIATING CUE:

The CRS has directed you to emergency borate the NC System by performing Step 12.d RNO of AP/2/A/5500/38 (Emergency Boration and Response to Inadvertent Dilution).

A Portion of this JPM is TIME CRITICAL

NOTE: No plant equipment should be operated during the performance of this JPM. All actions must be SIMULATED.

JPM A1a RO

Facility:	McGuire	Task No.:	
Task Title:	Complete a Surveillance for Mode Change	JPM No.:	2016 Admin – JPM A1a RO
K/A Reference:	2.1.20 (4.6)		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: ______ Actual Performance: __X__

Classroom __X__ Simulator ______ Plant ________

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handouts 1-2.

Initial Conditions:

- Unit 1 is in Mode 4 during a plant startup.
- Current EFPD is 248.
- NC System pressure has stabilized at 1600 psig.
- Chemistry has reported that the CLA Boron Concentrations are as follows:
  - CLA 1A – 2485 ppm
  - CLA 1B – 2482 ppm
  - CLA 1C – 2491 ppm
  - CLA 1D – 2349 ppm
- It has become necessary to perform Enclosure 13.4, NC Boron Concentration Checklist, of PT/1/A/4600/003D, Monthly Surveillance Items, in order to continue with the plant startup.

Initiating Cue:

- The CRS has directed you to complete Enclosure 13.4, NC Boron Concentration Checklist, of PT/1/A/4600/003D, Monthly Surveillance Items.
- Identify any Flex Strategy Administrative Limits and/or Technical Specification LCO's that are not met.

Task Standard:	The operator will complete Enclosure 13.4 of PT/1/A/4600/003D in accordance with the attached KEY, determine that all Flex Strategy Administrative Limits are met, and determine that LCO 3.5.1 is not currently met.
Required Materials:	Calculator
General References:	PT/1/A/4600/003D (Monthly Surveillance Items), Rev 89 MCEI-0400-304 (McGuire Unit 1 Cycle 24 Core Operating Limits Report), Rev 0 McGuire Technical Specification LCO 3.5.1 (Accumulators), Amendment 218/200
Handouts:	Handout 1: Blank copy of the body of PT/1/A/4600/003D, Monthly Surveillance Items and Enclosure 13.4, NC Boron Concentration Checklist. Handout 2: McGuire Cycle 24 Core Operating Limits Report.
Time Critical Task:	NO
Validation Time:	15 minutes

(Denote Critical Steps with an asterisk*)

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handouts 1-2.

START TIME: ___________

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
1	(Step 1, Bullet 1) Perform the following: IF performing routine monthly surveillances, THEN……	The operator recognizes that the Surveillance is NOT being performed for the Monthly Surveillance and proceeds.		
2	(Note prior to Step 1, Bullet 2) IF performing this procedure in preparation for mode change, Enclosure 13.4 may be performed prior to Mode 3 however, this surveillance shall be met in Mode 3 prior to NC System pressure increasing to greater than 1000 psig.	The operator reads the Note and proceeds.		
*3	(Step 1, Bullet 2) IF performing this procedure prior to Mode 3 OR Unit in Mode 3 prior to NC System pressure increasing greater than 1000 psig, THEN record the following: Mode to be entered: _____ Date: _____	The operator records Mode **3** and **Today (or Equivalent)**, and proceeds. **NOTE: The Date recorded is NOT critical.**		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
4	(Step 2) Check Boron Concentration of Cold Leg Accumulators within limits specified in COLR (Step 2.1) Record the following: Cold Leg Accumulator 1A Cold Leg Accumulator 1B Cold Leg Accumulator 1C Cold Leg Accumulator 1D	The operator records **2485** in the 1A CLA space provided. The operator records **2482** in the 1B CLA space provided. The operator records **2491** in the 1C CLA space provided. The operator records **2349** in the 1D CLA space provided.		
*5	(Step 2.2) Record Cold Leg Accumulator limits as specified in COLR: (Min) _____________ ppmB (Max) _____________ ppmB	The operator reviews the procedure and Section 2.11.1 of the Unit 1 COLR and determines that based on a current EFPD of 248, the minimum required Accumulator Boron Concentration is **2475** ppm, and records this in the space provided. The operator recognizes that the 1D CLA is less than that required by Tech Spec LCO 3.5.1. The operator reviews the procedure and Section 2.11.1 of the Unit 1 COLR and determines that the maximum allowable Accumulator Boron Concentration is **2875** ppm, and records this in the space provided.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
6	(Notes prior to Step 3) The FLEX Strategy CLA minimum Boron Concentration limit is a Beyond Design Basis External Event administrative limit and does NOT affect Tech Spec operability. The FLEX Strategy Boron Concentration administrative limit for Cold Leg Accumulators is greater than 2400 ppmB.	The operator reads the Notes and proceeds.		
7	(Step 3) Check FLEX CLA Boron Concentration administrative limit met (Step 3.1) IF all Cold Leg Accumulators Boron Concentration greater than 2400 ppmB, THEN….	The operator recognizes that the 1D CLA Boron Concentration is NOT greater than 2400 ppm, and proceeds.		
*8	(Step 3.2) IF only one Cold Leg Accumulator below 2400 ppmB, THEN perform the following: (Step 3.2.1) Record affected CLA: __________	The operator records **1D** in the space provided.		
*9	(Step 3.2.2) Record affected CLA Boron Concentration: __________ ppmB	The operator records **2349** in the space provided.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*10	(Step 3.2.3) Determine average Boron Concentration of the other three CLAs: [(___________ ppmB [1st CLA]) + (___________ ppmB [2nd CLA]) + (___________ ppmB [3rd CLA])] ÷ 3 = _____ [Avg of other CLAs]	The operator records **2485** in one space provided. The operator records **2482** in a second space provided. The operator records **2491** in the third space provided. The operator performs the calculation and determines that the Average of the Other CLAs is **2486** ppm, and this value is recorded.		
*11	(Step 3.2.4) Determine average CLA Boron Concentration: (______________ ppmB [Affected CLA] + ______________ ppmB [Average of other CLAs]) ÷ 2 = ______________ ppmB [Average CLA Boron Conc]	The operator records **2349** in the space provided for the Affected CLA. The operator records **2486** in the space provided for the Average of the Other CLAs. The operator performs the calculation and determines that the Average CLA Boron Concentration is **2417.5** ppm, and this value is recorded.		
*12	(Step 3.2.5) IF Average CLA Boron Concentration is greater than 2400 ppmB, THEN this surveillance is met.	The operator recognizes that the Average CLA Boron Concentration is greater than 2400 ppm, and concludes that the Surveillance (i.e. All Flex Strategy Administrative Limits) is met, and proceeds.		
13	(Step 3.2.6) IF above calculation is less than 2400 ppmB, THEN….	The operator recognizes that this step is NOT applicable, and proceeds.		
14	(Note prior to Step 3.3) Steps 3.3.1 and 3.3.2 may be performed concurrently.	The operator reads the Note and proceeds.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
15	(Step 3.3) IF more than one CLA is less than 2400 ppmB, THEN….	The operator recognizes that CLA 1A, 1B and 1C are all greater than 2400 ppm, that this step is NOT applicable, and proceeds.		
16	(Step 4) Initial one of the following: • No Discrepancy • Discrepancy Sheet Attached (IF any Acceptance Criteria NOT met, THEN it is identified as a discrepancy, evaluated per Tech Spec/SLC and appropriate corrective action taken.)	The operator leaves both bullets unsigned and hands off the Enclosure to the CRS.		
*17	(Directed Action) Complete Enclosure 13.4, NC Boron Concentration Checklist, of PT/1/A/4600/003D, Monthly Surveillance Items. Identify any Flex Strategy Administrative Limits and/or Technical Specification LCO's that are not met.	The operator recognizes that the 1D CLA is less than that required by Tech Spec LCO 3.5.1. The operator recognizes that all Flex Strategy Administrative Limits are met.		

Terminating Cue: **Evaluation on this JPM is complete.**

STOP TIME: ______________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 Admin – JPM A1a RO

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________________ Date: ____________________

INITIAL CONDITIONS:

- Unit 1 is in Mode 4 during a plant startup.
- Current EFPD is 248.
- NC System pressure has stabilized at 1600 psig.
- Chemistry has reported that the CLA Boron Concentrations are as follows:
  - CLA 1A – 2485 ppm
  - CLA 1B – 2482 ppm
  - CLA 1C – 2491 ppm
  - CLA 1D – 2349 ppm
- It has become necessary to perform Enclosure 13.4, NC Boron Concentration Checklist, of PT/1/A/4600/003D, Monthly Surveillance Items, in order to continue with the plant startup.

INITIATING CUE:

- The CRS has directed you to complete Enclosure 13.4, NC Boron Concentration Checklist, of PT/1/A/4600/003D, Monthly Surveillance Items.
- Identify any Flex Strategy Administrative Limits and/or Technical Specification LCO's that are not met.

Are ALL Flex Strategy Administrative Limits and/or Technical Specification LCO's met? ________________

If NOT, identify requirements NOT met:

JPM A1a SRO

Facility:	McGuire	Task No.:	
Task Title:	Determine Reportability Requirements	JPM No.:	2016 Admin – JPM A1a SRO
K/A Reference:	2.1.18 (3.8)		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom X Simulator ______ Plant ______

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 1.

Initial Conditions:

- With Unit 1 at 100% power, the following occurred at 0800 today:
  - The 1A1 KC Pump was declared inoperable due to a hot bearing.
  - The crew entered the appropriate Technical Specification ACTION.
- At 1100 maintenance personnel determined that the pump could not be repaired within the required Completion Time.
- Just-In-Time training was held for the operating crew, and a Pre-Job Brief was conducted.
- A plant downpower was initiated at 1400 per OP/1/A/6100/003 (Controlling Procedure for Unit Operation)
- The SM has verified that this event has NOT exceeded an Emergency Action Level (EAL).
- No external persons and/or agencies have been notified of this event, nor have any actions other than those identified been taken.

Initiating Cue: The SM directs you to determine reportability requirements, including completion of any necessary paperwork.

Task Standard: The operator will identify that this condition requires a 4-hour notification to the NRC in accordance with RP/0/A/5700/010 (NRC Immediate Notification Requirements), and to complete Enclosure 4.2 (NRC Event Notification Worksheet) in accordance with the attached Key.

Required Materials: None

General References: RP/0/A/5700/010 (NRC Immediate Notification Requirements), Rev. 28

RP/0/A/5700/014 (Emergency Telephone Directory), Rev. 35

AD-LS-ALL-0006 (Notification/Reportability Evaluation), Rev 0

Job Aid of Reporting Regulation (Associated with AD-LS-ALL-0006)

Job Aid on Reportability Guidance and Operating Experience (Associated with AD-LS-ALL-0006)

Job Aid on Templates, Pre-Job Briefs and Guidance (Associated with AD-LS-ALL-0006)

Technical Specification 3.7.6 (Component Cooling Water (CCW) System), Amendment 184/166

OP/1/A/6100/003 (Controlling Procedure for Unit Operation), Rev 197

Handouts: Handout 1: RP/0/A/5700/010 (NRC Immediate Notification Requirements).

Time Critical Task: NO

Validation Time: 25 minutes

NOTE: An Answer KEY is provided on Page 8 of this document.

(Denote Critical Steps with an asterisk*)

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 1.

START TIME: ____________

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
1	(Step 3.2) The Operations Shift Manager shall assure the Notification requirements of this procedure are met for the reportable events provided in Enclosure 4.1.	The operator reads the Step and proceeds.		
*2	(Step 3.3) Determine the appropriate notification requirement and the reporting time requirement using Enclosure 4.1, Events Requiring NRC Notification.	The operator addresses Enclosure 4.1. The operator recognizes that Event Condition 4.1.3.1 is applicable and that this event must be reported as soon as practical and within 4 hours of the occurrence.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
3	(Notes prior to Step 3.4) Security Reports should be reported per Nuclear Security Manual Directive 4.0 (Reporting and Trending of Safeguards and Security Events). The Security Shift Supervisor will provide all information to the Operations Shift Manager for the NRC Notification. AD-LS-ALL-0006 and NUREG 1022 Revision 3, contain additional information and detail pertaining to reportability requirements of selected events. MNS Regulatory Affairs Group, the Fleet Regulatory Affairs Organization AND the Community Relations Organization can provide support for completing Enclosure 4.2 (NRC Event Notification Work Sheet). Sections of Enclosure 4.2 that are not applicable should be marked (N/A)	The operator reads the Notes and proceeds.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
4 * (As shown on KEY)	(Step 3.4) Complete the applicable portions of Enclosure 4.2 as identified by Enclosure 4.1. If being completed for a drill write: "This is a Drill" on the first line of the event description. Then transmit to the NRC Operations Center using RP/0/A/5700/014, Enclosure 4.2.	The operator completes Enclosure 4.2 in accordance with the Attached Key. **Cue:** **After the Enclosure 4.2 is presented for transmittal, indicate that another operator will complete the required actions.**		

Terminating Cue: **Evaluation on this JPM is complete.**

STOP TIME: _______________

Job Performance Measure No.: 2016 Admin – JPM A1a SRO

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

KEY:

Enclosure 4.2 NRC Event Notification Worksheet Page 1 of 2

All blocks left blank except as follows:

Notification Time/Date:	(Left Blank)
Unit	**1**
Caller's Name	Operator's Name
Event Time and Zone	**1400 (time)**
Event Date	**Present Date**
Power/Mode Before	1
Power/Mode After	1
4-Hr Non-Emergency	**Check Mark in 4-Hr Non-Emergency (50.72(b)(2)(i) T/S Required S/D**
Event Description	**A plant shutdown required by Technical Specifications was initiated (or equivalent).**
Notifications: NRC Resident	NO or Will Be is checked
Notifications: State	NO or Will Be is checked
Notifications: Local	NO or Will Be is checked
Notifications: Other Gov Agencies	NO or Will Be is checked
Notifications: Media/Press Release	NO or Will Be is checked
Anything Unusual or NOT understood?	NO is checked
Did all Systems Function as required	YES is checked
Approved By:	Leave Blank
Time/Date:	Leave Blank

Enclosure 4.2 NRC Event Notification Worksheet Page 2 of 2

All blocks left blank except as follows:

Event Description	**Continued from Page 1 ONLY IF NEEDED: A plant shutdown required by Technical Specifications was initiated (or equivalent).**

CRITICAL Information is in BOLD

INITIAL CONDITIONS:

- With Unit 1 at 100% power, the following occurred at 0800 today:
  - The 1A1 KC Pump was declared inoperable due to a hot bearing.
  - The crew entered the appropriate Technical Specification ACTION.
- At 1100 maintenance personnel determined that the pump could not be repaired within the required Completion Time.
- Just-In-Time training was held for the operating crew, and a Pre-Job Brief was conducted.
- A plant downpower was initiated at 1400 per OP/1/A/6100/003 (Controlling Procedure for Unit Operation)
- The SM has verified that this event has NOT exceeded an Emergency Action Level (EAL).
- No external persons and/or agencies have been notified of this event, nor have any actions other than those identified been taken.

INITIATING CUE:

The SM directs you to determine reportability requirements, including completion of any necessary paperwork.

JPM A1b RO

Facility:	McGuire	Task No.:	
Task Title:	Calculate the Boric Acid Addition for a specified Rod Change	JPM No.:	2016 Admin – JPM A1b RO
K/A Reference:	2.1.25 (3.9)		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom X Simulator ______ Plant ______

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handouts 1-3.

Initial Conditions:

- Unit #1 Reactor Power is at 50%, Steady State.
- Core burnup is 125 EFPD.
- NC Boron Concentration = 950 PPM.
- Present Control Rod Height is Bank “D” at 165 steps.
- Desired Control Rod Height is Bank “D” at 210 steps.

Initiating Cue: The CRS has directed you to determine the amount of boric acid needed to obtain the desired Control Rod Height using the McGuire Unit 1 Data Book.

Task Standard: Boric Acid Addition of approximately 255.6 gallons is calculated in accordance with the attached KEY.

Required Materials: Calculator

General References:	OP/0/A/6100/006 (Reactivity Balance Calculation), Rev 77 OP/1/A/6100/022 (Unit 1 Data Book), Rev 481 MCEI-0400-304 (Unit 1 Cycle 24 Core Operating Limits Report), Rev 0
Handouts:	Handout 1: OP/1/A/6100/022 (Unit 1 Data Book) Cycle 24, Enclosure 4.3 – Section 5.1 Boration and Dilution Tables Handout 2: OP/1/A/6100/022 (Unit 1 Data Book) Cycle 24, Enclosure 4.3 – Table 6.3.3 Integral Rod Worth in Overlap HFP, Equilibrium Xenon Handout 3: OP/1/A/6100/022 (Unit 1 Data Book) Cycle 24, Enclosure 4.3 – Graph 6.11 Differential Boron Worth (HFP, ARO, Eq Xe, Eq Sm)
Time Critical Task:	NO
Validation Time:	15 minutes

(Denote Critical Steps with an asterisk*)

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handouts 1-3.

START TIME: ____________

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*1	Operator determines **165 steps** integral rod worth using the 51-150 EFPD column of OP/1/A/6100/22, Enclosure 4.3, Table 6.3.3, IRW in Overlap, HFP, Equilibrium Xe.	Initial inserted reactivity worth = **153 pcm**		
*2	Operator determines **210 steps** integral rod worth using the 51-150 EFPD column of OP/1/A/6100/22, Enclosure 4.3, Table 6.3.3, IRW in Overlap, HFP, Equilibrium Xe.	Desired Rod height inserted reactivity worth = **15 pcm**		
*3	Operator determines the change in reactivity required for the rod insertion	Change in reactivity to be compensated due to rod insertion = **15 pcm** **-153 pcm** **-138 pcm**		
*4	Using OP/1/A/6100/22, Enclosure 4.3, Graph 6.11 Differential Boron Worth (HFP, ARO, Eq Xe, Eq Sm, Unit 1 Cycle 24) determines the Differential Boron Worth for present conditions (125 EFPD)	Operator determines the Differential Boron Worth from the graph to be = **-6.02 pcm/ppm (-5.95 to -6.05 is acceptable)**		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
5	Using the Differential Boron Worth and the Change in reactivity, determines the change in Boron Concentration	Operator determines the change in Boron Concentration to be = **-138 /-6.02 pcm/ppm** = **22.9 ppm (22.8 to 23.2 is acceptable)**		
6	Operator determines Boron Concentration required	Change in Boron = **950 + 22.9 ppm** **= 972.9 ppm (972.8 to 973.2 is acceptable)**		
*7	Using OP/1/A/6100/22, Enclosure 4.3 Section 5.1 Boron and Dilution Tables, determines the Boric Acid addition	Using Present Boron Concentration 950 ppm and the Desired Boron Concentration of 972.9 ppm, determines from Table that change from 950-972.9 ppm will require the addition of **255.48 gallons** of Boric Acid. OR Calculation: 67388 x Ln(6050/6027.3) = **255.6 gallons**. **(254.36 to 258.84 is acceptable)** See Attached Key		

Terminating Cue: **Evaluation on this JPM is complete.**

STOP TIME: ______________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 Admin – JPM A1b RO

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________________ Date: ____________________

KEY:

Tables:

Page 12 of 20
Intersect Present Cb of 950 ppm with Desired Cb 970 ppm and determine 223 gallons.
Intersect Present Cb of 950 ppm with Desired Cb 980 ppm and determine 335 gallons.

335 gallons - 223 gallons = 112 gallons/10ppm = 11.2 gallons/ppm

223 gallons (at 970) + [11.2 gallons/ppm x 2.9 ppm] = 255.48

Calculation:

G = V x Ln [(C-Bi)/(C-Bf)]

Where:

G	Volume of boric acid required for boration
V	Equivalent System Volume = 67388 Gallons (Constant)
C	Concentration of Boric Acid being added = 7000 ppm (Constant)
Bi	Present NCS Boron Concentration (ppm B)
Bf	Desired NCS Boron Concentration (ppm B)

G = 67388 gallons x Ln [(7000 ppmB – 950 ppmB)/(7000-972.9 ppmB)]

G = 67388 gallons x Ln [(6050 ppmB)/(6027.1 ppmB)]

G = 67388 gallons x Ln [1.003766] = **255.55** gallons

(254.36 to 258.84 is acceptable)

NOTE: The acceptable range is based on the operator's ability to interpret OP/1/A/6100/22, Enclosure 4.3, Graph 6.11 Differential Boron Worth (HFP, ARO, Eq Xe, Eq Sm, Unit 1 Cycle 24). See JPM Step 4.

INITIAL CONDITIONS:

- Unit #1 Reactor Power is at 50%, Steady State.
- Core burnup is 125 EFPD.
- NC Boron Concentration = 950 PPM.
- Present Control Rod Height is Bank “D” at 165 steps.
- Desired Control Rod Height is Bank “D” at 210 steps.

INITIATING CUE:

The CRS has directed you to determine the amount of boric acid needed to obtain the desired Control Rod Height using the McGuire Unit 1 Data Book.

<u>JPM A1b SRO</u>

Facility:	McGuire	Task No.:	
Task Title:	Calculate QPTR	JPM No.:	2016 Admin – JPM A1b SRO
K/A Reference:	2.1.7 (4.7)		

Examinee:		NRC Examiner:	
Facility Evaluator:		Date:	

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom X Simulator ______ Plant ______

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Provide Candidate with Initial Conditions/Cue and Current Power Range Detector Currents (Last Two Pages of this JPM), and Handouts 1-2.

Initial Conditions:

- The Unit 1 OAC failed and is not operating.
- The vendor is being consulted concerning repairs.
- It is estimated it will take approximately 15 hours to complete repairs.
- The crew has implemented PT/1/A/4600/021A (Loss of Operator Aid Computer while in Mode 1) and completed through step 12.15.
- Unit 1 is at 99% power and all Power Range Instruments are OPERABLE.

Initiating Cue:

- The CRS has directed you to calculate QPTR in accordance with Step 12.16 of PT/1/A/4600/21A (Loss of Operator Aid Computer while in Mode 1).
- Identify any required TS ACTION(s).

NOTE: Round all calculations to two (2) decimal places.

Task Standard:	The operator will calculate the QPTR (See Attached Key) and determine that the QPTR Technical Specification has been exceeded; Then identify the required TS ACTION (i.e. Power must be reduced to at least 94% within two hours, and ACTIONS A.2 through A.7 must be taken).
Required Materials:	Calculator
General References:	PT/1/A/4600/021A (Loss of Operator Aid Computer while in Mode 1), Rev 41 OP/1/A/6100/022 (Unit 1 Data Book – Cycle 24), Rev 481 McGuire Technical Specifications LCO 3.2.4 (Quadrant Power Tilt Ratio), Amendment 261/241
Handouts:	Handout 1: PT/1/A/4600/021A (Loss of Operator Aid Computer while in Mode 1) marked up through step 12.15. Handout 2: OP/1/A/6100/022 (MNS Unit #1 Data Book), Enclosure 4.3, Table 2.2 (Excore Currents and Voltages Correlated to 100% Full Power at Various Axial Offsets)
Time Critical Task:	NO
Validation Time:	25 minutes

(Denote Critical Steps with an asterisk*)

Provide Candidate with Initial Conditions/Cue and Current Power Range Detector Currents (Last Two Pages of this JPM), and Handouts 1-2.

START TIME: ____________

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
1	(Step 12.16) IF QPTR Alarm inoperable AND greater than 50% RTP, perform the following: (Step 12.16.1) IF all Power Range (PR) channel inputs to QPTR operable, calculate QPTR on Enclosure13.5 (Calculation Sheet for Quadrant Power Tilt) Part A within 12 hours and every 12 hours thereafter until QPTR Alarm operable.	The operator determines from initial conditions QPTR Alarm is inoperable, Unit 1 is at 100% power and all PR channels are operable. Operator proceeds to Enclosure 13.5 (Calculation Sheet for Quadrant Power Tilt) Part A.		
2	(Enclosure 13.5 Part A) Complete the Form	The operator enters the current Date and Time at the top of the form.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*3	(Enclosure 13.5 Part A) Measured Current - From NI cabinet's current meter (located on respective PRB Drawers). Ensure Detector Milliamp Range Switches are in "0.5" position and read 0-500 microamp scale.	The operator records the correct amperage reading for each detector (From the Handout provided) in the **Measured Current** row for each of the eight (8) detectors as follows: PR-41A = **295** PR-41B = **304** PR-42A = **299** PR-42B = **327** PR-43A = **299** PR-43B = **315** PR-44A = **285** PR-44B = **304**		
*4	(Enclosure 13.5 Part A) Calibration Current - From most recent calibration data using "0" Incore Axial Offset Current in Data Book, Table 2.2 ("IT" for detector "A", "IB" for detector "B").	The operator locates OP/1/A/6100/022, Enclosure 4.3, Table 2.2, Excore Currents and Voltages Correlated to 100% Full Power at Various Axial Offsets. The operator records the correct amperage reading for each detector (Table 2.2) in the **Calibration Current** row for each of the eight (8) detectors as follows: PR-41A = **133.0** PR-41B = **145.5** PR-42A = **125.2** PR-42B = **135.0** PR-43A = **131.3** PR-43B = **147.3** PR-44A = **129.8** PR-44B = **147.7**		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*5	(Enclosure 13.5 Part A) Relative Flux (RF) – Divide line 1 by line 2 to calculate Relative Flux (RF) for each upper (A) and lower (B) detector.	The operator correctly calculates the average RF and records the in the **Relative Flux (RF)** row for each of the eight (8) detectors as follows: PR-41A = 295/133.0 = **2.22** PR-41B = 304/145.5 = **2.09** PR-42A = 299/125.2 = **2.39** PR-42B = 327/135.0 = **2.42** PR-43A = 299/131.3 = **2.28** PR-43B = 315/147.3 = **2.14** PR-44A = 285/129.8 = **2.20** PR-44B = 304/147.7 = **2.06**		
*6	(Enclosure 13.5 Part A) Quadrant Power Tilts: Calculate by dividing each upper relative flux by the average upper relative flux and dividing each lower relative flux by the average lower relative flux. Avg RF of A Detectors	The operator records the RF of each of the four (4) A detectors and calculates the Avg RF of A Detectors as follows: **(2.22+2.39+2.28+2.20)/4 = 2.27**		
*7	(Enclosure 13.5 Part A) Quadrant Power Tilts: Calculate by dividing each upper relative flux by the average upper relative flux and dividing each lower relative flux by the average lower relative flux. Avg RF of B Detectors	The operator records the RF of each of the four (4) B detectors and calculates the Avg RF of B Detectors as follows: **(2.09+2.42+2.14+2.06)/4 = 2.18**		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*8	(Enclosure 13.5 Part A) Quadrant Power Tilts: Calculate by dividing each upper relative flux by the average upper relative flux and dividing each lower relative flux by the average lower relative flux. PR-41A Tilt	The operator calculates the PR-41A Tilt as follows: **2.22/2.27 = 0.98 $\pm$ .01** And records this value.		
*9	(Enclosure 13.5 Part A) Quadrant Power Tilts: Calculate by dividing each upper relative flux by the average upper relative flux and dividing each lower relative flux by the average lower relative flux. PR-41B Tilt	The operator calculates the PR-41B Tilt as follows: **2.09/2.18 = 0.96 $\pm$ .01** And records this value.		
*10	(Enclosure 13.5 Part A) Quadrant Power Tilts: Calculate by dividing each upper relative flux by the average upper relative flux and dividing each lower relative flux by the average lower relative flux. PR-42A Tilt	The operator calculates the PR-42A Tilt as follows: **2.39/2.27 = 1.05 $\pm$ .01** And records this value.		
*11	(Enclosure 13.5 Part A) Quadrant Power Tilts: Calculate by dividing each upper relative flux by the average upper relative flux and dividing each lower relative flux by the average lower relative flux. PR-42B Tilt	The operator calculates the PR-42B Tilt as follows: **2.42/2.18 = 1.11 $\pm$ .01** And records this value.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*12	(Enclosure 13.5 Part A) Quadrant Power Tilts: Calculate by dividing each upper relative flux by the average upper relative flux and dividing each lower relative flux by the average lower relative flux. PR-43A Tilt	The operator calculates the PR-43A Tilt as follows: **2.28/2.27 = 1.00 ± .01** And records this value.		
*13	(Enclosure 13.5 Part A) Quadrant Power Tilts: Calculate by dividing each upper relative flux by the average upper relative flux and dividing each lower relative flux by the average lower relative flux. PR-43B Tilt	The operator calculates the PR-43B Tilt as follows: **2.14/2.18 = 0.98 ± .01** And records this value.		
*14	(Enclosure 13.5 Part A) Quadrant Power Tilts: Calculate by dividing each upper relative flux by the average upper relative flux and dividing each lower relative flux by the average lower relative flux. PR-44A Tilt	The operator calculates the PR-44A Tilt as follows: **2.20/2.27 = 0.97 ± .01** And records this value.		
*15	(Enclosure 13.5 Part A) Quadrant Power Tilts: Calculate by dividing each upper relative flux by the average upper relative flux and dividing each lower relative flux by the average lower relative flux. PR-44B Tilt	The operator calculates the PR-44B Tilt as follows: **2.06/2.18 = 0.94 ± .01** And records this value.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*16	(Technical Specification 3.2.4) The QPTR shall be ≤ 1.02.	The operator refers to LCO 3.2.4 and determines that QPTR is NOT met. The operator determines that power must be reduced (ACTION A.1) to at least 73% within 2 hours. NOTE: (Highest QPTR is 1.11 on PR-42B; Reduce ≥ 3% from RTP (100%) for each 1% of QPTR > 1.02 (1.11-1.02 = 0.09 x 3% RTP x100% QPTR/RTP)) The operator determines that ACTION A.2, A.3, A.4, A.5, A.6 and A.7 must be completed within the required COMPLETION TIME.		

Terminating Cue: **Evaluation on this JPM is complete.**

STOP TIME: _______________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 Admin – JPM A1b SRO

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

KEY:

Part A Page 1 of 4

	PR-41		PR-42		PR-43		PR-44	
	A	**B**	**A**	**B**	**A**	**B**	**A**	**B**
Measured Current	295	304	299	327	299	315	285	304
Calibration Current	133.0	145.5	125.2	135.0	131.3	147.3	129.8	147.7
Relative Flux (RF)	2.22	2.09	2.39	2.42	2.28	2.14	2.20	2.06

Part A Page 2 of 4

Avg RF of A Detectors = $\boxed{2.22}$ + $\boxed{2.39}$ + $\boxed{2.28}$ + $\boxed{2.20}$ = 2.27

Avg RF of B Detectors = $\boxed{2.09}$ + $\boxed{2.42}$ + $\boxed{2.14}$ + $\boxed{2.06}$ = 2.18

PR-41A Tilt RFA = $\frac{\text{RF of PR-41A}}{}$ = $\frac{2.22}{2.27}$ 0.98*

PR-41B Tilt RFB = $\frac{\text{RF of PR-41B}}{}$ = $\frac{2.09}{2.18}$ 0.96*

PR-42A Tilt RFA = $\frac{\text{RF of PR-42A}}{}$ = $\frac{2.39}{2.27}$ 1.05*

PR-42B Tilt RFB = $\frac{\text{RF of PR-42B}}{}$ = $\frac{2.42}{2.18}$ 1.11*

PR-43A Tilt RFA = $\frac{\text{RF of PR-43A}}{}$ = $\frac{2.28}{2.27}$ 1.00*

PR-43B Tilt RFB = $\frac{\text{RF of PR-43B}}{}$ = $\frac{2.14}{2.18}$ 0.98*

PR-44A Tilt RFA = $\frac{\text{RF of PR-44A}}{}$ = $\frac{2.20}{2.27}$ 0.97*

PR-44B Tilt RFB = $\frac{\text{RF of PR-44B}}{}$ = $\frac{2.06}{2.18}$ 0.94*

* $\pm$ .01

The following Detector Currents are observed on the NI cabinet current meters:

NI-41 detector:

A (left) 295 microamps

B (right) 304 microamps

NI-42 detector:

A (left) 299 microamps

B (right) 327 microamps

NI-43 detector:

A (left) 299 microamps

B (right) 315 microamps

NI-44 detector:

A (left) 285 microamps

B (right) 304 microamps

INITIAL CONDITIONS:

- The Unit 1 OAC failed and is not operating.
- The vendor is being consulted concerning repairs.
- It is estimated it will take approximately 15 hours to complete repairs.
- The crew has implemented PT/1/A/4600/021A (Loss of Operator Aid Computer while in Mode 1) and completed through step 12.15.
- Unit 1 is at 99% power and all Power Range Instruments are OPERABLE.

INITIATING CUE:

- The CRS has directed you to calculate QPTR in accordance with Step 12.16 of PT/1/A/4600/21A (Loss of Operator Aid Computer while in Mode 1).
- Identify any required TS ACTION(s).

NOTE: Round all calculations to two (2) decimal places.

JPM A2 RO

Facility: McGuire Task No.:

Task Title: Determine Leak Isolation Boundaries JPM No.: 2016 Admin – JPM A2 RO

K/A Reference: 2.2.41 (3.5)

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom X Simulator ______ Plant ________

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handouts 1-2.

Initial Conditions:

- Unit 1 is operating at 100% power.
- Suspecting a leak in the Aux Building the crew entered Case II of AP/1/A/5500/10, NC System Leakage Within the Capacity of Both NV Pumps.
- An AO has just reported that there is a large packing leak on 1NV-151A (NV Pumps Recirculation Valve).

Initiating Cue: The CRS has directed you to:

- Identify the closest leak isolation boundary valves for this leak.
- Identify which, if any, of these valves need to be re-positioned from their current position.
- Identify the Breaker for any electrically operated leak isolation boundary valve that may need to be operated.

Task Standard: The operator will review the Flow Diagram of Chemical and Volume Control System (NV) and determine the closest leak isolation boundary valves for this leak, review OP/1/A/6200/001E and determine the boundary valves that need to be re-positioned, and review OP/1/A/6200/001E and identify the Breaker for 1NV-150A in accordance with the Attached KEY.

Required Materials: None

General References: AP/1/A/5500/10 (NC System Leakage Within the Capacity of Both NV Pumps), Rev 23

OP/1/A/6200/001 B (Chemical and Volume Control System Charging), Rev 63

OP/1/A/6200/001 E (Chemical and Volume Control System Valve Checklists), Rev 34

MNS Drawing MCFD-1554-01.00 (Flow Diagram of Chemical and Volume Control System (NV)), Rev 11

MNS Drawing MCFD-1554-01.01 (Flow Diagram of Chemical and Volume Control System (NV)), Rev 11

MNS Drawing MCFD-1554-01.02 (Flow Diagram of Chemical and Volume Control System (NV)), Rev 13

MNS Drawing MCFD-1554-01.03 (Flow Diagram of Chemical and Volume Control System (NV)), Rev 4

MNS Drawing MCFD-1554-02.00 (Flow Diagram of Chemical and Volume Control System (NV)), Rev 18

MNS Drawing MCFD-1554-02.01 (Flow Diagram of Chemical and Volume Control System (NV)), Rev 6

MNS Drawing MCFD-1554-03.00 (Flow Diagram of Chemical and Volume Control System (NV)), Rev 20

MNS Drawing MCFD-1554-03.01 (Flow Diagram of Chemical and Volume Control System (NV)), Rev 24

MNS Drawing MCFD-1554-04.00 (Flow Diagram of Chemical and Volume Control System (NV)), Rev 12

MNS Drawing MCFD-1554-05.00 (Flow Diagram of Chemical and Volume Control System (NV)), Rev 22

Handouts: Handout 1: Series of MNS Drawings - Flow Diagram of Chemical and Volume Control System (NV)

Handout 2: OP/1/A/6200/001 E (Chemical and Volume Control System Valve Checklists)

Time Critical Task: NO

Validation Time: 30 minutes

(Denote Critical Steps with an asterisk)*

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handouts 1-2.

START TIME: ____________

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*1	(Directed Action) Identify the closest leak isolation boundary valves for this leak.	The operator will review the Flow Diagram of Chemical and Volume Control System (NV) and determine the closest leak isolation boundary valves for this leak are: • 1NV-150B, NV Pumps Recirculation • 1NV-148, Seal Wtr Filt #1 Outlet Isol • 1NV-152, SW Hx #1 Tube Inlet Isol • 1NV-149, Seal Wtr Filter Byp • 1NV-154, SW Hx #1 Byp See attached KEY		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*2	(Directed Action) Identify which, if any, of these valves need to be re-positioned from their current position.	The operator will review the Flow Diagram of Chemical and Volume Control System (NV) and/or OP/1/A/6200/001 E and determine that of these leak isolation boundary valves only the following valves must be re-positioned: • 1NV-150B, NV Pumps Recirculation • 1NV-148, Seal Wtr Filt #1 Outlet Isol • 1NV-152, SW Hx #1 Tube Inlet Isol See attached KEY		
*3	(Directed Action) Identify the Breaker for any electrically operated leak isolation boundary valve that may need to be operated.	The operator will review OP/1/A/6200/001 E and determine that the Breaker for 1NV-150B, NV Pumps Recirculation, is 1EMXB2-F2C. See attached KEY		

Terminating Cue: **Evaluation on this JPM is complete.**

STOP TIME: ______________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 Admin – JPM A2 RO

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Result: SAT ______ UNSAT _______

Examiner's Signature: ________________________________ Date: ____________________

KEY:

Closest leak isolation boundary valves for this leak.	• **1NV-150B, NV Pumps Recirculation** • **1NV-148, Seal Wtr Filt #1 Outlet Isol** • **1NV-152, SW Hx #1 Tube Inlet Isol** • **1NV-149, Seal Wtr Filter Byp** • **1NV-154, SW Hx #1 Byp**
Which, if any, leak isolation boundary valves need to be re-positioned from their current position.	• **1NV-150B, NV Pumps Recirculation** • **1NV-148, Seal Wtr Filt #1 Outlet Isol** • **1NV-152, SW Hx #1 Tube Inlet Isol**
Breaker for any electrically operated leak isolation boundary valve that may need to be operated.	**The Breaker for 1NV-150B, NV Pumps Recirculation, is 1EMXB2-F2C.**

INITIAL CONDITIONS:

- Unit 1 is operating at 100% power.
- Suspecting a leak in the Aux Building the crew entered Case II of AP/1/A/5500/10, NC System Leakage Within the Capacity of Both NV Pumps.
- An AO has just reported that there is a large packing leak on 1NV-151A (NV Pumps Recirculation Valve).

INITIATING CUE:

The CRS has directed you to:

- Identify the closest leak isolation boundary valves for this leak.
- Identify which, if any, of these valves need to be re-positioned from their current position.
- Identify the Breaker for any electrically operated leak isolation boundary valve that may need to be operated.

Closest leak isolation boundary valves for this leak.	
Which, if any, leak isolation boundary valves need to be re-positioned from their current position.	
Breaker for any electrically operated leak isolation boundary valve that may need to be operated.	

JPM A2 SRO

Facility:	McGuire	Task No.:	
Task Title:	Respond to a Fire Detection System Trouble Alarm	JPM No.:	2016 Admin – JPM A2 SRO
K/A Reference:	2.2.40 (4.7)		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom X Simulator ______ Plant ________

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 1.

Initial Conditions:

- Unit 1 is in Mode 3 at normal operating temperature and pressure.
- Annunciator 1AD-13 E3, FIRE DET SYS ALERT, has alarmed.
- The crew has entered OP/0/A/6400/002F (Fireworks Fire Detection System), and is performing Enclosure 4.1 (Fire Detection System Alarm/Trouble).
- A check of Fire Alarm Control Panel (FACP) 1 shows that Zone 150 has a TROUBLE condition.
- It is subsequently determined that 3 non-adjacent detectors within Zone 150 are not FUNCTIONAL.
- Enclosure 4.1 of OP/0/A/6400/002F has been completed through Step 3.12.1.2.

Initiating Cue:

- Complete Step 3.12.1.3, and if necessary 3.12.1.4, of Enclosure 4.1 of OP/0/A/6400/002F.
- Identify any Technical Specification LCO/SLC required actions.

Task Standard: The operator will identify that SLC 16.9.6 ACTION is required, that Remedial Action Condition B is met, that the required ACTION must be performed in accordance with the attached KEY.

Required Materials: None

General References:
OP/1/A/6100/010 N (Annunciator Response for Panel 1AD-13), Rev. 78
OP/0/A/6400/002F (Fireworks Fire Detection System), Rev. 23
MNS SLC 16.9.6 (Fire Detection Instrumentation), Rev. 138
MNS Technical Specification LCO 3.6.5 (Containment Air Temperature), Amendment 184/166
NSD 316 (Fire Protection Impairment and Surveillance), Rev. 17
OMP 5-16 (Electronic Fire Impairment Log), Rev. 7

Handouts: Handout 1: Full copy of OP/0/A/6400/002F with Enclosure 4.1 marked up through Step 3.12.1.2

Time Critical Task: YES. The SLC Action must be identified within 60 minutes.

Validation Time: 14 minutes

(Denote Critical Steps with an asterisk*)

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handout 1.

START TIME: ____________

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*1	(Step 3.12.1.3) Determine if any zone in alarm or trouble is SLC related. (Refer to Encl. 4.2, Fire Detection System - Fire Zone Data.)	The operator proceeds to Enclosure 4.2, Page 6 of 9, and determines that Zone 150 is SLC related. The operator proceeds to Step 3.12.1.4.		
*2	(Step 3.12.1.4) IF any zone in alarm is SLC related, notify CRS to evaluate SLC as appropriate.	The operator addresses SLC 16.9.6, Fire Detection Instrumentation. The operator evaluates SLC Table 16.9.6-1 and determines that Zone 150 has five (5) Heat Detectors. The operator evaluates SLC Table 16.9.6-1 and determines that Zone 150 detectors are Function A (early warning/notification) detectors. The operator recognizes that 3 of the 5 detectors in Zone 150 are not FUNCTIONAL, and that Condition B is applicable.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*3	(Directed Action) Identify any Technical Specification LCO/SLC required actions.	The operator identifies the following required ACTION: B.1 Establish fire watch patrol to inspect zones outside containment with non-functional instruments, within 1 hour AND once per hour thereafter. AND B.2.1 Establish a fire watch patrol to inspect zones inside containment with non-functional instruments, within 1 hour AND once per 8 hours thereafter. OR B.2.2 Monitor containment air temperature at the locations given in ITS 3.6.5.1 or 3.6.5.2, once per hour.		

Terminating Cue: **Evaluation on this JPM is complete.**

STOP TIME: _______________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 Admin – JPM A2 SRO

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

INITIAL CONDITIONS:

- Unit 1 is in Mode 3 at normal operating temperature and pressure.
- Annunciator 1AD-13 E3, FIRE DET SYS ALERT, has alarmed.
- The crew has entered OP/0/A/6400/002F (Fireworks Fire Detection System), and is performing Enclosure 4.1 (Fire Detection System Alarm/Trouble).
- A check of Fire Alarm Control Panel (FACP) 1 shows that Zone 150 has a TROUBLE condition.
- It is subsequently determined that 3 non-adjacent detectors within Zone 150 are not FUNCTIONAL.
- Enclosure 4.1 of OP/0/A/6400/002F has been completed through Step 3.12.1.2.

INITIATING CUE:

- Complete Step 3.12.1.3, and if necessary 3.12.1.4, of Enclosure 4.1 of OP/0/A/6400/002F.
- Identify any Technical Specification LCO/SLC required actions.

Technical Specification LCO/SLC required actions (If Any):

JPM A3 RO

Facility:	McGuire	Task No.:	
Task Title:	Perform a Unit Vent Flow Calculation of a Containment Air Release	JPM No.:	2016 Admin – JPM A3 RO
K/A Reference:	2.3.11 (3.8)		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: ______ Actual Performance: __X__

Classroom __X__ Simulator ______ Plant ______

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handouts 1-3.

Initial Conditions:

- GWR Package # 2016013 for Unit 1 Containment Air Release is currently in use to conduct a series of Containment air releases.
- Three releases have been made.
- During the first release, conducted using Enclosure 4.2 (Air Release Mode With VQ Flow Monitor Operable) of OP/1/A/6450/017 (Containment Air Addition and Release), the Unit 1 VQ Monitor became inoperable.
- The crew stopped the release and continued the air release using Enclosure 4.3 (Air Release Mode with VQ Flow Monitor Inoperable) of OP/1/A/6450/017 (Containment Air Addition and Release), and recorded the release volume on the GWR paperwork.
- At 1743 on 4/4/16, containment pressure was 0.18 PSIG and another (4^{th}) VQ release was initiated to reduce pressure to 0.12 PSIG per Step 3.9 of Enclosure 4.3.
- This release was secured at 1839 on 4/4/16 and the procedure was completed through step 3.9.1 for this 4^{th} release.

Initiating Cue:	• You have been directed to calculate the volume released for the 4th release and complete all required paperwork starting with Step 3.9.2, **AND**, since this is the last release for GWR package 2016013, perform Steps 3.11.4 through 3.11.9 of Enclosure 4.3 to determine the total volume released from the Containment. • The CRS notified RP (Mike Cline) at 1840 on 4/4/16 that the release has been terminated.

Task Standard: The operator will calculate the volume of air released from the Containment during the final release, and determine the total volume of air released in the series of four releases in accordance with the provided KEY.

Required Materials: Calculator

General References: OP/1/A/6450/017 (Containment Air Release and Addition System), Rev 42

Handouts: Handout 1: Enclosure 4.2 (Air Release Mode With VQ Flow Monitor Operable) of OP/1/A/6450/017 (Containment Air Addition and Release) marked up as follows:

Step 2.1 – Initialed.
Step 2.2 – Initialed.
Step 2.3 – Initialed.
Step 2.4 – Initialed, GWR# 2016013 recorded.
Step 3.1 – Checkbox is checked.
Step 3.2 – Initialed.
Step 3.2.1 – Initialed and CV initialed.
Step 3.2.2 – Initialed and CV initialed.
Step 3.2.3-- Checkbox is checked
Step 3.2.4 – Initialed and **Mike Cline**/Date/Time Recorded consistent with first release Date/Time (4/4/16 0903).
Step 3.3 – N/A and Initialed.
Step 3.4 –Initialed.
Step 3.5 – Initialed and CV initialed.
Step 3.6 – Initialed.
Step 3.7 – Initialed.
Step 3.8 – Initialed.
Step 3.8.1 – Checkbox is checked.
Step 3.8.2 – Checkbox is checked.
Step 3.8.3 – Initialed and CV initialed, VQ Monitor flow is recorded as 1236, and Actual Volume Released is recorded as 12,360.
Step 3.8.4 – All three Checkbox' are checked.
Step 3.8.5 – Initialed.
Step 3.8.6 – Checkbox is checked.
Step 3.9.1 – Checkbox is checked.
Step 3.9.2 – Checkbox is checked.
Step 3.9.3 – Checkbox is checked.
Step 3.9.4 – Checkbox is checked.
Step 3.9.5 – Both Checkbox' are checked.
Step 3.9.6 – Checkbox is checked.
Step 3.9.7-- Initialed.
Step 3.10 – Initialed.

Page 5 of 5 (Attachment 1) is marked up as follows: Sheet 1 of 1

1VQ-2B Open					1VQ-2B Closed		
Doer	CV	VQ Flow Monitor Counting (√)	VQ Flow Less Than 300 cfm (√)	Date/Time	Doer	CV	Date/Time
Initial	Initial	√	√	4/4/16 0903	Initial	Initial	4/4/16 1016

Handout 2: Enclosure 4.3 (Air Release Mode With VQ Flow Monitor Inoperable) of OP/1/A/6450/017 (Containment Air Addition and Release) marked up as follows:

Step 2.1 – Initialed.
Step 2.2 – Initialed.
Step 2.3 – Initialed.
Step 2.4 – Initialed, GWR# 2016013 recorded.
Step 3.1 – Checkbox is checked.
Step 3.2 – Initialed.
Step 3.2.1 – Initialed and CV initialed.
Step 3.2.2 – Initialed and CV initialed.
Step 3.2.3 -- Checkbox is checked.
Step 3.2.4 – Initialed and Person Notified/Date/Time Recorded consistent with **first** release Date/Time on Page 6 of 6.
Step 3.3 – NA and Initialed.
Step 3.4 – Initialed.
Step 3.5 – Initialed.
Step 3.6 – Initialed and CV initialed.
Step 3.7.1 – Checkbox is checked.
Step 3.7.2 – Checkbox is checked.
Step 3.7.3 – Checkbox is checked.
Step 3.7.4 – Both Checkbox' are checked.
Step 3.7.5 – Initialed.
Step 3.7.6 – Initialed.
Step 3.8 – NA and Initialed.
Step 3.9 – Initialed.
Step 3.9.1 - Checkbox is triple-checked.
Step 3.9.2 - Checkbox is double-checked.
Step 3.9.3 - Double Initialed, and double CV initialed.
Step 3.10 – Initialed.

Page 6 of 6 (Attachment 1) is marked as follows: Sheet **1** of **1**

1VQ-2B Open				1VQ-2B Closed					
Doer	CV	Date/Time	Start Pressure (psig)	Doer	CV	Date/Time	Stop Pressure (psig)	Ft^3 Released	Total Ft^3 Released
Initial	Initial	4/4/16 1117	0.22	Initial	Initial	4/4/16 1258	0.12	21,740.17	21,740.17
Initial	Initial	4/4/16 1432	0.20	Initial	Initial	4/4/16 1547	0.12	15,747.32	37,487.49
Initial	Initial	4/4/16 1743	0.18	Initial	Initial		0.12		

Handout 3: GWR Paperwork with 12360ft^3 release volume from Enclosure 4.2 recorded.

Time Critical Task: NO

Validation Time: 24 minutes

(Denote Critical Steps with an asterisk*)

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handouts 1-3.

START TIME: ____________

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
1	(Enclosure 4.3, Step 3.9.2) Record stop date/time on Attachment 1	The operator records **4/4/16 1839** in the 1VQ-2B Closed Date/Time Block of Attachment 1.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
2 *	(Step 3.9.3) Calculate volume released using the following and record on Attachment 1. (Documentation of calculation NOT required) Cu. Ft. Released = X + (YxZ) Where: X and Y are from Table 4.3-1 Z is actual release duration in minutes from Attachment 1.	The operator uses Table 4.3-1 of Enclosure 4.3 and determines X to be **17.31** (Start Pressure of 0.18). The operator uses Table 4.3-1 of Enclosure 4.3 and determines Y to be **203.99** (Start Pressure of 0.18). The operator uses Attachment 1 of Enclosure 4.3 and determines Z to be **56** (Stop Time of 1839 - Start Time of 1743). The operator calculates volume released as follows: 17.31 + (203.99 x 56) = **11,440.75±0.5% (See KEY)**, and records this value in the 1VQ-2B Closed Cubic Ft Released Block of Attachment 1. **Examiner Cue:** **If the operator is concerned about the completion of Steps 3.11.1-3, indicate that valves 1VQ-1A, 1VQ-2B and 1VQ-4 are CLOSED.**		
3	(Step 3.11.4) Ensure release stop date/time recorded on Attachment 1.	The operator ensures **4/4/16 1839** recorded in the 1VQ-2B Closed Date/Time Block of Attachment 1.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
4	(Step 3.11.5) Notify RP that release has been terminated ……	The operator recognizes from the initial conditions that RP has been notified.		
5 *	(Step 3.11.6) Determine Total Cu. Ft Released on Attachment 1.	The operator adds the volume of this most recent release (**11,440.75**) to the total previously released on Attachment 1 (**37,487.49**) and determines that the total volume released is **48,928.24 ft^3 (See KEY)**. The operator records this value in the 1VQ-2B Closed Total Cubic Ft Released Block of Attachment 1.		
6	(Step 3.11.7) Record Total Cu. Ft Released from Attachment 1:________ft^3	The operator records **48,928.24 (See KEY)** in the 1VQ-2B Closed Cubic Ft Released Block of Attachment 1.		
*7	(Step 3.11.8) IF any VQ Totalizer readings recorded on GWR paperwork, perform the following: (Step 3.11.8.1) Determine Total Volume Released as recorded on GWR paperwork. (Step 3.11.8.2) Record Total Volume Released from GWR: ____________ ft^3.	The operator observes GWR paperwork and determines that **12,360** ft^3 had been released when the VQ Monitor was operable, and records this value on Enclosure 4.3, Step 3.11.8.2.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*8	(Step 3.11.9) Calculate Total Volume Released for GWR as follows: ____ ft^3 + ____ ft^3 = ____ ft^3 Step 3.11.7 Step 3.11.8.2 Total Vol Rel	The operator adds the total volume released recorded in Step 3.11.7 (**48,928.24**) and the total volume released recorded in Step 3.11.8.1 (**12,360**), and determines the Total Volume Released for this series of Containment Air Releases is **61,288.24 ft^3 (See KEY)**.		

Terminating Cue: **Evaluation on this JPM is complete.**

STOP TIME: ______________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 Admin – JPM A3 RO

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Result: SAT ______ UNSAT _______

Examiner's Signature: ________________________________ Date: ____________________

KEY:

Enclosure 4.3, Attachment 1:

RED = filled in at start of JPM.
GREEN = filled in during JPM performance

1VQ-2B Open				1VQ-2B Closed					
Doer	CV	Date/Time	Start Pressure (psig)	Doer	CV	Date/Time	Stop Pressure (psig)	Ft^3 Released	Total Ft^3 Released
Initial	Initial	4/4/16 1117	0.22	Initial	Initial	4/4/16 1258	0.12	21,740.17	21,740.17
Initial	Initial	4/4/16 1432	0.20	Initial	Initial	4/4/16 1547	0.12	15,747.32	37,487.49
Initial	Initial	4/4/16 1743	0.18	Initial	Initial	4/4/16 1839	0.12	11,440.75	48,928.24

Enclosure 4.3, Step 3.9.3 (JPM Step 2): Volume released, current release:
17.31 ft^3 + (203.99 ft^3/min x 56 min) = 11,440.75 ft^3 (11,383.55 - 11,497.95)

Enclosure 4.3, Step 3.11.6 (JPM Step 5): Total Volume released, during performance of Enclosure 4.3:
11,440.75 ft^3 + 37,487.49 ft^3 = 48,928.24 ft^3 (48,871.04 – 48985.44)

Enclosure 4.3, Step 3.11.9 (JPM Step 8): Total Volume released, during performance of GW Permit:
48,928.24 ft^3 + 12360 ft^3 = 61,288.24 ft^3 (61,231.04 – 61,345.44)

INITIAL CONDITIONS:

- GWR Package # 2016013 for Unit 1 Containment Air Release is currently in use to conduct a series of Containment air releases.
- Three releases have been made.
- During the first release, conducted using Enclosure 4.2 (Air Release Mode With VQ Flow Monitor Operable) of OP/1/A/6450/017 (Containment Air Addition and Release), the Unit 1 VQ Monitor became inoperable.
- The crew stopped the release and continued the air release using Enclosure 4.3 (Air Release Mode with VQ Flow Monitor Inoperable) of OP/1/A/6450/017 (Containment Air Addition and Release), and recorded the release volume on the GWR paperwork.
- At 1743 on 4/4/16, containment pressure was 0.18 PSIG and another (4^{th}) VQ release was initiated to reduce pressure to 0.12 PSIG per Step 3.9 of Enclosure 4.3.
- This release was secured at 1839 on 4/4/16 and the procedure was completed through step 3.9.1 for this 4^{th} release.

INITIATING CUE:

- You have been directed to calculate the volume released for the 4^{th} release and complete all required paperwork starting with Step 3.9.2, **AND**, since this is the last release for GWR package 2016013, perform Steps 3.11.4 through 3.11.9 of Enclosure 4.3 to determine the total volume released from the Containment.
- The CRS notified RP (Mike Cline) at 1840 on 4/4/16 that the release has been terminated.

JPM A3 SRO

Facility:	McGuire	Task No.:	
Task Title:	Take On-Site Protective Actions During a General Emergency	JPM No.:	2016 Admin – JPM A3 SRO
K/A Reference:	2.3.4 (3.7)		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom X Simulator ______ Plant ______

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Provide Candidate with Initial Conditions/Cue and the List of Available Rescuers (Last two (2) Pages of this JPM), and Handout 1.

Initial Conditions:

- With Unit 1 shutting down due to failed fuel causing high NC System Activity, a LOCA Outside of Containment occurred.
- A Site Assembly is in progress in accordance with Enclosure 4.3 of RP/0/A/5700/011 (Conducting a Site Assembly, Site Evacuation or Containment Evacuation), and all personnel have NOT been accounted for.
- An RP Technician reports that an operator working with him in the 695 pipe chase has fallen and is severely injured. He has moved the injured person to an area that is somewhat shielded. Due to rapidly increasing dose rates, the RP Technician leaves to get help. He believes the injuries are life threatening. He also stated that the individual could be retrieved but it would take two people to do so.
- RP has been contacted and estimates it will take at least ten minutes to retrieve the victim.
- Dose rates at the area needing access are greater than 500 Rem/Hr.
- RP/0/A/5700/004 (General Emergency) is complete through Step 3.8.2.

Initiating Cue:	• As the Emergency Coordinator, perform Step 3.8.3 of RP/0/A/5700/004 (General Emergency) using the List of Available Rescuers in the Control Room. • Complete Enclosure 4.4 up to the point that the rescuers are identified.
Task Standard:	Select and dispatch two rescuers (Smith and Shelly) by completing Enclosure 4.4 of RP/0/A/5700/004 (General Emergency).
Required Materials:	Calculator
General References:	RP/0/A/5700/004 (General Emergency), Rev 31 RP/0/A/5700/011 (Conducting a Site Assembly, Site Evacuation or Containment Evacuation), Rev 20 RP/0/A/5700/29, RP/0/A/5700/29 (Notification of Off-Site Agencies From the Control Room), Rev 17 AD-OP-ALL-1000 (Conduct of Operations), Rev 4
Handouts:	Handout 1: Full copy of RP/0/A/5700/004, General Emergency, marked up as follows: • Section 2 immediate actions are complete. • Enclosure 4.1 and 4.2 actions are complete. • Section 3 subsequent actions complete through Step 3.8.1 and 3.8.2.
Time Critical Task:	NO
Validation Time:	15 minutes

(Denote Critical Steps with an asterisk)*

Provide Candidate with Initial Conditions/Cue and the List of Available Rescuers (Last two (2) Pages of this JPM), and Handout 1.

START TIME: ___________

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
1	(Step 3.8.3) Complete Enclosure 4.4 (Request for Emergency Exposure), prior to dispatch of emergency workers if emergency situation precludes documentation.	The operator reviews List of Available Rescuers in Control Room and determines qualification of potential rescuers.		
*2	(Enclosure 4.4.a) Request for Emergency Exposure	The operator determines that **Casey** cannot be dispatched as a rescuer (Declared pregnancy)		
*3	(Enclosure 4.4.c) Only on a volunteer basis to persons fully aware of the risks involved. All factors being equal, select volunteers above the age of 45 and those who normally receive little exposure.	Operator determines that **Blade** cannot be dispatched as a rescuer (Does NOT Volunteer). Operator determines that **Mack** cannot be dispatched as a rescuer (Has too much Lifetime Exposure). Operator determines that **Leavy** cannot be dispatched as a rescuer (Only STA – AD-OP-ALL-1000 Section 4.5.3 requires her in Control Room). Operator determines that **Baylor** cannot be dispatched as a rescuer (< 45 years Old).		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*4	(Enclosure 4.4) Request for Emergency Exposure	The operator selects **Smith** and **Shelly** as rescuers, and completes Enclosure 4.4. The operator enters the following information on Enclosure 4.4 for **Smith**: • RP Badge # - 12579 • Name – Smith • Age – 52 • Employer – Duke The operator enters the following information on Enclosure 4.4 for **Shelly**: • RP Badge # - 12456 • Name – Shelly • Age – 48 • Employer – Duke The operator requests **Smith** and **Shelly** to Read and Sign Enclosure 4.4.		

Terminating Cue: **Evaluation on this JPM is complete.**

STOP TIME: ______________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 Admin – JPM A3 SRO

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

List of Available Rescuers in Control Room:

RP Badge #	Name	Gender/ Age	Job Assignment	Employer	Current Exposure (yr)	Lifetime Exposure	Special Status
12345	Blade	Male/ 49	Maintenance	Duke	1800 mR	5.2 R	Would prefer not to go/ Reports good physical health
12456	Shelly	Female/ 48	Engineer	Duke	45 mR	400 mR	Volunteers/ Reports good physical health
12567	Mack	Male /45	AO	Duke	125 mR	35.4 R	Volunteers/ Reports good physical health
12579	Smith	Male/ 52	Training Supervisor	Duke	6 mR	1.4R	Volunteers/Reports good physical health
12110	Casey	Female/ 32	Security Supervisor	Duke	10 mR	65 mR	Declared Pregnant/Volunteers/ Reports good physical health
12238	Leavy	Female/ 46	STA (Only Qualified STA on Site)	Duke	4 mR	120 mR	Volunteers/Reports good physical health.
12198	Baylor	Male/ 34	U2 BOP	Duke	78 mR	1.7 R	Volunteers/ Reports good physical health

INITIAL CONDITIONS:

- With Unit 1 shutting down due to failed fuel causing high NC System Activity, a LOCA Outside of Containment occurred.
- A Site Assembly is in progress in accordance with Enclosure 4.3 of RP/0/A/5700/011 (Conducting a Site Assembly, Site Evacuation or Containment Evacuation), and all personnel have NOT been accounted for.
- An RP Technician reports that an operator working with him in the 695 pipe chase has fallen and is severely injured. He has moved the injured person to an area that is somewhat shielded. Due to rapidly increasing dose rates, the RP Technician leaves to get help. He believes the injuries are life threatening. He also stated that the individual could be retrieved but it would take two people to do so.
- RP has been contacted and estimates it will take at least ten minutes to retrieve the victim.
- Dose rates at the area needing access are greater than 500 Rem/Hr.
- RP/0/A/5700/004 (General Emergency) is complete through Step 3.8.2.

INITIATING CUE:

- As the Emergency Coordinator, perform Step 3.8.3 of RP/0/A/5700/004 (General Emergency) using the List of Available Rescuers in the Control Room.
- Complete Enclosure 4.4 up to the point that the rescuers are identified.

JPM A4 SRO

Facility:	McGuire	Task No.:	
Task Title:	Classify an Emergency Event	JPM No.:	2016 Admin – JPM A4 SRO
K/A Reference:	2.4.41 (4.6)		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom X Simulator ______ Plant ________

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handouts 1-2.

Initial Conditions:

- Both Units were operating at 100% power.
- Due to severe weather several of the Unit 1 Control Room Annunciator Panels failed.
- The crew entered PT/1/A4600/033 (Loss of Control Room Annunciators), and has completed Enclosure 13.2 (Partial Loss of Annunciator Panels) through Step 3.5.
- Two additional off-shift operators have been assigned to observe annunciators associated with Time Critical Actions.
- The OAC became unavailable at the time of the Annunciator Panel loss.
- IAE has reported that it will take at least one hour to determine the extent of the damage.
- Computer Services has not responded yet.
- Unit 1 has tripped for reasons unknown.
- The crew entered EP/1/A/5000/E-0, Reactor Trip and/or Safety Injection, and verified that the immediate actions were completed as expected.
- The crew transitioned to EP/1/A/5000/ES-0.1, Reactor Trip Response, after verifying that all Critical Safety Functions were either GREEN or YELLOW.

Initiating Cue:	• Classify the Event in accordance with RP/0/A/5700/000 (Classification of Emergency). • If more than one Emergency Action Level (EAL) has been exceeded, identify the EAL resulting in the Highest Emergency Classification. • Then, prepare a Nuclear Power Plant Emergency Notification Form for the event, and present to the Emergency Coordinator for approval. **THIS IS A TIME CRITICAL JPM**

Task Standard: The operator will declare an ALERT based on 4.2.A.1, Unplanned Loss of Most or All Safety System Annunciation or Indication in Control Room With Either (1) a Significant Transient in Progress, or (2) Compensatory Non-Alarming Indicators Unavailable; and complete the pre-printed ENF 4.2.A.1 in accordance with the attached KEY.

Required Materials: Calculator

General References:
- PT/1/A4600/033 (Loss of Control Room Annunciators), Rev 7
- RP/0/A/5700/000 (Classification of Emergency), Rev 23
- RP/0/B/5700/029 (Notifications to Offsite Agencies From the Control Room), Rev 17
- OMP 4-3 (Use of Emergency And Abnormal Procedures and FLEX Support Guidelines), Rev 42
- RP/0/A/5700/001 (Notification of Unusual Event), Rev 32
- RP/0/A/5700/002 (Alert), Rev 32
- RP/0/A/5700/003 (Site Area Emergency), Rev 33
- RP/0/A/5700/004 (General Emergency), Rev 31

Handouts:
- Handout 1: PT/1/A4600/033 (Loss of Control Room Annunciators) marked up for this JPM.
- Handout 2: RP/0/A/5700/000 (Classification of Emergency)
- Handout 3: RP/0/B/5700/029 (Notifications to Offsite Agencies From the Control Room)
- Handout 4: Blank copies of preprinted Nuclear Power Plant Emergency Notification Forms (Multiple Copies is needed)

Time Critical Task: YES – 15 minute to make classification, and THEN 15 minutes to complete ENF.

Validation Time: 18 minutes

(Denote Critical Steps with an asterisk*)

Provide Candidate with Initial Conditions/Cue (Last Page of this JPM), and Handouts 1-2.

START TIME: ____________

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
1	(OMP 4-3, Steps 7.21.1/7.21.1.1) OSM Responsibilities Assume role of Emergency Coordinator upon activation of the Emergency Plan until properly relieved by the Station Manager.	The operator enters RP/0/A/5700/000, Step 2.1.		
2	(RP/0/A/5700/000, Note prior to Step 2.1) Assessment, classification and declaration of any applicable emergency condition should be completed within 15 minutes after the availability to indications or information to cognizant facility staff that an EAL threshold has been exceeded. (Refer to enclosure 4.9, Emergency Declaration Guidelines, as needed.)	The operator reads the Note and proceeds. The operator refers to Enclosure 4.9 as needed.		
3	(RP/0/A/5700/000, Step 2.1) Determine operating mode that existed at the time the event occurred prior to any protection system or operator action initiated in response of the event.	The operator enters determines that the plant was in Mode 1 at the start of the event.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
4	(RP/0/A/5700/000, Step 2.2) IF valid Security Event,…..	The operator recognizes that this is NOT a valid Security Event, that this Step is Not Applicable, and proceeds.		
5	(RP/0/A/5700/000, Step 2.3) IF the plant was in Mode 1-4 and a valid condition affects fission product barriers, THEN …...	The operator reviews Enclosure 4.1, and determines that no Loss or Potential Loss of a Fission Product Barrier exists per Enclosure 1, and proceeds.		
6	(RP/0/A/5700/000, Step 2.4) IF a General Emergency is NOT declared in Step 2.3, OR the condition does not affect fission product barriers, THEN review the listing of enclosures to determine if the event is applicable to one of the categories shown.	The operator reviews Enclosure 4.2 through 4.7, and determines the following: The operator reviews Enclosure 4.2 and determines that an **<u>ALERT</u>** exists, based on **<u>4.2.A.1</u>**, Unplanned Loss of Most or All Safety System Annunciation or Indication in Control Room With Either (1) a Significant Transient in Progress, or (2) Compensatory Non-Alarming Indicators Unavailable. [4.2.A.1-1 The following conditions exist: Unplanned loss of most (>50%) annunciators associated with safety systems for greater than 15 minutes. AND In the opinion of the Operations Shift Manager/Emergency		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
6 (Cont'd)		Coordinator/EOF Director, the loss of the annunciators or indicators requires additional personnel (beyond normal shift compliment) to safely operate the unit. AND EITHER of the following: A significant plant transient is in progress. OR Loss of the OAC.].		
*7	(RP/0/A/5700/000, Step 2.5) IF Emergency Action Level threshold has been exceeded, THEN declare the appropriate Emergency Classification.	The operator determines that an **ALERT** exists, based on **4.2.A.1**, Unplanned Loss of Most or All Safety System Annunciation or Indication in Control Room With Either (1) a Significant Transient in Progress, or (2) Compensatory Non-Alarming Indicators Unavailable. The operator records the event declaration time in Step 2.6.1.		

Examiner Note: Record Time Critical Stop Time __________

NOTE that this time is also the Start Time for the 2nd Time Critical action of completing the pre-printed ENF 4.2.A.1.

Provide the operator with Handout 3 and Handout 4 (Pre-printed ENFs for EALs).

NOTE: A pre-printed form for the requested EAL must be provided (i.e. The operator may request an incorrect EAL form).

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
8	(RP/0/A/5700/000, Step 2.6) Implement the applicable Emergency Response Procedure (RP) for that classification and continue with subsequent steps of this procedure. • Notification of Unusual Event RP/0/A/5700/001 • Alert RP/0/A/5700/002 • Site Area Emergency RP/0/A/5700/003 • General Emergency RP/0/A/5700/004.	The operator proceeds to RP/0/A/5700/002, Immediate Actions.		
9	(RP/0/A/5700/002, Note and IA Steps 2.1-2.2) The Immediate Actions and part of the Subsequent Actions have been separated into position specific enclosures to enhance timely completion and consistent execution. The following Enclosures should be given to the appropriate personnel: The OSM should execute Enclosure 4.1 (OSM Immediate and Subsequent Actions) in a timely manner. The STA should execute Enclosure 4.2 (STA Immediate and Subsequent Actions) in a timely manner. Have an SRO make offsite notifications PER RP/0/B/5700/029 (Notifications to Offsite Agencies from the Control Room).	The operator proceeds to RP/0/A/5700/029, Immediate Actions.		

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*10	(RP/0/A/5700/029, IA Step 2.1) For Initial Notifications, perform Enclosure 4.1 (Completion and Transmission of an Initial Notification Message).	The operator proceeds to Enclosure 4.1 Step 1. The operator completes the ALERT ENF by performing Steps 1-2.13 of Enclosure 4.1 in accordance with the attached KEY (See Page 10 of this JPM). The operator presents the completed ENF Form to the Emergency Coordinator. **NOTE:** The critical nature of this action is that the form is completed within 15 minutes.		

Terminating Cue: **Evaluation on this JPM is complete.**

STOP TIME: ______________

Critical TIME 1: ______________

Critical TIME 2: ______________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2016 Admin – JPM A4 SRO

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

KEY:

Enclosure 4.1 Step #	Block	How Completed
2.1.1	Drill/Actual Event	Operator checks A (Drill) is already shaded in.
2.1.2	Message #	The operator enters 01 (or equivalent)
Note prior to Step 2.2	Notification Time	The operator leaves Blank
Note prior to Step 2.2	Notification Date	The operator leaves Blank
Note prior to Step 2.2	Authentication #	The operator leaves Blank
2.2	Initial/Follow-Up	The operator checks A (Initial).
2.3.1	Site	McGuire Nuclear Site is pre-recorded
2.3.2	Confirmation Phone #	(704) 875-6044 is pre-recorded
2.4.1	Emergency Classification	Operator checks B (ALERT) is already shaded in.
2.4.2	EAL #	Operator checks 4.2.A.1 is already written in.
2.4.3	EAL Description	Operator checks that the following statement is written in: Unplanned Loss of Most or All Safety System Annunciation or Indication in Control Room With Either (1) a Significant Transient in Progress, or (2) Compensatory Non-Alarming Indicators Unavailable.
2.5.1	Protective Action Recommendations	Operator checks None is shaded in.
2.6.1	Emergency Release	The operator checks A (None)
2.7.3	Release Significance	The operator checks A (Not Applicable).
2.8	Event Prognosis	The operator checks A (Improving) or B (Stable).
2.9.1	Wind Direction	The operator leaves Blank
2.9.2	Wind Speed	The operator leaves Blank
2.9.3	Precipitation	The operator leaves Blank
2.9.4	Stability Class	The operator leaves Blank
2.10.1	Declaration/Termination	Operator checks A (Declaration) is shaded in.
2.10.2	Time/Date	The operator records the Time recorded in JPM Step 7, and today's date.
2.11	Affected Unit(s)	The operator checks U1 ONLY.
2.12	Unit Status	The operator records that Unit 1 is at 0% power, and shutdown within last 15 minutes, Today. The operator records that Unit 2 is at 100% power.
2.13	Remarks	Left Blank or "None" recorded

Critical Steps are identified in RED

INITIAL CONDITIONS:

- Both Units were operating at 100% power.
- Due to severe weather several of the Unit 1 Control Room Annunciator Panels failed.
- The crew entered PT/1/A4600/033 (Loss of Control Room Annunciators), and has completed Enclosure 13.2 (Partial Loss of Annunciator Panels) through Step 3.5.
- Two additional off-shift operators have been assigned to observe annunciators associated with Time Critical Actions.
- The OAC became unavailable at the time of the Annunciator Panel loss.
- IAE has reported that it will take at least one hour to determine the extent of the damage.
- Computer Services has not responded yet.
- Unit 1 has tripped for reasons unknown.
- The crew entered EP/1/A/5000/E-0, Reactor Trip and/or Safety Injection, and verified that the immediate actions were completed as expected.
- The crew transitioned to EP/1/A/5000/ES-0.1, Reactor Trip Response, after verifying that all Critical Safety Functions were either GREEN or YELLOW.

INITIATING CUE:

- Classify the Event in accordance with RP/0/A/5700/000 (Classification of Emergency).
- If more than one Emergency Action Level (EAL) has been exceeded, identify the EAL resulting in the Highest Emergency Classification.
- Then, prepare a Nuclear Power Plant Emergency Notification Form for the event, and present to the Emergency Coordinator for approval.

THIS IS A TIME CRITICAL JPM

Emergency Classification: ______________________________