

Facility:	Three Mile Island	Scenario No.:	1	Op Test No.:	<u>TMI-2017-1</u>
Examiners:			Operators:		
Initial Conditions:					
<ul style="list-style-type: none"> • 100% power, MOL • EG-Y-1A "A" Diesel Generator Out of Service • Generator output meter GN-OM-1 is out of service for repair. Put computer points A0099 and A0098 on data trend to monitor MVAR and MW's. 					
Turnover:					
EG-Y-1A 7 day LCO has expired. Plant is beginning a shutdown. Directed rate of change of reactor power is 1%/minute					
Critical Tasks:					
<ul style="list-style-type: none"> • Control RCS Inventory (CT-30) • Natural Circulation RCS Flow (CT-12) 					
Event No.	Malf. No.	Event Type*	Event Description		
1		R CRS R URO	Shutdown reactor in 1102-4 (Allow power to lower >10%) (ICS in Auto, ULD in Hand)		
2		TS CRS	EF-P-1 oil bubbler empty, EF-P-1 inoperable		
3	RW02A	TS CRS C ARO	NR-P-1A Trips, NR-P-1B Fails to Auto-Start, entry into OP-TM-MAP-B0105, and OP-TM-MAP-B0205 (ARO: Starts NR-P-1B from CR)		
4	IC09 IC53	I CRS I URO I ARO	ICS Malfunction, entry into OP-TM-AOP-070 (Main Generator Megawatts fails to 50%, SASS fails to actuate)		
5	ED22C	I CRS I URO I ARO	Loss of ICS AUTO Subfeed Power (MU), entry into OP-TM-MAP-H0108 (URO: Operate MU-V-32 in HAND, ARO: Restore letdown)		
6	ED01	M CRS M URO M ARO	Loss of Offsite power with one Emergency Diesel available, Entry into OP-TM-AOP-020		
7	FW62C	C CRS C ARO	EF-P-2B trips, Entry into OP-TM-EOP-004, Lack of Heat Transfer		
8		C CRS C ARO	Places the SBO diesel on the 1D 4KV bus, starts EF-P-2A		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

Three Mile Island NRC Scenario #1

Event #1: Diesel generator, EG-Y-1A, was out of service for a system outage. Due to complications, the outage lasted longer than 7 days, and the plant is commencing a shutdown in accordance with 1102-4, Power Operations. The Shift Manager has ordered a 1%/minute ULD load rate of change.

After the shutdown has commenced, the lead examiner can continue the scenario.

Event #2: When directed the booth operator will call the control room over the plant page. He will notify the CRO/CRS that EF-U-1 turbine oil bubbler is out of oil, and that there is oil on the floor in the EF-P-1 cubicle.

The CRS should declare EF-P-1 inoperable and order the MS-V-13A/B hand wheel closed and EF-P-1 tripped. The CRS should review TS 3.4.1.1.a.2:

With one EFW Pump or any EFW flowpath inoperable, restore the inoperable pump or flowpath to OPERABLE status within 72 hours or be in COLD SHUTDOWN within the next 12 hours.

Once the tech spec is declared, the scenario can continue.

Event #3: The Lead Examiner will cue the trip of the "A" Nuclear River Pump. "B" Nuclear River Pump fails to auto-start in standby, leaving only one (1) Nuclear River Pump running. One Nuclear River Pump may not be sufficient to cool both the Nuclear Service Closed Cooling System (NSCCW) and the Intermediate Closed Cooling System (ICCW).

It is considered a loss of NSCCW if NSCCW temperatures reach 100°F, and the following Critical Safety Functions are affected:

CSF 4, Core Heat Removal: Provide the capability to remove core heat production at all times: Loss of Nuclear Services cooling function: RC pumps must shutdown. Natural Circulation will be used RCS heat removal.

CSF 8, Auxiliary Emergency Systems: Provide equipment cooling (closed cooling and ventilation), and other support requirements to accomplish the other Critical Safety Functions. Provide Instrument Air for operation of EFW, ADVs, RCP Support Systems, and some containment isolation valves: Loss of Nuclear Services cooling function: Other CSFs are affected as follows: (1) the reliability of safety related power sources and instrumentation system is degraded by the loss of the control building chillers and (2) the reliability of the decay closed pump motors and emergency feed pump motors is degraded by the loss of cooling to the area ventilation coolers.

CSF 10, Chemistry Control: Provide the means to monitor and control primary and secondary water chemistry in order to ensure the long term reliability of plant

Scenario Set-up
NRC Scenario 1

systems and limit the potential release of radioactive materials: Loss of Nuclear Services cooling function would result in the loss of the capability to obtain an RCS or OTSG sample.

It is considered a loss of ICCW if ICCW temperatures reach 120°F, and the following Critical Safety Functions are affected:

CSF 1, Reactivity and Reactor Power Control: Maintain control of the fission process, maintain the capability to shutdown the reactor and the capability to maintain the reactor in a shutdown condition. Control energy production and reactor power distribution based on design limits and current core heat removal capability. Loss of Intermediate Component Cooling: The reactor is tripped in the event of loss of cooling to the CRD stators in order to prevent stator damage. Loss of CRD stator cooling would not prevent CRD insertion on RPS actuation. Maintaining reactor shutdown is not affected by loss of IC component cooling.

CSF 3, RCS Integrity: Maintain the capability to control heatup and cooldown rates and control RCS pressure prevent reactor vessel brittle fracture or LTOP events. Maintain RCP seal cooling to prevent excessive loss of RCS inventory through RCP seals. Loss of Intermediate Component Cooling: One of two RCP seal cooling methods is lost. Loss of seal injection would require RCP shutdown. If SI is lost, overheating of RCP seals is likely. If seal injection maintained, solid operation may be required due to the loss of letdown.

The crew will diagnose the trip of NR-P-1A by an amber disagreement light on the NR-P-1A control switch and Annunciator alarms B-1-5 and B-2-5. The ARO will manually start "B" Nuclear River Pump to provide sufficient cooling for NSCCW and ICCW. The CRS will identify and declare the following Tech Spec: 3.3.2.

When NR-P-1B is running and the Tech Spec has been declared, the scenario can continue.

Event #4: When directed by the lead examiner, insert event #4 for and ICS Failure.

The MW Generated Input to ICS Fails to 0 Volts. A cross-limit may occur as a result of the feed flow reduction caused by the BTU limit. This transient could occur if an open circuit occurs in MW Generated input to the ICS.

The crew will enter OP-TM-AOP-070 and place ICS stations placed in manual as necessary. Plant will be stabilized at 100% power or hot shutdown.

The console left digital indicator will indicate 500 MWe. A large megawatt error signal will be developed which will be used for developing the header pressure modified setpoint and for developing the megawatt calibrating integral. The modified header pressure signal will cause the Turbine Control Valves to open and cause the Main Turbine to trip to manual. Steam Generator and Reactor Demand will both increase.

After the plan is stabilized, the scenario can continue.

Scenario Set-up
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Event #5: The Lead Examiner will cue the Loss of ICS AUTO Power (Makeup Subfeed only). The following Critical Safety Functions are affected by the Loss of ICS AUTO Makeup Subfeed:

CSF 2: Reactor Vessel Inventory Control: Provide the means to maintain the core covered with sub cooled water. **Loss of ATA or ICS auto power:** Letdown is isolated by closure of MU-V-3, MU-V-1A and MU-V-1B. Letdown can be recovered when resources are available. Lifted leads are required to remotely operate some Makeup Valves.

CSF 3: RCS Integrity: Maintain the capability to control heatup and cooldown rates and control RCS pressure prevent reactor vessel brittle fracture or LTOP events. Maintain RCP seal cooling to prevent excessive loss of RCS inventory through RCP seals. **Loss of ATA or ICS auto power:** MU-V-32 transfers to hand control.

The crew will diagnose the loss of ICS Auto Power to the Makeup Subfeed by Annunciators H-1-8 and D-2-1 in alarm, multiple PPC points in alarm, and MU-V-3 and MU-V-5 indicating midscale.

The Loss of ICS MU Auto power will cause MU-V-5, LETDOWN FLOW CONTROL BYPASS VALVE, to fail to 50% open, which will raise letdown flow. Since the cooling water for letdown remains the same with increased letdown flow, MU-V-3, RCS LETDOWN RB ISOL VALVE, will close on High Temperature interlock, thereby creating an isolation of Letdown.

The URO will control Seal Injection flow with MU-V-32 in Hand. The ARO will restore letdown IAW OP-TM-211-950 (performing the appropriate portion of the procedure when restoring from isolation following a High Temperature isolation).

Once Letdown is restored, the scenario can continue.

Event #6/7/8: When directed by the lead examiner, initiate event #6 for the loss of offsite power and EF-P-2B breaker failing to close.

When offsite power is lost, all main feedwater pumps, condensate pumps, and condensate booster pumps are lost. Due to EF-P-1 (Steam Driven Emergency Feedwater Pump) being inoperable from earlier in the scenario, EF-P-2B (Motor driven emergency feedwater pump) breaker not closing, and the loss of 1D 4160V ES bus (due to EG-Y-1A being inoperable), the crew should enter OP-TM-EOP-004, LACK OF PRIMARY TO SECONDARY HEAT TRANSFER, based on incore temperatures rising and no feedwater available.

The crew will also enter OP-TM-AOP-020, LOSS OF STATION POWER. The crew will should initiate OP-TM-864-901, SBO DIESEL GENERATOR (EG-Y-4) OPERATIONS, and power the 1D 4160V bus from EG-Y-4.

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Once the SBO diesel, EG-Y-4, is powering the 1D 4160V ES bus, emergency feedwater pump, EF-P-2A can be started to provide cooling to both OTSG's.

Termination: Once EF-P-2A is running and feeding the both OTSG's the scenario can be terminated.

B&W Unit EOP Critical Task Description Document, 47-1229003-04:

CT-30 – Control RCS Inventory – During a reactor trip, appropriate control of pressurizer level contributes to proper RCS pressure/inventory control. During this reactor trip, all power will be temporarily lost, then only the 1E 4kV bus gets repowered automatically. Since the normally running makeup pump is not ES selected, when power is returned there will be no makeup pump running.

Safety Significance: To be able to control RCS inventory, the crew must start a makeup pump. Failure to control RCS inventory after heat transfer and natural circulation are established could result in the pressurizer heaters to become uncovered and unavailable due to a low level interlock and/or unnecessary ES actuations.

Cues:

- Mismatch lights for MU-P-1B
- Off lights for MU-P-1A and MU-P-1B.
- No RCS MU flow.
- No RCS Seal Injection flow.

Performance Indicators:

- Operation of MU-P-1A (if the 1D 4kV bus has been restored)
- Operation of MU-P-1C (if the 1D 4kV bus is still in the process of being restored)
- MU header pressure MU2-PI is above RCS pressure.

Feedback:

- Seal injection flow rises.
- Makeup flow rises if level is below setpoint.

CT-12 – Establish Natural Circulation RC Flow – Whenever forced RC flow is not available, NC flow should be established. Maintaining primary to secondary heat transfer via NC eliminates the need to add RC to the RB as would occur with the back up feed and bleed HPI core cooling mode.

- If primary to secondary heat transfer has been lost, then establish and maintain appropriate SG levels in accordance with Rule 4.0.
- Reduce SG pressure using the TBVs/ADVs to establish a positive primary to secondary side ΔT of - 50°F.
- RCS pressure should be maintained constant or slightly increasing using MU or HPI. RCS pressure should not be increased if PTS guidance is invoked.
- Trying to establish Natural Circulation RC flow outside of the following limits should be considered **grounds for failure of the critical task**:

Scenario Set-up
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- Establish Natural Circulation prior to transitioning into OP-TM-EOP-009, HPI Cooling.

Safety Significance: Enhances the transient mitigation capability of the plant by maintaining SGs operable and eliminates the need to add RC to the RB as with HPI Cooling.

Cues:

- Low RC flow alarm
- Verbal alert by plant staff that all RCPs have tripped
- SCM monitor and associated alarms
- P-T display and associated alarms

Performance Indicators:

- Operation of EFW/FW pump and valve controls
- Operation of TBV/ADV controls
- Operation of MU/HPI pump and valve controls

Feedback:

- Verbal verification that natural circulation has been established
- SG pressure
- RC temperature

Scenario Set-up
NRC Scenario 1

Event	Description	Procedure Support
	Initial setup	100% power, beginning plant shutdown, Enclosure 2A is complete, notifications and logs for shutdown are complete
1	Commence plant shutdown at 1%/min due	1102-4, Plant Operations
2	EF-P-1 oil leak	Technical Specification 3.4.1.1.a.2
3	NR-P-1C trips, NR-P-1B fails to auto start	MAP B, MAIN ANNUNCIATOR PANEL B
		B-1-5, 480V ES MOTOR TRIP
		B-2-5, 480V ES MOTOR OVERLOAD
4	ICS Malfunction – Generated MW goes to 0	OP-TM-AOP-070, PRIMARY TO SECONDARY HEAT TRANSFER UPSET
5	Loss of ICS AUTO Subfeed Power (MU)	OP-TM-AOP-027, LOSS OF ATA OR ICS AUTO POWER
		OP-TM-MAP-D0201, LETDOWN CLRS OUTLET TEMP HI
		OP-TM-MAP-H0108, ICS/NNI POWER LOST
		OP-TM-211-476, SEAL INJECTION CONTROL – MU-V-32 CONSOLE OPERATIONS
		OP-TM-211-950, RESTORATION OF LETDOWN FLOW
6	Loss of offsite power, Reactor Trip, Lack of Primary to Secondary Heat Transfer	OP-TM-AOP-020, LOSS OF STATON POWER
		OP-TM-EOP-001, REACTOR TRIP
		OP-TM-EOP-004, LACK OF PRIMARY TO SECODARY HEAT TRANSFER
7	Place SBO diesel on the 1D 4160V ES bus	OP-TM-864-901, SBO DIESEL GENERATOR (EG-Y-4) OPERATIONS
8	Restore heat transfer, start Emergency Feed Pump 2A	OP-TM-424-901, EMERGENCY FEEDWATER

Scenario Set-up
NRC Scenario 1

ACTION	COMMENTS / INSTRUCTIONS	DESCRIPTION
IC-241	Initial setup for shutdown	EG-Y-1A protected equipment
Malfunction EG01A	Value: Insert When: Immediately	EG-Y-1A will not start
Remote EGR28	Value: Insert When: Immediately	Trip EG-Y-1A fuel rack
Malfunction RW02A	Value: Insert When: Event # 3	NR-P-1A Trips
Override 03A6S25-ZDINRP1BT(3)	Value: Off When: Immediately	NR-P-1B fails to autostart
Malfunction IC09	Value: Insert When: Event # 4	Generated Megawatts to 500
Malfunction IC53	Value: Insert When: Event # 4	SASS fails to actuate
Malfunction ED22C	Value: Insert When: Event # 5	Loss of ICS Auto Power Makeup Subfeed
Malfunction ED01	Value: Insert When: Event # 6	Loss of offsite power
Malfunction FW62C	Value: Insert When: Event # 6	EF-P-2B breaker fails to close
Malfunction FWR78	Value: Manual When: Event # 10	MS-V-13A Local Manual Control
Malfunction FWR79	Value: 0 When: Event # 10	MS-V-13A position to 0
Malfunction FWR80	Value: Manual When: Event #11	MS-V-13B Local Manual Control
Malfunction FWR81	Value: 0 When: Event # 11	MS-V-13B position to 0
Malfunction FW17	Value: 0 When: Event # 12	Trips EF-P-1
Remote MUR59	Value: Lifted When: Event # 13	MU-V-1A/B HI TEMP INTERLOCK LIFTED LEAD
Remote MUR60	Value: Lifted When: Event # 14	MU-V-3 HI TEMP INTERLOCK LIFTED LEAD
Remote RWR12	Value: NR-P-1B When: Event # 15	NR-P-1B ES selected

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NRC Scenario 1

Instructions:

1. Put G1-02 in PTL with info tag.
2. Place info tag on start PB for EG-Y-1
3. Ensure brief sheet is available for CRS.
4. Ensure proper CST and MUT level/pressure.
5. Ensure grid voltage monitor is off.
6. Ensure 1102-4, Enclosure 2A is complete. Ensure correct PPC points are removed from monitor.
7. Ensure copy of OP-TM-541-461 is available.

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Event Description: Normal reactor shutdown

Time	Position	Applicant's Actions or Behavior
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EXAMINER NOTE: There is no trigger for this event.**EXAMINER NOTE: This is a normal evolution to shutdown the reactor at the end of a 7 day LCO for EG-Y-1A inoperability.****EXAMINER NOTE: The crew may have briefed the shutdown prior to entering the simulator.**

	Crew	Conduct a shutdown brief.
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1102-4, POWER OPERATIONS, Section 3.3

	URO	Step 3.b.1 – Ensures the ULD is in Hand
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	URO	Step 3.b.2 – Sets the ULD Load rate of change to 1%/minute (which is at setting of 10 on the ULD load rate of change station)
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	URO	Step 3.b.2 – Sets the ULD target load demand to the desired setpoint as ordered by the CRS
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EXAMINER NOTE: The crew will perform actions from Enclosure 2B as time permits.**EXAMINER NOTE: Once sufficient power reduction is observed, go to event #2**

Op Test No.: NRC Scenario # 1 Event # 2

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Event Description: EF-P-1 oil leak

Time	Position	Applicant's Actions or Behavior
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BOOTH CUE:		When directed by the lead examiner call into the control room as the secondary operator. Inform them that there is oil on the floor in the EF-P-1 cubicle, and that it appears that EF-P-1 outboard bearing oil bubbler is empty.
EXAMINER NOTE:		The CRS should determine that EF-P-1 is inoperable and take step to ensure EF-P-1 does not automatically or manually start.
BOOTH CUE:		If Maintenance is requested to investigate, report that they are unable to maintain level in the bubbler after oil was added.
	CRS	<p>Declares tech spec 3.4.1.1.a.2</p> <p>Three EFW pumps, each capable of being powered from an OPERABLE emergency bus, and one EFW pump capable of being powered from two OPERABLE main steam supply paths:</p> <ul style="list-style-type: none"> With one EFW pump or any EFW flow path inoperable, restore the inoperable pump or flowpath to OPERABLE status within 72 hours or be in COLD SHUTDOWN within the next 12 hours.
BOOTH CUE:		<p>When ordered to place handwheel for MS-V-13A in the closed position, insert Event #10.</p> <p>When ordered to place the handwheel for MS-V-13B in the closed position, insert event #11</p> <p>If ordered to trip EF-P-1, insert event #12.</p>
EXAMINER NOTE:		Either or both methods (Tripping or closing the MS-V-13's) is an acceptable method of ensuring EF-P-1 doesn't start. The CRS may order the valves closed and EF-P-1 tripped, and then choose to follow up with an alternate form of configuration control.
	ARO	Dispatches an operator to close the handwheels for MS-V-13A/B, and to trip EF-P-1.

Op Test No.: NRC Scenario # 1 Event # 2

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Event Description: EF-P-1 oil leak

Time	Position	Applicant's Actions or Behavior
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EXAMINER NOTE:

When the technical specification is declared and the steam supplies to EF-P-1 gagged closed (and/or EF-P-1 is tripped), go to Event #3.

Op Test No.: NRC Scenario # 1 Event # 3

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Event Description: NR-P-1A Trips, NR-P-1B Fails to Auto-Start

Time	Position	Applicant's Actions or Behavior
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BOOTH CUE:		When directed by the Lead Examiner INITIATE Event #3.
INDICATIONS AVAILABLE: MAP B-1-5 and B-2-5 in alarm, NR-P-1A amber disagreement light lit on CR, PPC alarm.		
EXAMINER NOTE:	<p>Crew may decide to start NR-P-1B upon discovery of it not auto-starting IAW OS-24, Section 4.3.5.A:</p> <p>Any time an automatic control or interlock functions fails to perform as designed and there is no specific procedure direction, the reactor operator should take action to compensate directly for the failure. The Reactor Operator should verbalize the actions taken to inform the Control Room team of the condition and actions taken.</p>	
BOOTH CUE:		If directed, as an Auxiliary Operator and/or Maintenance, to investigate NR-P-1A and its breaker, acknowledge the order. Nothing will be found at the pump or breaker.
	CRS	Diagnose the trip of NR-P-1A and the failure of NR-P-1B to automatically start on standby and direct entry into OP-TM-MAP-B0105, 480V ES MOTOR TRIP
OP-TM-MAP-B0105, 480V ES MOTOR TRIP		
EXAMINER NOTE:	OP-TM-MAP-B0105, Step 1 is an IAAT statement that is expected to remain N/A for the duration of the scenario.	
	ARO	<p>Step 2: Ensures the start of the standby pump as follows:</p> <ul style="list-style-type: none"> Starts NR-P-1B by turning the Control Switch (CR) clockwise, observing red indicating light and normal running amps after initial start.
EXAMINER NOTE:	The crew may match flags for NR-P-1A (place pump in Off or Pull-to-Lock to clear overhead alarm.)	

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>3</u>	Page 15 of 32
Event Description:	NR-P-1A Trips, NR-P-1B Fails to Auto-Start					
Time	Position	Applicant's Actions or Behavior				

EXAMINER NOTE: OP-TM-MAP-B0105, Steps 3 and 4 are N/A		
	ARO	Step 5: Maintain Nuclear River header IAW OP-TM-541-461, "IC & NS Temperature Control".
OP-TM-541-461, IC & NS Temperature Control		
	ARO	<p>Step 3.2: Limitations.</p> <p>3.2.1 To prevent NR pump run-out if a NR pump trips when two NR pumps were operating, maintain NR-PI-217 pressure above the 2 PUMP OPERATION NOT PERMITTED region on Attachment 7.2.</p> <p>3.2.4 To avoid clogging of the NR strainers (i.e., keep strainer pressure > 20 psig), do not operate for extended periods (> 4 HRs) with NR-PI-217 pressure in the RESTRICTED REGION on Attachment 7.2.</p> <p>3.2.5 To prevent excessive pump wear or damage, do not operate NR pumps for extended (> 4 HRs) periods with NR-PI-217 pressure in the RESTRICTED REGION on Attachment 7.2.</p>
		Step 4.1.5: Verify NR PI-217 (CC) NR system pressure is within limits specified in Section 4.3.
		Step 4.2.7: Verify NR PI-217 (CC) NR system pressure is within the limits of Section 4.3.
EXAMINER NOTE: Nuclear River header pressure is expected to be in the proper range and therefore the steps listed to raise or lower are not scripted.		
		4.3.3 Maintain NR-PI-217 between the high and low pressure limits of Attachment 7.2...
EXAMINER NOTE: OP-TM-MAP-B0105, Step 6 is N/A		
	CRS	Step 7: Declares a 3.3.2 (72 Hour) Tech Spec clock.

Op Test No.: NRC Scenario # 1 Event # 3

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Event Description: NR-P-1A Trips, NR-P-1B Fails to Auto-Start

Time	Position	Applicant's Actions or Behavior
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EXAMINER NOTE:	<p>Tech Spec 3.3.2:</p> <p>Maintenance or testing shall be allowed during reactor operation on any component(s) in the makeup and purification, decay heat, RB emergency cooling water, RB spray, BWST level instrumentation, or cooling water systems which will not remove more than one train of each system from service.</p> <p>Components shall not be removed from service so that the affected system train is inoperable for more than 72 consecutive hours.</p> <p>If the system is not restored to meet the requirements of Specification 3.3.1 within 72 hours, the reactor shall be placed in a HOT SHUTDOWN condition within six hours.*</p>
EXAMINER NOTE:	<p>The crew may choose to enter OP-TM-541-451, Remove NR-P-1A From Service, which provides direction to swap the power supply for NR-P-1B and ES select NR-P-1B on the 1R 480V ES bus and also to close NR-V-1A.</p>
EXAMINER NOTE:	<p>Once the 72 hour tech spec is declared, go to Event #4.</p>

Op Test No.: NRC Scenario # 1 Event # 4

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Event Description: Generated Megawatts fail to 0 volts, Entry into OP-TM-AOP-070

Time	Position	Applicant's Actions or Behavior
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BOOTH CUE:		When directed by the lead examiner, insert Event #4.
EXAMINER NOTE:		The console left digital indicator will indicate 500 MWe. A large megawatt error signal will be developed which will be used for developing the header pressure modified setpoint and for developing the megawatt calibrating integral. Rods withdrawal and pressure rises.
	Crew	Recognizes entry into OP-TM-AOP-070, PRIMARY TO SECONDARY HEAT TRANSFER UPSET
OP-TM-AOP-070, Section 2.0 Immediate Manual Actions		
	URO	Step 2.1: Ensures the diamond is in MAN and inserts control rods to match gross FW flow
	ARO	Step 2.2: Ensures both SG A & B FW Demand stations on in HAND and stabilizes Tavg at current temperature.
	ARO	Step 2.3: Verifies Turbine Header pressure between 835 and 935 psig
	URO	Step 2.4: Verifies RCS pressure is lowering or less than 2205 psig. RNO: Fully open RC-V-1 and return to Auto
OP-TM-AOP-070, Section 3.0 Follow-up actions		
	Crew	Step 3.1: IAAT if a reactor trip setpoint is reached, to trip the reactor
	CRS/URO	Step 3.2: IAAT for Makeup tank level, which is NA for this scenario.
	ARO	Step 3.3: Verifies the Main Turbine is RESET

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>4</u>	Page 18 of 32
Event Description:		Generated Megawatts fail to 0 volts, Entry into OP-TM-AOP-070				
Time	Position	Applicant's Actions or Behavior				

	CRS	Step 3.4: Assigns manual control bands: <ul style="list-style-type: none"> Power within 1% of current power Tave within 2 degrees F of current Tave Turbine Header Pressure within 10 psig or current pressure.
	ARO	Step 3.5: Makes plant announcement for entry into OP-TM-AOP-070
	CRS	Step 3.6: N/A 1102-4 is already initiated
	CRS/URO	Step 3.7: Ensures the following stations in HAND: <ul style="list-style-type: none"> SG/Reactor Demand Reactor Demand SG A/B Load Ratio ULD
	ARO	Step 3.8: Verifies Main Feedwater Pump dP is greater than 30 psid.
EXAMINER NOTE:		Steps 3.9 and 3.10 are NA for this scenario
	ARO	Step 3.11: Adjusts FW flow to restore Tave to between 578F and 580F
	ARO	Step 3.12: Restores deltaTc to less than 5F
BOOTH CUE:		If the chooses to swap generated megawatt instruments, call in as SHIFT MANAGER, and report that the I&C supervisor reports that the plant must stay in manual to support troubleshooting. The plant shutdown can continue.
EXAMINER NOTE:		When the plant is stable, the scenario can continue.

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>5</u>	Page 19 of 32
Event Description:		Loss of ICS AUTO Power Makeup subfeed				
Time	Position	Applicant's Actions or Behavior				

BOOTH OPERATOR: When directed by the Lead Examiner, INITIATE Event 5.		
Indications Available: Annunciators H-1-8, D-2-1, D-2-2, and D-3-3 in alarm, various Makeup related instrumentation and controls fail midscale.		
BOOTH CUE: If directed, as an Auxiliary Operator and/or Maintenance, to investigate which ICS subfeed has been lost at the ICS Power Monitor Panel, report back that "the MU AUTO subfeed light is out, all other subfeed lights are lit".		
	Crew	Diagnoses a loss of MU AUTO Subfeed.
	CRS	Direct entry into OP-TM-MAP-H0108, ICS/NNI POWER LOST
		OP-TM-MAP-H0108, ICS/NNI POWER LOST
	CRS	Step 4.0: Goes to OP-TM-AOP-027, Loss of ATA or ICS AUTO Power
EXAMINER NOTE: OP-TM-AOP-027 is not entered in its entirety since the entry conditions are not fully met. It is used only as a reference for the affected subfeed. The CRS may also decide on using "approaching" criteria to enter MAP G-2-5 or D-2-3 for direction to restore letdown.		
BOOTH CUE: If asked, maintenance is available to support the restoration of letdown		
		OP-TM-AOP-027, Loss of ATA or ICS AUTO Power
	URO	Step 3.10: If MU-V-17 is in HAND, then INITIATE OP-TM-211-472 "Manual Pressurizer Level Control".
OP-TM-AOP-027, Loss of ATA or ICS AUTO Power		
	ARO	Step 3.11: Initiates OP-TM-211-950, "Restoration Of Letdown Flow".

Op Test No.: NRC Scenario # 1 Event # 5

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Event Description: Loss of ICS AUTO Power Makeup subfeed

Time	Position	Applicant's Actions or Behavior
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OP-TM-211-950, RESTORATION OF LETDOWN FLOW

	ARO	Reviews Precautions, Limitations, and Prerequisites.
BOOTH CUE:	If directed as an Auxiliary Operator to report Local ICCW cooler outlet temperature, respond "Local ICCW cooler outlet temperature < 100°F". There is no Local ICCW Flow indicator, so if directed to report Local ICCW cooler outlet temperature, respond that you cannot find an indicator for ICCW flow.	
EXAMINER NOTE:	OP-TM-211-950 Step 3.3.1 states to verify ICCW flow >550gpm. With ICS power to the indicator lost, the crew will need to display proper Engaged Thinking Skills to determine that flow has not changed (SOER 10-2)	
EXAMINER NOTE:	OP-TM-211-950, Steps 4.1-4.3 are N/A.	
EXAMINER NOTE:	Role Play as Shift Manager and give concurrence to restore letdown.	
	CRS	Step 4.4.1: Decides that ICS AUTO power is deenergized and obtains Shift Manager concurrence to lift leads.
BOOTH CUE:	When directed as an I&C Technician to disconnect lead 7-3-3-16 in the ICS/NNI cabinet, insert EVENT #13 and report back that lead 7-3-3-16 in the ICS/NNI cabinet is disconnected and, if applicable, that another I&C Technician has performed the Concurrent Verification.	
	ARO	Step 4.4.2: Directs an Auxiliary Operator to disconnect lead 7-3-3-16 in the ICS/NNI cabinet.
EXAMINER NOTE:	The crew may decide that Step 4.4.3 does not need to be performed because this partial loss of AUTO power has not affected MU-V-3 operations, and perform a Partial Performance of OP-TM-211-901.	

Op Test No.: NRC Scenario # 1 Event # 5

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Event Description: Loss of ICS AUTO Power Makeup subfeed

Time	Position	Applicant's Actions or Behavior
BOOTH CUE:		
If directed as an Auxiliary Operator (or I&C Technician) to disconnect lead 5-4-5-4 in the ICS/NNI cabinet, insert EVENT #14 and report back that lead 5-4-5-4 in the ICS/NNI cabinet is disconnected and, if applicable, that another Auxiliary Operator (or I&C Technician) has performed the Concurrent Verification.		
	ARO	Step 4.4.3: Directs an Auxiliary Operator to disconnect lead 5-4-5-4 in the ICS/NNI cabinet.
EXAMINER NOTE: OP-TM-211-950, Step 4.4.4 is N/A.		
	ARO	Step 4.5: Verifies MU-V-5 is closed by the Control Station demand indicator reading zero (CC), closes MU-V-3 and MU-V-4, verifying green closed lights lit and the red open lights not lit (CC).
EXAMINER NOTE: Step 4.6 is N/A.		
	ARO	Step 4.7: Verifies MU-V-1A and MU-V-1B are Open by the indicating lights for each being red (not green) (CC)
	ARO	Step 4.8.2: Verifies MU-V-2A and MU-V-2B are open by observing lights on CC are red and PCR are amber.
BOOTH CUE: If asked, MU-V-98 is not throttled open.		
	ARO	Step 4.9.2: Throttles MU-V-5 to 10% open by operating the dial on the MU-V-5 Control Station to the 10 position.
	ARO	Step 4.10: Determines MU-V-8 is aligned to the THRU position by the indication THRU TO FILTERS lit and BYPASS indication not lit (CC).

Op Test No.: NRC Scenario # 1 Event # 5

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Event Description: Loss of ICS AUTO Power Makeup subfeed

Time	Position	Applicant's Actions or Behavior
	ARO	Step 4.11.4: Opens MU-V-3 by pressing the open pushbutton until high letdown temperature alarm (D-2-1) clears, and observing the red open light lit and green closed light not lit (CC)
EXAMINER NOTE: OP-TM-211-950, Steps 4.12 and 4.13 require no action.		
OP-TM-AOP-027, Loss of ATA or ICS AUTO Power		
	URO	Step 3.12: If MU-V-32 is in HAND, then INITIATE OP-TM-211-476 "Seal Injection Control – MU-V-32 Console Operations".
OP-TM-211-476, Seal Injection Control - MU-V-32 Console Operations		
	URO	Step 4.2.1: Manually control SI flow using MU-V-32 H/A station as follows: PLACE MU-V-32 in HAND by pressing White HAND PB on the MU-V-32 Bailey Control Station (CC)
	URO	Step 4.2.2: Determines that the White HAND light and RED AUTO lights are not Lit on the MU-V-32 Bailey Control Station (CC).
BOOTH CUE: If contacted as an Auxiliary Operator to determine Seal Injection flow locally, go to the a RCP screen on the simulator computer, read seal injection, then multiply by 4 to report total seal injection.		
	URO	Step 2.4.3: ADJUST Seal Injection Flow (MU42-FI1)(CC) using the toggle switch in the up and/or down directions, as necessary at the MU-V-32 Bailey Control Station (CC).
EXAMINER NOTE: Once letdown is being restored and Seal Injection is controlled properly, Go to Event 6.		

Op Test No.: NRC Scenario # 1 Event # 6/7/8

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Event Description: Loss of Offsite Power, Reactor Trip, Lack of Primary to Secondary Heat Transfer

Time	Position	Applicant's Actions or Behavior
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BOOTH CUE: When directed by the lead examiner, insert event 6. Ensure EF-P-1 is tripped (EVENT 12) if not done in Event 2

EXAMINER NOTE: The crew will recognize we lost offsite power by the reactor trip, and the control room lights de-energizing. Since only ½ the lights will re-energize, the crew will recognize that the 1D 4160V bus did not repower because its associated diesel generator, EG-Y-1A is OOS.

BOOTH CUE: After the reactor trip is announced, perform the OS-24 actions that the Auxiliary Operators would normally perform.

	Crew	Recognizes and diagnoses a loss of offsite power and performs OP-TM-EOP-001 Immediate Actions.

OP-TM-EOP-001, Reactor Trip, Section 2.0 Immediate Actions

	URO	Step 2.1: Presses both Reactor Trip and DSS pushbuttons
	URO	Step 2.2: Verifies the reactor is shutdown.
	URO	Step 2.3: Presses the turbine trip pushbutton
	URO	Step 2.4: Verifies the turbine stop valves are Closed.

OP-TM-EOP-001, Section 3.0 Vital System Status Verification (VSSV)

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Op Test No.: NRC Scenario # 1 Event # 6/7/8

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Event Description: Loss of Offsite Power, Reactor Trip, Lack of Primary to Secondary Heat Transfer

Time	Position	Applicant's Actions or Behavior
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EXAMINER NOTE: Entry into OP-TM-EOP-004, Lack of Primary to Secondary Heat Transfer is through the performance of a symptom check. The crew may choose to enter via the first performance, or through a subsequent symptom check based on incore temperature trends at the time of the check. Either option is acceptable.

EXAMINER NOTE: After recognition, the CRS should prioritize OP-TM-EOP-004, and OP-TM-AOP-020 actions to place the SBO diesel on the 1D 4160V ES bus. The crew may choose to attempt to start Emergency Feedwater Pump 2B, EF-P-2B. The breaker will not close due to malfunctions entered. The crew may choose continue to monitor the lack of heat transfer symptom until they have come to the conclusion that NO FEEDWATER is available.

	ARO	Step 3.1: Performs a symptom check. Based on incore temperature rising, and no feedwater available, recognizes a lack of primary to secondary heat transfer is occurring.

OP-TM-EOP-004, Lack of Primary to Secondary Heat Transfer, Section 3.0

	URO	Step 3.1: Ensure no more than 1 RCP running per loop. No action taken as the LOOP caused all RCP's to turn off.
	ARO	Step 3.2: Initiate OP-TM-424-901, "Emergency Feedwater".

OP-TM-424-901, EMERGENCY FEEDWATER

	ARO	Step 4.2: If not Emergency Feedwater pumps are operating, and automatic HSPS/EFW actuation has occurred, the PLACE the EF-V-30 valves in Hand, with Zero Demand. Examinee presses the 'M' button on all four EF-V-30 controllers and lowers demand to zero. Examinee could pin each of the toggle switches in the close position.

OP-TM-EOP-004, Lack of Primary to Secondary Heat Transfer, Section 3.0

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>6/7/8</u>	Page 25 of 32
Event Description:		Loss of Offsite Power, Reactor Trip, Lack of Primary to Secondary Heat Transfer				
Time	Position	Applicant's Actions or Behavior				

	ARO	Step 3.3: Ensure reactor trip announcement.
	Crew	Step 3.4: IAAT time step for after primary to secondary transfer is established. This step will be used after the 1D 4160V ES bus is loaded onto the SBO diesel.
	Crew	Step 3.5: IAAT step to go to OP-TM-EOP-009, HPI Cooling if SCM approaches 25F. This step should be NA for this scenario.
	CRS/URO	Step 3.6: If RCS pressure approaches 2450 psig, and feedwater is available, the URO will ENSURE the PORV block valve is OPEN, then OPEN and deep seat the PORV.
	Crew	Step 3.7: IAAT step for when FEEDWATER is available. This step will be applicable after EF-P-2A is started.
	Crew	Step 3.8: IAAT RCS pressure approaches 2450 psig and FEEDWATER is not available, GO TO OP-TM-EOP-009, "HPI Cooling". This step is expected to be N/A for this scenario
	Crew	Step 3.9: Condensate booster pump cooling is not an option for this scenario due to no condensate booster pumps or reactor coolant pumps running.
	Crew	Step 3.10: When FEEDWATER is available, then continue. This is a hold point until the 1D 4160V ES bus is loaded onto the SBO diesel and EF-P-2A is started.
OP-TM-AOP-020, Loss of Station Power, Section 3.0 Follow up actions		
	ARO	Step 3.1: Initiate OP-TM-424-901, "Emergency Feedwater"
	ARO	Step 3.2: Initiate both OP-TM-861-901 and OP-TM-861-902 for EG-Y-1A and EG-Y-1B Operations.

Op Test No.: NRC Scenario # 1 Event # 6/7/8

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Event Description: Loss of Offsite Power, Reactor Trip, Lack of Primary to Secondary Heat Transfer

Time	Position	Applicant's Actions or Behavior
	ARO	Step 3.3: Verify 1D 4160V and 1E 4160V busses are energized – RNO <ul style="list-style-type: none"> • Initiate OP-TM-864-901 "SBO Diesel Generator (EG-Y-4) Operations • If either ES 4160V bus is available, then Continue
EXAMINER NOTE: The CRS should prioritize SBO diesel operations to power the 1D 4160V ES bus. Once the 1D 4160V ES bus is energized, EF-P-2A can be started and feedwater established.		
OP-TM-864-901, SBO Diesel Generator (EG-Y-1A) Operations		
	ARO	Verifies precautions, limitations, and prerequisites
	ARO	Step 4.1.1: Verify 1D 4160V bus is de-energized.
	ARO	Step 4.1.2: The PPC is available, verify S2072, 4kV bus 1D overcurrent, is NORM.
	ARO	Step 4.1.3: Ensure 1SA-D2 and 1SB-D2 are OPEN
	ARO	Step 4.1.4: Ensure the following control switches are in PTL: <ul style="list-style-type: none"> A. BS-P-1A B. The ES selected MU pump: MU-P-1A or MU-P-1B-D C. DH-P-1A D. RR-P-1A E. EF-P-2A
	ARO	Step 4.1.5: PRESS and HOLD for approximately 8 seconds the START PB for the SBO Diesel Generator
	ARO	Step 4.1.6: Generator voltage will be between 4.1 and 4.3 kV. No action taken.
	ARO	Step 4.1.7: Generator frequency is between 59 and 61 Hz. No action taken.

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>6/7/8</u>	Page 27 of 32
Event Description:		Loss of Offsite Power, Reactor Trip, Lack of Primary to Secondary Heat Transfer				
Time	Position	Applicant's Actions or Behavior				

	ARO	Step 4.1.8: ENSURE G1-02 is in PTL
	ARO	Step 4.1.9: Place T1-C2 in PTL.
	ARO	Step 4.1.10: Close G2-12 (EG-Y-4 output breaker)
	ARO	Step 4.1.11: Close T1-D2 (1F 4160V bus cross tie to 1D 4160V)
	ARO	Step 4.1.12: GO TO Section 4.4
EXAMINER NOTE: After the SBO is powering the 1D 4160V ES bus, the CRS and ARO should prioritize starting EF-P-2A to restore feedwater.		
EXAMINER NOTE: The crew could choose to restore seal injection via two methods. The crew could choose to restore SI while the 1D 4kV bus is de-energized, which would drive them to starting MU-P-1C. The crew could decide to wait until the 1D 4kV bus is powered from the SBO diesel, and then start MU-P-1A. Either method is acceptable to meet the critical task.		
OP-TM-AOP-041, LOSS OF SEAL INJECTION (for starting either MU-P-1A or 1C)		
	URO	Step 3.1: IAAT if SI and ICCW flow are lost. N/A for this event.
	URO	Step 3.2: IAAT for seal cooling lost for > 30 mins. N/A for this event.
	URO	Step 3.3: ENSURE MU-V-32 is in hand and closed. Examinee will use the toggle switch to close MU-V-32.
	URO	Step 3.4: When 1D or 1E 4160V bus is energized, then continue. Examinee determines that the 1D and/or 1E 4160 V bus is energized and continues.

Op Test No.:	NRC	Scenario #	1	Event #	6/7/8	Page 28 of 32
Event Description: Loss of Offsite Power, Reactor Trip, Lack of Primary to Secondary Heat Transfer						
Time	Position	Applicant's Actions or Behavior				

	URO	Step 3.5: Verify a makeup pump is operating and aligned to seal injection. Examinee determines that no makeup pump is running and goes to the RNO.
	URO	Step 3.5 RNO1: ENSURE MU-V-3 is closed. Examinee presses green pushbutton on CC. Green pushbutton lights, the red push button extinguishes. Letdown is isolated.
	URO	Step 3.5 RNO2: ENSURE MU-V-17 is closed. Examinee presses HAND button on MU-V-17. The white light becomes bright and red AUTO light extinguishes. Examinee closes the valves with the toggle switch.
	URO	Step 3.5 RNO3: Examinee verifies MU tank level is >40".
	URO	Step 3.5 RNO4: Examinee verifies MU tank level was never below 18" by looking at the trend on CC.
	URO	Step 3.5 RNO5: If MU-V-77A & B are open, then GO TO section 4.0. Examinee goes to section 4.0.
EXAMINER NOTE		If the crew waits until the 1D 4160 kV bus is powered from the SBO diesel, they will perform Section 4.0. If they choose to start MU-P-1C, the crew will perform the applicable steps of section 4.0, then go to the RNO of step 4.4.
OP-TM-AOP-041, LOSS OF SEAL INJECTION, section 4.0		
	URO	Step 4.0: MU-V-77A & B are open. N/A for this event.
	URO	Step 4.1: Ensure MU-P-1A is ES selected. Examinee may determine from normal configuration control that MU-P-1A is ES selected, or dispatch an operator to verify.

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>6/7/8</u>	Page 29 of 32
Event Description:		Loss of Offsite Power, Reactor Trip, Lack of Primary to Secondary Heat Transfer				
Time	Position	Applicant's Actions or Behavior				

	URO	Step 4.2: Verify that MU-V-36 and MU-V-37 are open. Examinee determines from CC (red light lit, green light extinguished) or PCR (amber light lit, blue light extinguished) that MU-V-36 and MU-V-27 are open.
	URO	Step 4.3: ENSURE DR-P-1A and DC-P-1A are operating. Examinee starts both pumps on CC by taking the pistol grip to the start position and ensuring the red light becomes bright and the green light extinguishes.
CT-30	URO	Step 4.4: Start MU-P-1A. Examinee starts MU-P-1A by taking the pistol grip on CC to the start position. The red light becomes bright, and the green light extinguishes.
EXAMINER NOTE:		<p>If the crew chooses to start MU-P-1C, the will perform the following section. There are two paths available to start MU-P-1C. If the examinee/crew decides that MU-P-1B may be started from its current power supply, the crew will go to Section 5.0. In Step 5.1, the operator verifies that the 1E 4160V bus feeder from offsite power is closed, which it is not. The crew will then GO TO section 6.0.</p> <p>The crew may choose to go right to section 6.0 based on the knowledge that while MU-P-1B may technically be started on its current power supply, that the procedure will have the crew start MU-P-1C instead, based on the feeder breaker from offsite power to the 1E 4160V bus. Either choice is acceptable. Only the section from starting MU-P-1C will be scripted here.</p>
BOOTH CUE:		When dispatched, use the soft panels to open MU-V-76A&B, then report that they are open to the control room.
OP-TM-AOP-041, LOSS OF SEAL INJECTION, SECTION 6.0		
	URO	Step 6.0: Examinee will dispatch an operator to open MU-V-76A&B.
	URO	Step 6.1: Examinee ensures MU-P-1C is ES selected by using normal configuration control and or dispatching an operator to the 1E 4160V bus.

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>6/7/8</u>	Page 30 of 32
Event Description:		Loss of Offsite Power, Reactor Trip, Lack of Primary to Secondary Heat Transfer				
Time	Position	Applicant's Actions or Behavior				

	URO	Step 6.2: Verify that MU-V-36 and MU-V-37 are open. Examinee determines from CC (red light lit, green light extinguished) or PCR (amber light lit, blue light extinguished) that MU-V-36 and MU-V-27 are open.
	URO	Step 6.3: ENSURE DR-P-1B and DC-P-1B are operating. Examinee starts both pumps on CR by taking the pistol grip to the start position and ensuring the red light becomes bright and the green light extinguishes.
CT-30	URO	Step 6.4: Start MU-P-1C. Examinee starts MU-P-1C by taking the pistol grip on CR to the start position. The red light becomes bright, and the green light extinguishes.
	URO	Step 6.5: Examinee waits until report of MU-V-76A & B being open, then goes to step 3.5.
OP-TM-864-901, Section 4.4, While EG-Y-4 is loaded (UNIT Ops) on a 4160V bus		
	ARO	Step 4.4.1: To start EF-P-2A: <ol style="list-style-type: none"> 1. Verify ESAS is defeated or not actuated 2. Verify HSPS is defeated or not actuated 3. Start one large ES motor 4. Verify affected bus voltage is > 4100 volts
EXAMINER NOTE:		Once EF-P-2A is started, the CRS should continue in OP-TM-EOP-004 and Rule 4 of OP-TM-EOP-010 to establish feeding and steaming of both OTSG's.
OP-TM-EOP-004, Section 3.0		
	ARO	Step 3.11: IAAT OTSG pressure < 750 psig, then DEFEAT HSPS Lo-Lo Pressure MFW Isolation.
	URO	Step 3.12: IAAT all RCPs are off then INITIATE Guide 7, "RCP Restart"

Op Test No.: NRC Scenario # 1 Event # 6/7/8Page **31** of **32**

Event Description: Loss of Offsite Power, Reactor Trip, Lack of Primary to Secondary Heat Transfer

Time	Position	Applicant's Actions or Behavior
	ARO	Step 3.14: REDUCE OTSG Pressure so that secondary Tsat is 40 to 60°F lower than incore thermocouple temperature.
	EXAMINER NOTE:	Step 3.14 is N/A. With EFW flow, RCS pressure should be lowering
	ARO	Step 3.15: REDUCE OTSG Pressure so that the secondary Tsat is 90 to 100°F lower than incore thermocouple temperature.
	ARO	Step 3.16: RAISE OTSG level to 75 to 85% operating range with EFW.
	Crew	Step 3.17: ENSURE performance of an alarm review.
	EXAMINER NOTE:	If asked to evaluate EALs, acknowledge the order.
	CRS	Step 3.18: REQUEST SM evaluate Emergency Action Levels (EALs).
	Crew	Step 3.19: When primary to secondary heat transfer has been restored, then CONTINUE.
	EXAMINER NOTE:	Primary to secondary heat transfer will be present after natural circulation is verified. OP-TM-EOP-004 steps to reduce OTSG pressure, and raise OTSG level are performed to establish and strengthen natural circulation. Natural Circulation may have been verified prior to this point.
	OP-TM-EOP-010, Rule 4	
	ARO	Step 1: Examinee determines only one EFW pump is available and enters the RNO to maintain flow less than < 515 gpm. EFW flow can be totaled by using the EF-V-30 controller flow or using the PPC.
	ARO	Step 2: Examinee verifies SCM is greater than 25F on the PPC.

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>6/7/8</u>	Page 32 of 32
Event Description:		Loss of Offsite Power, Reactor Trip, Lack of Primary to Secondary Heat Transfer				
Time	Position	Applicant's Actions or Behavior				

	ARO	Step 3: Examinee verifies neither OTSG is dry.
	ARO	Step 4: Examinee determines that no RCP is running and OTSG level is not > 50% in the operating range. Examinee enters RNO to feed at maximum rate permitted (515 gpm in this case).
OP-TM-EOP-010, Guide 10		
CT-12	URO	<p>Guide 10: If all of the following conditions exist, then adequate natural circulation is present:</p> <ul style="list-style-type: none"> – RCS THOT minus TCOLD stabilizes at less than 50 °F. – THOT < 600 °F. – Incore temperature stabilizes and tracks THOT. – Cold leg temperatures approach saturation temperature for secondary side pressure. – OTSG heat removal is indicated by feeding or steaming with stable OTSG pressure. – SCM > 25F.
EXAMINER NOTE:		Once natural circulation is verified, the scenario is can be terminated.

Facility:	Three Mile Island	Scenario No.:	2	Op Test No.:	<u>TMI-2017-1</u>
Examiners:			Operators:		
Initial Conditions:					
	<ul style="list-style-type: none"> 85% power, MOL, load following 				
	<ul style="list-style-type: none"> EG-Y-1A is 2 days into a 6 day system outage 				
	<ul style="list-style-type: none"> Feedwater pump control is on the MSC 				
Turnover:					
	Maintain 85% power				
Critical Tasks:					
	<ul style="list-style-type: none"> Trip All Reactor Coolant Pumps (CT-1) 				
	<ul style="list-style-type: none"> Reduce Steaming/Isolate Affected SGs (CT-22) 				
Event No.	Malf. No.	Event Type*	Event Description		
1	ES08A	TS CRS I URO I ARO	Inadvertent 1600# ES actuation, "A" train, enter OP-TM-AOP-046 (URO: AOP-046 IMA's, ARO: Restores Letdown)		
2	TH17A	TS CRS R URO	'A' OTSG Tube Leak, TS call, Reactivity manipulation (URO: Lowers power)		
3	TH13C	C CRS C ARO	RC-P-1C High Vibrations (ARO: Secures RCP)		
4	IC63	I CRS I URO I ARO	Feedwater fails to re-ratio on loss of RCP		
5	TH16A	M CRS M URO M ARO	'A' OTSG tube rupture, requiring HPI initiation, entry into OP-TM-EOP-001		
6	MU23A	C CRS C URO	MU-P-1A fails to start on ES (URO: Starts MU-P-1A)		
7		C CRS C URO C ARO	Loss of SCM, entry into OP-TM-EOP-002, then return to OP-TM-EOP-005 (URO: Rule 1, ARO: Steams 'A' OTSG)		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

Three Mile Island NRC Scenario #2

Event #1: The Lead Examiner will cue the Inadvertent 1600# ESAS Signal. The crew must quickly recognize the condition and perform the required Immediate Manual Actions of OP-TM-AOP-046, INADVERTENT ESAS ACTUATION, to minimize the RCS pressure transient and pressurizer in-surge due to HPI. Additionally, while at power, immediately reducing HPI also minimizes the possibility of a reactor trip on high RCS pressure.

The crew will diagnose the Inadvertent "A" 1600# ESAS Signal by multiple annunciators in alarm, "A" Train components in their ES actuated state, and/or "A" EDG running, while all primary indications appear steady or rising (RCS pressure not at 500#).

The URO will perform the Immediate Manual Actions of OP-TM-AOP-046, INADVERTANT ESAS. The ARO will restore letdown IAW OP-TM-211-950 (performing the appropriate portion of the procedure when restoring from isolation following an ESAS signal).

Once the plant is stabilized and Letdown is restored, the scenario can continue.

Event #2: The Lead Examiner will cue the 'A' OTSG Tube Leak. Any OTSG tube leak causes an abnormal increase in the release of radioactive materials to the environment. The most fundamental objective is to minimize this release. The prioritized objectives of this procedure are:

- Maintain core cooling.
- Minimize the activity release to the atmosphere (minimize release duration, rate and concentration of radioisotopes, particularly iodine)
- Minimize the integrated tube leakage

The crew will diagnose an OTSG tube leak based on RM-G-26, RM-A-5, and RM-A-15 indications (PR), Annunciator C-1-1 in alarm, and/or pressurizer level lowering (CC). The CRS will announce entry into OP-TM-EOP-005, OTSG TUBE LEAKAGE. This is a reactivity manipulation event. The URO will perform reactor shutdown with ICS in Auto. The ARO may lineup to feed to the RCS from the "B" RBCT for inventory control. The CRS will evaluate and declare Tech Spec 3.1.6.3

When sufficient reactivity manipulation has been observed, the scenario can continue.

Event #3/4: The lead examiner will cue the RC-P-1C high vibrations. Vibrations will slowly worsen until they the motor exceeds 7 mils and pump exceeds 20 mils.

The CRS will enter OP-TM-PPC-L3124, and request the Shift Manager establish a duty team call within 30 minutes.

Time compression will be used, and the Shift Manager will report that the duty team directed the crew to shutdown RC-P-1C in accordance with OP-TM-226-153.

Scenario Set-up
NRC Scenario 2

The crew will lower power to less than 75% and secure RC-P-1C. Upon securing RC-P-1C, feedwater will fail to re-ratio requiring ICS to be placed in manual in accordance with OP-TM-621-471, down to the feedwater loop masters.

When the crew has completed the re-ratio of feedwater the scenario can continue.

Event #5: The Lead Examiner will cue the "A" OTSG Tube leakrate rising to approximately 500 gpm. The CRS will direct the initiation of High Pressure Injection and will continue with the shutdown. If the level in the Pressurizer goes below 150", then the CRS will enter OP-TM-EOP-001 to direct the Immediate Manual Actions, and then continue in OP-TM-EOP-005, OTSG Tube Leak.

Event #6/7: Makeup Pump, MU-P-1A will fail to start on the ES actuation. The URO must manually start MU-P-1A.

After the reactor trip, 25F subcooling margin will be lost and the crew will enter OP-TM-EOP-002, Loss of 25F subcooling margin. The crew will perform Rule 1 and initiate a cooldown in accordance with Guide 11.

When that is complete, the crew will return to OP-TM-EOP-005 for the OTSG 'A' tube leakage.

Termination: The scenario can be terminated when the crew has begun to preferentially steam the 'A' OTSG in OP-TM-EOP-005, OTSG TUBE LEAKAGE.

B&W Unit EOP Critical Task Description Document, 47-1229003-04:

CT-1 - Trip All RCPs - requires that the RCPs be tripped within 1 minute of Loss of Sub Cooling Margin, IAW OP-TM-102-106 reference FSAR 14.2.2.4.

Safety Significance: SBLOCA analyses were performed using conservative Appendix K assumptions with the objective of meeting 10 CFR50.46 criteria. These analyses predicted that continued RCP operation, during certain SBLOCAs, could lead to RCS void fractions of 70% if RCPs continued to operate longer than [1 or 2] minutes following initiation of the SBLOCA. The analyses predicted that if RCPs were tripped after these high void fractions occurred, the core would not be adequately covered and fuel clad failure would occur.

Cues:

1. SCM meter reading less than 25F
2. P-T Display and associated alarms
3. Low RCS Pressure alarms

Performance Indicators:

1. Operation of all console RCP trip devices

Feedback:

1. Report by the URO to the crew that RULE 1 has been completed

Scenario Set-up
NRC Scenario 2

CT-22 – Reduce Steaming/Isolate Affected SGs (includes use of SG drains) –
Steam affected SGs to maintain level < [overflow setpoint]. If steaming alone cannot prevent SG fill, then use SG drains (if available) to maintain SG level below [overflow setpoint]. Isolate SG(s) if steaming and draining cannot prevent overflow and maintain RCS and isolated SG pressures < 1000 PSIG by use of [primary and secondary relief paths].

- Isolating Affected SGs outside of the following limits should be considered grounds for failure of the critical task:
 - Do not allow isolation to occur with RCS pressure > 1000 psig.
 - Do not allow the RCS to re-pressurize > 1000 psig with an isolated OTSG.

Safety Significance: The more probable tube rupture scenario is a tube leak in one SG with both SGs available. The preferred mitigation strategy is therefore isolation of the affected SG following the initial cooldown and depressurization to <1000 PSIG. This limits the radiological consequences of the event, but does require cooldown to DHRS operation using one SG.

Both SGs are always used in the initial cooldown and depressurization to < 1000 PSIG. Prevention of MSSV lift on the affected SG(s) is integral to the goal of minimizing off-site release, and assurance requires RCS temperatures at or below 500°F in order to maintain SCM when RCS pressure is < 1000 PSIG. Once this initial cooldown and RCS depressurization to <1000 PSIG is completed, then SG isolation can be considered.

There are limitations on continued steaming of a SG with a SGTR. These limitations consider the overriding concerns of SGTR transients that dictate the isolation of the SG(s) and initiation of HPI cooling, if necessary. These limits are based on integrated radiation dose reaching predetermined values and SG filling due to tube leakage despite steaming to achieve maximum allowable cooldown rate.

SGs isolated due to SG fill criteria pose concerns related to liquid passing through MSSVs. MSSVs should be prevented from passing liquid, since their failure to reseal becomes more probable. For this reason, RCS and SG pressures are maintained <1000 PSIG by use of [primary and secondary relief paths]. These relief paths may include such things as letdown, PZR vents, HPVs, the PORV, TBVs and ADVs.

Cues:

1. Rising OTSG level
2. Rad Monitor Alarms
3. Lowering Pressurizer level
4. Lowering RCS Pressure
5. Automatic initiation of HPI

Scenario Set-up
NRC Scenario 2

Performance Indicators:

1. Operation of TBV/ADV controls

Feedback:

1. SG(s) level and pressure
2. RCS pressure
3. MFW/EFW flow
4. MFW/EFW pump and valve status indication
5. TBV/ADV status indication
6. RCS pressure is maintained less than 1000 psig

Industry Experience:

- Indian Point 2 (2/15/00) – Steam Generator Tube Failure (380 litres per minute)
- Palo Verde 2 (3/14/93) – Steam Generator Tube Leak ranged between 11 and 39 litres per day, suddenly turned to 900 litres per minute tube rupture.

PRA

- Steam Generator Tube Rupture (Initiating Event)

Scenario Set-up
NRC Scenario 2

Event	Description	Procedure Support
	Initial Setup	85% Power, MOL
1	Inadvertent 1600# ESAS	OP-TM-AOP-046, Inadvertent ESAS Actuation
		Tech Spec 3.5.1.1
2	~30 gpm "B" OTSG Tube Leak	OP-TM-EOP-005, OTSG Tube Leak
		OP-TM-EOP-010, Emergency Procedure Rules, Guides and Graphs
		1102-4, Power Operations
3	RC-P-1C High Vibrations	OP-TM-PPC-3124, RC-P-1C HIGH VIBRATION
		1102-4, Power Operations
4	Feedwater fails to re-ratio	OP-TM-621-471, ICS MANUAL CONTROL
5	~500 gpm "B" OTSG Tube Rupture	OP-TM-EOP-001, Reactor Trip
		OP-TM-EOP-010, Emergency Procedure Rules, Guides and Graphs
		OP-TM-EOP-005, OTSG Tube Leak
6	Loss of 25F Subcooling Margin	OP-TM-EOP-002, Loss of 25F Subcooling Margin

Scenario Set-up
NRC Scenario 2

ACTION	COMMENTS / INSTRUCTIONS	DESCRIPTION
Initialization IC-242	85% HFP ICS in AUTO	Equilibrium XENON Tags and protected equipment for EG-Y-1A
Malfunction EG01A	Value: Insert When: Immediately	EG-Y-1A will not start
Malfunction EGR28	Value: Insert When: Immediately	Trip EG-Y-1A fuel rack
Malfunction ES07A	Value: Insert When: Event #1	Inadvertent 'A' side ESAS actuation
Trigger #10	Value: DMF ES07A When: dhndhp1a > 0.9	Removes Inadvertent 'A' ESAS actuation
Malfunction TH17A	Value: 0.2 When: Event #2	~ 30 GPM tube leak 'A' OTSG
Malfunction TH13C	Value: 40% over 120 sec When: Event #3	RC-P-1C High Vibrations
Malfunction IC63	Value: Insert When: Immediately	Feedwater fails to re-ratio
Malfunction TH16A	Value: 4.7 Ramp 180 secs When: EVENT 5	"A" OTSG Tube Rupture
Remote MSR66	Value: Insert When: EVENT 11	Initiate Aux Boilers
Remote FWR78	Value: MAN When: EVENT 12	MS-V-13B Manual Control
Remote FWR79	Value: 0 When: EVENT 12	MS-V-13B Closed Position
Trigger #20	When: ratpw < 20 Command: mmf TH16A 15 60	Modifies TH16A to lose subcooling margin after trip.
Malfunction MU23A	Value: Event #5 When: Immediately	MU-P-1A fails to start on ES.

Instructions:

1. Put G1-02 in PTL with info tag.
2. Place info tag on start PB for EG-Y-1A
3. Ensure LO-P-8A and 8B are running.
4. Ensure procedure copies of OP-TM-226-153 are available.

Op Test No.:	<u>NRC</u>	Scenario #	<u>2</u>	Event #	<u>1</u>	Page 9 of 27
Event Description:	Inadvertent 'A' Train ES 1600# Actuation					
Time	Position	Applicant's Actions or Behavior				

BOOTH OPERATOR: When directed by the Lead Examiner INITIATE EVENT 1.		
Indications Available: Multiple Main Annunciator Panel Alarms illuminated, MU-P-1A running, ES positions indicated on PCR for "A" Train components.		
EXAMINER NOTE: When maintenance is requested to investigate, wait until the appropriate time and report that loose coils in the actuation circuitry cause the ES actuation.		
	Crew	Diagnoses an Inadvertent ES Actuation, "A Train 1600#.
	CRS	Direct entry into OP-TM-AOP-046, Inadvertent ESAS Actuation.
OP-TM-AOP-046, Inadvertent ESAS Actuation		
	URO/ARO	Step 2.1 (IMA): Defeats invalid ESAS signals by pressing "Defeat / Enable" pushbuttons for each of three channels, verifying that the amber "Defeat" light is lit for each channel and the blue Block load lights are not lit for each channel (PCR).
	URO	Step 2.2 (IMA): Determines that MU-P-1A is not required for seal injection and secures it by rotating the Control Switch in the counter-clockwise direction and verifying the green flag indicator is visible, and that the green Off light is lit and the red Running light is not lit.
EXAMINERS NOTE: Once MU-P-1A is secured, MU-V-16A and MU-V-16B will have flow based on MU-P-1B operating.		
	URO	Step 2.3 (IMA): Throttles MU-V-16A / 16B with HPI flow to maintain MU-P-1B flow > 115 gpm.
	ARO	Step 3.1: Announces entry into OP-TM-AOP-046, "Inadvertent ESAS Actuation" over the plant page and radio.

Op Test No.: NRC Scenario # 2 Event # 1

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Event Description: Inadvertent 'A' Train ES 1600# Actuation

Time	Position	Applicant's Actions or Behavior
	CRS	Step 3.2: IAAT for ICCW flow. NA for this scenario.
	URO	Step 3.3: Ensures MU-V-36 is Open by pressing the open pushbutton and verifying the red open light is lit and the green closed light is not lit (CC). MU-V-37 is already open, evidenced by red open light lit and green closed light not lit (CC).
EXAMINERS NOTE: Steps 3.4 through 3.6 are N/A		
	URO	Step 3.7: Verifies MU-V-36 and MU-V-37 are Open.
	URO	Step 3.8: If MU-V-77A & 77B are OPEN, then perform the following: <ul style="list-style-type: none"> • ENSURE MU-V-16A is Closed • ENSURE MU-V-16B is Closed
EXAMINERS NOTE: Steps 3.9 and 3.10 are N/A		
	URO	Step 3.11: Ensures MU-V-14A is Closed by pressing the close pushbutton and verifying the green closed light is lit and the red open light is not lit (CC). MU-V-14B is already closed, evidenced by green closed light lit and red open light not lit (CC).
	CRS/URO	Step 3.12: IAAT step to ensure rods stay in desired bands. As scenario progresses, rods could pull and the URO could lower power and control rods with this step.
	ARO	Step 3.13: If at power, then ENSURE two Secondary River pumps are running.
	ARO	Step 3.14: INITIATE an alarm review.
	ARO	Step 3.15: Initiates OP-TM-211-950, "Restoration of Letdown Flow."

Op Test No.: NRC Scenario # 2 Event # 1

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Event Description: Inadvertent 'A' Train ES 1600# Actuation

Time	Position	Applicant's Actions or Behavior
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OP-TM-211-950, Restoration of Letdown Flow		
	ARO	Section 3.0: Reviews Precautions, Limitations, and Prerequisites.
BOOTH CUE: If contacted to verify integrity of Letdown Line, state "The integrity of the Letdown Line to MU-T-1 has been assessed and the Letdown line is intact".		
EXAMINERS NOTE: Steps 4.1 through 4.4 are N/A.		
	ARO	Step 4.5: Ensures: <ul style="list-style-type: none"> • MU-V-3 is closed by observing green closed light lit, red open light not lit. • MU-V-4 is closed by pressing the green closed light, observing green closed light lit, red open light not lit. • MU-V-5 is closed by pressing the Control Station toggle switch in the downward direction, observing the carrot position indicator is pointing to zero.
EXAMINERS NOTE: Step 4.6 is N/A		
	ARO	Step 4.7: Verifies MU-V-1A and MU-V-1B are Open by the indicating lights for each being red (not green) (CC)
	ARO	Step 4.8: Opens MU-V-2A and MU-V-2B below:
	ARO	Step 4.8.2: Verifies MU-V-2A and MU-V-2B are Open by the indicating lights for each being red (not green) (CC)
	ARO	Step 4.9.2: Throttles MU-V-5 to 10% open by operating the dial on the MU-V-5 Control Station to the 10 position.
	ARO	Step 4.10: Verifies MU-V-8 is aligned to the Thru position by the indication Thru to filters lit and Bleed indication not lit (CC)

Op Test No.: NRC Scenario # 2 Event # 1

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Event Description: Inadvertent 'A' Train ES 1600# Actuation

Time	Position	Applicant's Actions or Behavior
	ARO	Step 4.11: Opens MU-V-3 by pressing the open pushbutton and observing the red open light lit and the green closed light not lit (CC)
EXAMINERS NOTE: Step 4.12 for OP-TM-541-901 is a procedure that is always open in the CR. Step 4.13 Letdown temperature is maintained < 125F.		
	ARO	Step 4.14: Raises letdown flow at < 2.5 gpm/min to desired flow by operating the dial on the MU-V-5 Control Station in the clockwise direction to open MU-V-5 gradually.
OP-TM-AOP-046, Section 3.0		
EXAMINER NOTE: Step 3.16 is N/A		
	CRS	Step 3.17: Declares a 3.5.1.1 (24 Hours) Tech Spec LCO time clock.

Op Test No.: NRC Scenario # 2 Event # 1

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Event Description: Inadvertent 'A' Train ES 1600# Actuation

Time	Position	Applicant's Actions or Behavior
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EXAMINERS NOTE: Tech Spec 3.5.1.1 The reactor shall not be in a startup mode or in a critical state unless the requirements of Table 3.5-1, Column "A" and "B" are met, except as provided in Table 3.5-1, Column "C". Specification 3.0.1 applies.

**TABLE 3.5-1
INSTRUMENTS OPERATING CONDITIONS
C. Engineered Safety Features**

Functional Unit	(A) Minimum Operable Channels	(B) Minimum Degree of Redundancy	(C) Operational Action if Conditions of Column A and B Cannot Be Met
Engineered Safety Features: 1.a Reactor Coolant Pressure Instrument Channels	2	1(b)	(a)

(a) Restore the conditions of Column (A) and Column (B) within an additional 6 hours and COLD SHUTDOWN within the following 24 hours.

Time	Position	Applicant's Actions or Behavior
<p>EXAMINER NOTE:</p>		

Once the CRS has determined the Tech Spec, or as the lead examiners discretion, inform the CRS that the cause of the Inadvertent ES has been fixed.

Time	Position	Applicant's Actions or Behavior
<p>EXAMINERS NOTE:</p>		

Once Letdown has been restored, Go to Event #2.

Op Test No.: NRC Scenario # 2 Event # 2

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Event Description: 'A' OTSG Tube Leak

Time	Position	Applicant's Actions or Behavior
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BOOTH CUE: When directed by the Lead Examiner INITIATE Event #2.**Indications Available: MAP Annunciator C-1-1 actuates, RM-A-5/15/RM-G-26 counts rise.**

	Crew	Diagnoses the "A" OTSG Tube leak.
	CRS	Announces entry into OP-TM-EOP-005, OTSG Tube leakage
OP-TM-EOP-005, OTSG Tube leakage		
	CRS	Step 3.1: NOTIFY "Shift Dose Assessor" to begin offsite dose assessment.
	ARO	Step 3.2: Announce OTSG TUBE LEAK.
	INFO	Step 3.3: INITIATE Guide 9, "RCS Inventory Control.
OP-TM-EOP-010, GUIDE 9, RCS Inventory Control		
	URO	Step C.1: Verify MU Pump is operating.
	URO	Step C.2: Verify MU-V-5 is closed.
	URO	Step C.3: Verify MU24-FI >20 gpm RNO: Ensure MU-V-18 is Open by pressing the Open Pushbutton (CC); verifying the valve open light is lit and the valve closed light is not lit.
	URO	Step C.4: Ensure MU-V-17 is open.
	URO	Step C.5: Verify Pressurizer level is being restored.

Op Test No.:	<u>NRC</u>	Scenario #	<u>2</u>	Event #	<u>2</u>	Page 15 of 27
Event Description: 'A' OTSG Tube Leak						
Time	Position	Applicant's Actions or Behavior				

OP-TM-EOP-005, OTSG Tube leakage		
BOOTH CUE:		When directed to fire both Auxiliary Boilers, request the control room to open CO-V-14A (if they have not) and insert Event #11.
	ARO	Step 3.4: INITIATE the following procedures to start both Auxiliary Boilers: <ul style="list-style-type: none"> - OP-TM-414-401, "Starting AS-B-1A". - OP-TM-414-402, "Starting AS-B-1B".
	CRS	Step 3.5: VERIFY the reactor is critical.
	N/A	Step 3.6: IAAT pressurizer level < 150 inches and reactor power > 25%, then perform the following: <ul style="list-style-type: none"> • INITIATE HPI. • TRIP the reactor. • GO TO EOP-001
	N/A	Step 3.7: IAAT the turbine trips, and reactor power > 15%, then perform the following: <ul style="list-style-type: none"> • TRIP the reactor • GO TO EOP-001
Procedure Note:		1102-4, "Power Operation" actions to perform plant power reduction should be completed as resources permit. The rate of power reduction should be selected to maintain control and avoid lifting MSSVs.
	URO	Step 3.8: Verify SG/REACTOR DEMAND is in Auto, Ensures the ULD is HAND, sets the Load Rate of Change and then the ULD Target Load demand to 0%.
	ARO	Step 3.9: Place both FW-P-1A and FW-P-1B in Hand.
EXAMINERS NOTE:		Acknowledge as the personnel listed in the next step, or acknowledge as Shift Manager to notify the personnel listed in the next step. Also acknowledge evaluating EAL's.

Op Test No.: NRC Scenario # 2 Event # 2

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Event Description: 'A' OTSG Tube Leak

Time	Position	Applicant's Actions or Behavior
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OP-TM-EOP-005, OTSG Tube leakage

	CRS	Step 3.10: REQUEST SM to: <ul style="list-style-type: none"> - Evaluate Emergency Action Levels - NOTIFY Power Team - NOTIFY TSO - NOTIFY NDO.
	CRS	Step 3.11: IDENTIFY the affected OTSG: ('A' OTSG)
BOOTH CUE:		When directed to place the MS-V-13A handwheel in the closed position, insert Event #12 and then report the action complete.
	ARO	Step 3.12: IAAT all of the following conditions exist: <ul style="list-style-type: none"> - The affected OTSG is identified - EF-P-1 is not running - Either Motor Driven EFW Pump is Operable then Place the Handwheel of the affected MS-V-13, in the CLOSED position.
	CRS	Declares a 3.1.6.2 and 3.1.6.3 (24 hours) Tech Spec clock.
EXAMINERS NOTE:		Technical Specification 3.1.6.3 – If the primary-to-secondary leakage through any one (1) steam generator exceeds 150 GPD, the reactor shall be placed in hot shutdown within 6 hours, and in cold shutdown within 36 hours.
EXAMINERS NOTE:		After the Tech Spec call is made and sufficient reactivity manipulation has occurred, GO TO Event #3.

Op Test No.:	<u>NRC</u>	Scenario #	<u>2</u>	Event #	<u>3/4</u>	Page 17 of 27
Event Description: RC-P-1C High Vibrations, Feedwater fails to re-ratio						
Time	Position	Applicant's Actions or Behavior				

BOOTH CUE:		When directed by the Lead Examiner INITIATE Event #3.
Indications Available: PLF RCP Bentley Nevada Vibration Monitor, PPC Point L3124 RC-P-1C High Vibration		
	Crew	Diagnoses the RC-P-1C has high pump and motor vibrations.
OP-TM-PPC-L3124, RC-P-1C High Vibrations		
	ARO	Attempts to reset the alarm, alarm will not reset.
<p>EXAMINERS NOTE: The crew will evaluate the validity of the high vibration alarm. The alarm will exceed the threshold to perform a duty team call regarding securing the RC pump. The CRS will request a duty team call to evaluate the status.</p> <p>EXAMINERS NOTE: After the CRS requests the duty team call, use time compression and notify the CRS that the duty determined that the pump needs to be secured as soon as power is less than 75%.</p> <p>EXAMINERS NOTE: Due to the 'A' OTSG tube leakage, power may be below the 75% threshold.</p>		
OP-TM-226-153, SHUTDOWN RC-P-1C		
	ARO	Reviews/Verifies Precautions, Limitations, and Prerequisites
	CRS	Step 4.1: Evaluates the final RCP combination for effects of vibrations and procedural requirements.
<p>EXAMINERS NOTE: A 2/1 RCP combination with OTSG levels > LLL will require a re-ratio (~70% / 30%) of feedwater flow to A / B OTSG</p>		
	ARO	Step 4.2: Evaluates FW Flow requirements for new RCP combination to minimize effects on Delta Tc

Op Test No.:	<u>NRC</u>	Scenario #	<u>2</u>	Event #	<u>3/4</u>	Page 18 of 27
Event Description:		RC-P-1C High Vibrations, Feedwater fails to re-ratio				
Time	Position	Applicant's Actions or Behavior				

	CRS	Step 4.3: Notifies Electrical Maintenance to monitor RC-P-1C vibrations.
	ARO	Step 4.4: Places one of the following to Normal-After-Start: <ul style="list-style-type: none"> - RC-P-2C-2, Oil Lift Pump DC HP - RC-P-2C-1, Oil Lift Pump AC HP
	ARO	Step 4.5: Places RC-P-1C in Pull to Lock
EXAMINERS NOTE: At this point, the crew will diagnose that feedwater failed to re-ratio based on Delta Tc not recovering to ~0 and P-T plot indications.		
	Crew	Diagnoses feedwater re-ratio failure. Enters OP-TM-621-471, ICS MANUAL CONTROL to take control of feedwater.
OP-TM-621-471, ICS MANUAL CONTROL		
	CRS	Reviews limits, precautions, and prerequisites
	URO	Step 4.1: Ensures ULD is in HAND.
	URO	Step 4.2.1: Places SG/REACTOR DEMAND station in HAND.
	URO	Step 4.2.2: Ensures control rod position does not change.
	ARO	Step 4.2.3: Verifies alarm H-2-1 "ICS in Track" In.
	URO	Step 4.2.4: Description on how to change power with the SG/REACTOR DEMAND station. This will be used later to lower power due to the 'A' OTSG tube leak.
	ARO	Step 4.3: Manual feedwater control is needed.

Op Test No.: NRC Scenario # 2 Event # 3/4

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Event Description: RC-P-1C High Vibrations, Feedwater fails to re-ratio

Time	Position	Applicant's Actions or Behavior
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	ARO	Step 4.4.1: Places the SG A/B LOAD RATIO station in HAND.
	ARO	Step 4.4.2: Places SG A FW DEMAND station in HAND.
	ARO	Step 4.4.3: Places SG B FW DEMAND station in HAND.
	ARO	Step 4.4.4: Adjusts SG A and/or B FW DEMAND to maintain Tavg, deltaTc, and OTSG level within limits.

EXAMINERS NOTE: When feedwater is re-ratioed correctly, and the examiner has observed sufficient manual reactivity manipulation, the scenario can continue.

Op Test No.: NRC Scenario # 2 Event # 5/6/7

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Event Description: OTSG Tube Rupture, Loss of Subcooling Margin, MU-P-1A fails to start on ES

Time	Position	Applicant's Actions or Behavior
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BOOTH CUE: When directed by the Lead Examiner INITIATE Event 5.

Indications Available: Pressurizer level lowering rapidly, RCS Pressure lowering rapidly, "A" OTSG level rising rapidly

	URO	Continues in Guide 9
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OP-TM-EOP-010, Guide 9, RCS Inventory Control

	URO	Step C.8: Verify PZR level is NOT being restored by observing rising level on Pressurizer level indicators (CC) and/or the PPC. RNO: INITIATE HPI IAW OP-TM-211-901, "Emergency Injection HPI/LPI".
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OP-TM-211-901, Emergency Injection (HPI/LPI)

		Step 4.1.2: Verifies that ESAS Train A "Load Seq Block 4" lights (PCR) are not BLUE, and then presses the "A" Train 1600# ES Actuation Manual pushbutton (CC), verifying that block loading is occurring for the "A" Train of ES (PCR).
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		Step 4.1.5: Verifies that ESAS Train B "Load Seq Block 4" lights (PCR) are not BLUE, and then presses the "B" Train 1600# ES Actuation Manual pushbutton (CR), verifying that block loading is occurring for the "B" Train of ES (PCR).
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		Step 4.3.1: Monitors HPI IAW RULE 2 and throttles HPI IAW Attachment 7.3.
--	--	---

	Crew	Diagnoses the Pressurizer has gone below 150".
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	URO	Observes MU-P-1A did not start. URO starts MU-P-1A (in accordance with OS-24) and notifies the CRS.
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Op Test No.: NRC Scenario # 2 Event # 5/6/7

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Event Description: OTSG Tube Rupture, Loss of Subcooling Margin, MU-P-1A fails to start on ES

Time	Position	Applicant's Actions or Behavior
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EXAMINERS NOTE: The CRS will direct the IMAs of OP-TM-EOP-001, Reactor Trip and following the Symptom Check he should re-enter OP-TM-EOP-005, OTSG Tube Leakage. Based on the reactor being tripped, previous actions have already been taken and the event picks up at step 3.24. The crew may or may not have made it through step 3.23, but those steps are not applicable once the reactor is tripped.

The URO will continue in Guide 9, RCS Inventory.

OP-TM-EOP-001, REACTOR TRIP

	URO	Step 2.1 (IMA): Presses Both Reactor Trip and DSS pushbuttons (CC).
	URO	Step 2.2 (IMA): Verifies that the reactor is shutdown by <u>one</u> of the following: <ol style="list-style-type: none"> 1. Power Range Nuclear Instrumentation indicates less than 5% (CC) 2. All control rods are inserted (PC) 3. Source Range count rate is continuously lowering (CC)
	URO	Step 2.3 (IMA): Presses the Turbine Trip pushbutton (CL)
	URO	Step 2.4 (IMA): Verifies the Turbine Stop valves are closed by observing the indication on CL.
	ARO	Performs a Symptom Check, and identifies the "A" OTSG tube leak, and informs the CRS.
	URO	Diagnoses the "A" OTSG Tube leak rate increasing by lowering Pressurizer level and RCS pressure, and informs the CRS.
EXAMINERS NOTE: The CRS should continue in OP-TM-EOP-005. This event picks up at step 3.24. The crew may or may not have made it further.		

Op Test No.:	<u>NRC</u>	Scenario #	<u>2</u>	Event #	<u>5/6/7</u>	Page 22 of 27
Event Description: OTSG Tube Rupture, Loss of Subcooling Margin, MU-P-1A fails to start on ES						
Time	Position	Applicant's Actions or Behavior				

OP-TM-EOP-005, OTSG Tube Leakage.

	URO	Step 3.24: Verify control rod groups 1 through 7 are fully inserted.
	ARO	Step 3.26: Ensure announcement of reactor trip.
	ARO	Step 3.27: Dispatch an operator to check MSSV status.
	ARO	Step 3.28: Ensure performance of an alarm review.
EXAMINER NOTE:		The step implementing CT-22 is below. Since the step is an IAAT, the isolation of 'A' OTSG will occur sometime later. The script for the isolation of the 'A' OTSG will occur at the end of the scenario.
CT-22	ARO	Step 3.29: IAAT OTSG A (B) pressure approaches, or is greater than 1000 psig, then perform the following: <ul style="list-style-type: none"> - ENSURE MS-V-2A (MS-V-2B) is Open. - OPEN MS-V-3D, E, F (MS-V-3A, B, C) to maintain OTSG pressure < 1000 psig.
EXAMIE		
EXAMINERS NOTE:		Cooldown rate is 100°F/hr per Guide 11 until 10CFR 50.54x is invoked.
CT-22	ARO	Step 3.30: IAAT OTSG level is rising due to tube leakage in an AVAILABLE OTSG, then preferentially STEAM to maintain OTSG level < 85% by adjusting the toggle switches for MS-V-3D, E, F (MS-V-3A, B, C) upward/downward as necessary.
Procedure Note:		If exceeding RCS or Pressurizer Tech Spec cooldown rate limits is needed to permit isolation of an OTSG, then 10CFR 50.54x entry should be evaluated.

Op Test No.: NRC Scenario # 2 Event # 5/6/7

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Event Description: OTSG Tube Rupture, Loss of Subcooling Margin, MU-P-1A fails to start on ES

Time	Position	Applicant's Actions or Behavior
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EXAMINERS NOTE: The OTSG tube rupture will continue to get worse until 25F Subcooling Margin is lost, and OP-TM-EOP-002 is entered.

OP-TM-EOP-002, LOSS OF 25F SUBCOOLING MARGIN

	URO	Step 2.1 - PERFORM Rule 1, LSCM.

OP-TM-EOP-010, Rule 1, Loss Of Subcooling Margin

	URO	Step 1 - VERIFY it has been more than two minutes since RCP start.
CT-1	URO	Step 2 - ENSURE <u>all</u> RCPs are shutdown within <u>one</u> minute by rotating the control switches (CC) counter-clockwise, observing red lights out, green lights lit, and no amps for each RCP.
	URO	Step 3 - INITIATE 4 # ESAS Actuation IAW OP-TM-642-902 4# ESAS Actuation by pressing the A and B train 4# manual ESAS actuation buttons (CC and CR) and observing 4# ES actuation on PCR. This step was completed in guide 9, and may or may not be performed again. The 'B' side still will not work.
	ARO	Step 4 - INITIATE OP-TM-424-901, "Emergency Feedwater" and FEED IAW Rule 4, Feedwater Control.

OP-TM-EOP-002, Section 3.0

	ARO	Step 3.1 - ENSURE announcement of reactor trip.
	CRS	Step 3.2 - IAAT LPI flow >1250 gpm in each line, then GO TO EOP-006.
	URO	Step 3.3: Verifies both LPI pumps are both operating.

Op Test No.: NRC Scenario # 2 Event # 5/6/7Page **24** of **27**

Event Description: OTSG Tube Rupture, Loss of Subcooling Margin, MU-P-1A fails to start on ES

Time	Position	Applicant's Actions or Behavior
	URO	Step 3.4 - VERIFY PORV is closed. (Tailpipe ΔP indicator, Alarm G-1-7, A0517).
	CRS	Step 3.5 - INITIATE Attachment 1 "Isolation of possible sources of leakage".
OP-TM-EOP-002, Attachment 1		
		Ensures the following valves are closed:
	URO	<ul style="list-style-type: none"> RC-V-1 (Spray) by taking the "Auto-Manual" switch (CC) to "Manual" and, if the spray valve is open, pressing the closed pushbutton (CC), verifying the closed light is lit and the open light is not lit.
	URO	<ul style="list-style-type: none"> RC-V-3 (Spray Block) by pressing the closed pushbutton (CC), verifying the closed light is lit and the open light is not lit.
	URO	<ul style="list-style-type: none"> MU-V-3 (Letdown Block) by pressing the closed pushbutton (CC), verifying the closed light is lit and the open light is not lit.
	URO	<ul style="list-style-type: none"> MU-V-1A (Letdown Cooler Isolation) by pressing the closed pushbutton (CC), verifying the closed light is lit and the open light is not lit.
	URO	<ul style="list-style-type: none"> MU-V-1B (Letdown Cooler Isolation) by pressing the closed pushbutton (CC), verifying the closed light is lit and the open light is not lit.
OP-TM-EOP-002, LOSS OF 25F SUBCOOLING MARGIN		
	URO	Step 3.8 - VERIFY all RC pumps are shutdown.
	CRS	Step 3.10 - IAAT RCS > 25 °F superheat, then GO TO EOP-008.

Op Test No.: NRC Scenario # 2 Event # 5/6/7Page **25** of **27**

Event Description: OTSG Tube Rupture, Loss of Subcooling Margin, MU-P-1A fails to start on ES

Time	Position	Applicant's Actions or Behavior
	CRS	Step 3.11 - If primary to secondary heat transfer is excessive (XHT), then GO TO EOP-003.
	CRS	Step 3.12 - VERIFY cooldown rate > 40 °F/hr, or primary to secondary heat transfer (PSHT) exists.
	CRS	Step 3.13 - If OTSG TUBE LEAKAGE exists, then GO TO EOP-005.
EXAMINERS NOTE: The scenario can be terminated when the crew re-enters OP-TM-EOP-005 isolates the 'A' OTSG.		

Op Test No.: NRC Scenario # 2 Event # addendum

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Event Description: Isolation of the 'A' OTSG

Time	Position	Applicant's Actions or Behavior
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EXAMINER NOTE: When isolation criteria has been met, the crew will perform attachment 1A of OP-TM-EOP-005 to isolate the 'A' OTSG		
	ARO	Ensure closed the following valves :
CT-22	ARO	MS-V-1A - CC – Examinee presses closed pushbutton. Green light becomes bright, white test light becomes bright, and red light stays bright. When the valve is fully is closed, only the Green light will remain bright.
CT-22	ARO	MS-V-1B - CC – Examinee presses closed pushbutton. Green light becomes bright, white test light becomes bright, and red light stays bright. When the valve is fully is closed, only the Green light will remain bright.
CT-22	ARO	FW-V-17A – CC – Examinee places the FW-V-17A ICS station in hand, and places the toggle switch in the closed position. The examinee will verify the valve is closed by verifying the red position indicator beside the ICS station goes to 0.
CT-22	ARO	FW-V-5A – CC – Examinee verifies that the FW-V-5A RED closed pushbutton is bright. FW-V-5A should have closed when the reactor was tripped.
CT-22	ARO	FW-V-16A – CC – Examinee places the FW-V-16A ICS station in hand, and places the toggle switch in the closed position. The examinee will verify the valve is closed by verifying the red position indicator beside the ICS station goes to 0.
CT-22	ARO	FW-V-92A – CC – Examinee presses the GREEN closed pushbutton. The CLOSED light becomes bright, the RED pushbutton becomes DIM.
CT-22	ARO	EF-V-30A – CL – Examinee presses the manual button on the EF-V-30A station and pins the toggle switch in the closed position.

Op Test No.: NRC Scenario # 2 Event # addendumPage **27** of **27**

Event Description: Isolation of the 'A' OTSG

Time	Position	Applicant's Actions or Behavior
CT-22	ARO	EF-V-30D – CL – Examinee presses the manual button on the EF-V-30D station and pins the toggle switch in the closed position.
CT-22	ARO	MS-V-3D, E, F – CC – Examinee places the MS-V-3D, E, F ICS station to HAND and presses the toggle switch in the closed direction. Examinee verifies that the MS-V-3D, E, F lights on CC are green.
CT-22	ARO	MS-V-4A – CC – Examinee places MS-V-4A on the BU LOADER by pressing the BU LOADER button. Examinee ensures that the MS-V-4A demand wheel is in the 0 position.
CT-22	ARO	MS-V-13A – CC – Examinee presses the MS-V-13A pushbutton. This step may have been done previously. Examinee verifies the GREEN light becomes bright and the RED light becomes dim.
CT-22	ARO	CA-V-4A or CA-V-5A – PCR – Examinee closes CA-V-4A or CA-V-5A on PCR (Below the ES status panel), by taking the barrel switch to the close to the close position.

Facility:	Three Mile Island	Scenario No.:	3	Op Test No.:	<u>TMI-2017-1</u>
Examiners:	_____	Operators:	_____		
	_____		_____		
	_____		_____		
Initial Conditions:	<ul style="list-style-type: none"> 100% power, MOL Generator output meter GN-OM-1 is out of service for repair. Put computer points A0099 and A0098 on data trend to monitor MVAR and MW's. 				
Turnover:	Remain at 100% power				
Critical Tasks:	<ul style="list-style-type: none"> Natural Circulation RCS Flow (CT-12) Isolate Overcooling SG(s) (CT-17) 				
Event No.	Malif. No.	Event Type*	Event Description		
1	ZAOWDL LI806	TS CRS	RB Flood Level Instrument Fails High (TS)		
2	MS04	C CRS C URO C ARO	MSIV inadvertent closure, entry into OP-TM-PPC-L2204 (ATC: Lowers power < 90%), (BOP: Opens MS-V-1D)		
3	IC18	I CRS R URO	ULD fails @ 98% in auto (URO: Lowers power with SG/RX Demand to less than 98%)		
4	ED09C	TS CRS C ARO	Loss of Vital Bus "C" (ARO: RM-A-8G interlock to defeat)		
5	MS19A	C CRS C ARO	Isolable Steam Leak in Turbine Bldg, entry into OP-TM-AOP-051. 'B' OTSG (ARO: Isolate Steam Leak)		
6	TC01 RD28	I CRS I URO	Turbine Trips, Reactor fails to automatically trip (URO: IMA's)		
7	ED01	M CRS M URO M ARO	Loss of Offsite Power with both Emergency Diesel Generators available, entry into OP-TM-AOP-020.		
8	MS07B	C CRS C ARO	Stuck open MSSV's, entry into OP-TM-EOP-003. (ARO: Isolate "B" OTSG)		
<p>* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor</p>					

Scenario Set-up
NRC Scenario 3

Three Mile Island NRC Scenario #3

Event #1: The lead Examiner can cue the failure of LT-806 RB Flood Level Transmitter high. PRF1-4-6 alarm will be received. The CRS will declare a 30 day LCO Tech Spec (3.5.5.2).

IAW Tech Spec 3.5.5.2:

The channels identified for the instruments specified in Table 3.5-3 shall be OPERABLE. With the number of instrumentation channels less than required, restore the inoperable channel(s) to OPERABLE in accordance with the action specified in Table 3.5-3.

TABLE 3.5-3
POST ACCIDENT MONITORING INSTRUMENTATION

Instrument or Control Parameter	Required Number of Channels	Minimum Number of Channels
Containment Water Level Containment Flood (LT-806/807)	2	1

Action Statement: B. 1. With the number of OPERABLE accident monitoring instrumentation channels less than the Required Channels OPERABLE requirements, restore the inoperable channel(s) to OPERABLE status within 30 days or be in at least HOT SHUTDOWN within the next 12 hours.

Event #2/3: The lead examiner will cue the Closure of MS-V-1D. The crew will identify this by the green closed light lit, white test light lit (during travel) and the red open light not lit (after travel is complete) (CC). The crew will enter OP-TM-PPC-L2204, which will direct lowering power less than 90% and reopening MS-V1A.

At 95% power, the ULD will fail, and the power reduction will stop. The crew will take ICS to manual in accordance with OP-TM-621-471, ICS MANUAL CONTROL procedure and lower power with the SG/RX demand station.

When MS-V-1D has been opened, the scenario can continue.

Event #4: The lead examiner will cue the loss of Vital Bus 'C' (VBC).

The effects and compensatory actions of a loss of VBC which are significant for plant safety or operation are described in OP-TM-AOP-017.

This procedure stabilizes the plant and performs compensatory actions for equipment failures. The CRS will determine what tech specs we are in and brief the crew.

Once the brief is complete, the scenario can continue.

Event #5: The Lead Examiner will cue the Isolable Steam Leak in the Turbine Building.

Scenario Set-up
NRC Scenario 3

The operators will diagnose a Secondary Side Steam Leak based on a lowered efficiency of the Secondary Plant (Megawatts, Header Pressure, OTSG pressures, etc.) and a call-in report from the field.

The crew will diagnose the Steam Leak and the CRS will enter OP-TM-AOP-051, Secondary Side High Energy Leak. OP-TM-AOP-051 is entered for Steam Leaks that affect large portions of the plant and therefore it is not obvious to the operator what needs to be done initially to isolate the leak.

OP-TM-AOP-051 systematically attempts to isolate the leak remotely from the Control Room while taking steps to minimize the adverse effects of a steam environment on safety related equipment. The OP-TM-AOP-051 mitigation strategy for a Steam Leak in the Turbine Building is as follows:

- Attempt to isolate the leak from the Control Room.
- Shutdown and Cooldown the plant in a controlled manner to minimize pressure surges that could make the leak worse. Shutdown may have to be done quickly or the plant may have to be tripped depending on the circumstances.

The ARO will isolate Steam Leak by closing the appropriate valve, MS-V-5B. This can be performed because the steam supplies to the Main Feedwater Pumps are as follows:

- Below 25% power, Main Steam, only, supplies the Main Feedwater Pumps.
- Between 25% and 40% power, Main Steam supplements Extraction Steam as supplies to the Main Feedwater Pumps.
- Above 40% power, Extraction Steam, only, supplies the Main Feedwater Pumps.

Once the Steam Leak has been isolated, the scenario can continue

Event #6: The lead examiner will cue the turbine trip. The reactor will not automatically trip, and the CRS/URO will enter OP-TM-EOP-001, REACTOR TRIP and perform the IMA's.

After the immediate manual actions and symptom check are complete, the scenario can continue.

Event #7/8: The lead examiner will cue the Loss of Offsite Power.

The crew will diagnose a loss of offsite power by multiple Annunciators in alarm, PPC points in alarm, RCP's secured (CC), loss of half of the Control Room lighting.

The CRS will enter OP-TM-AOP-020, LOSS OF STATION POWER. Both diesel generators will start, and power the 1D and 1E 4kV busses.

Scenario Set-up
NRC Scenario 3

Two stuck open main steam safety valves on the "B" OTSG will cause conditions to be met for an Excessive Primary to Secondary Heat transfer. The CRS will announce transition into OP-TM-EOP-003, Excessive Primary to Secondary Heat Transfer. The ARO will perform Phase 1 and 2 isolation to secure emergency feedwater from the 'B' OTSG.

Termination: The scenario can be terminated when OTSG "B" has been isolated, Seal injection has been restored, and Natural Circulation has been established.

B&W Unit EOP Critical Task Description Document, 47-1229003-04:

CT-12 – Establish Natural Circulation RC Flow – Whenever forced RC flow is not available, NC flow should be established. Maintaining primary to secondary heat transfer via NC eliminates the need to add RC to the RB as would occur with the back up feed and bleed HPI core cooling mode.

- If primary to secondary heat transfer has been lost, then establish and maintain appropriate SG levels in accordance with Rule 4.0.
- Reduce SG pressure using the TBVs/ADVs to establish a positive primary to secondary side ΔT of - 50°F.
- RCS pressure should be maintained constant or slightly increasing using MU or HPI. RCS pressure should not be increased if PTS guidance is invoked.
- Trying to establish Natural Circulation RC flow outside of the following limits should be considered **grounds for failure of the critical task**:
 - Establish Natural Circulation prior to transitioning into OP-TM-EOP-009, HPI Cooling.

Safety Significance: Enhances the transient mitigation capability of the plant by maintaining SGs operable and eliminates the need to add RC to the RB as with HPI Cooling.

Cues:

- Low RC flow alarm
- Verbal alert by plant staff that all RCPs have tripped
- SCM monitor and associated alarms
- P-T display and associated alarms

Performance Indicators:

- Operation of EFW/FW pump and valve controls
- Operation of TBV/ADV controls
- Operation of MU/HPI pump and valve controls

Feedback:

- Verbal verification that natural circulation has been established
- SG pressure
- RC temperature

CT-17 - Isolate Overcooling SGs - This is a critical task in that continued feeding of an OTSG with a steam break will continue to overcool the RCS, which could result in emptying the Pressurizer and causing a loss of subcooling margin. This would significantly change the mitigation strategy of the event.

- Critical task (CT-17) is to isolate the affected OTSG prior to emptying the, pressurizer. Alternately if HPI held pressurizer level, cooldown below 329°F with HPI on would violate TS. Either condition should be considered grounds for failing critical task.

Safety Significance: If the overcooling SG has been identified then that SG should be isolated, otherwise both SGs should be isolated. Isolating a SG means to stop all FW flow (MFW and AFW) and steam flow (e.g., close TBVs, ADVs, steam supply to FW pumps, MSIVs etc.). FW flow should be maintained to the unaffected SG and cooling stabilized using the unaffected SG.

Isolation of a SG or both SGs should always follow a logical progression of increasingly more drastic attempts to isolate the SG. For example, if the overcooling is not severe it may be possible to close both the TBVs and ADVs as well as the auxiliary steam valves thus isolating the SG. If this does not work, then for those plants which have main steam isolation valves, the main steam isolation valve should then be closed. For severe overcooling situations, [secondary plant protection system] will likely actuate.

Inappropriate mitigative actions can cause loss of both SGs even if only one SG is faulted; such a situation would cause degradation of the transient mitigation capability of the plant.

Cues:

1. SPDS displays and associated alarms
2. P-T display and associated alarms
3. Rising RB Pressure and Temperature
4. RB Fire/Heat alarms

Performance Indicators:

1. Operation of HIPI/MU pump start switches
2. Operation of associated FW pump and valve controls (affected OTSG)
3. Operation of associated steam valve (included TBVs/ADV's) controls (affected OTSG)
4. Operation of MSIV's (affected OTSG)

Feedback:

1. RC temperature and pressure
2. SG level and pressure
3. MSIV status indication
4. MFW/AFW pump and valve status indications

Scenario Set-up
NRC Scenario 3

Event	Description	Procedure Support
	Initial Setup	100% power, MOL
1	LT-806, RB Flood Level Instrument fails high	TS 3.5.5.2
		TS Table 3.5-3
		OP-TM-PRF1-0406, RB FLOOD LEVEL HI
2	MS-V-1D closes	OP-TM-PPC-L2207, MAIN STEAM ISOL MS-V-1D
		1102-4, POWER OPERATIONS
3	ULD fails to lower power in AUTO	OP-TM-621-471, ICS MANUAL OPERATION
4	Loss of Vital Bus 'C' (VBC)	OP-TM-AOP-017, LOSS OF VBC
		TS 3.1.6 and 3.5.1.9
5	Isolable Steam Leak in the Turbine Building	OP-TM-AOP-051, SECONDARY SIDE HIGH ENERGY LEAK
		TS 3.4.1.2.3
6	Turbine trip, Reactor fails to trip automatically	OP-TM-EOP-001, REACTOR TRIP
7	Loss of Offsite power	OP-TM-AOP-020, LOSS OF OFFSITE POWER
		OP-TM-EOP-010, EMERGENCY PROCEDURE RULES, GUIDES, AND GRAPHS
8	Stuck open Main Steam Safety Valves, Excessive Heat Transfer	OP-TM-EOP-003, EXCESSIVE PRIMARY TO SECONDARY HEAT TRANSFER

Scenario Set-up
NRC Scenario 3

ACTION	COMMENTS / INSTRUCTIONS	DESCRIPTION
IC-243	100% power, ICS in Auto	Equilibrium Xenon
I/O Override 02A3M27-ZAOWDLLI806	Value: 100 When: Event #1	LT-806 RB Flood Level Transmitter Fails High
I/O Override PRF1-4-6	Value: ON When: Event #1	PRF1-4-6 Alarms, RB Flood Level High
Event Trigger #1	Value: Command: SET PPA0449_V = 90.0	Sets PPC point A0449 to 90 inches to match Event #1
Monitor Point	Value: SET PPA0449_O = True When: Immediately	Enables PPC Point A0449 to be set by event trigger #1
Malfunction MSR04	Value: 0.000 When: Event #2	MS-V-1D closes
Event #3 Trigger	Value: ratpw < 98 Command: IMF IC18 84	ULD fails at ~98%
Malfunction ED09C	Value: Insert When: Event #4	Loss of Vital Bus 'C'
Malfunction MS19B	Value: 3 ramp of 2 mins When: Event #5	Steam leak in the turbine building
Malfunction TC01	Value: Insert When: Event #6	Turbine Trip
Malfunction RD28	Value: Insert When: Immediately	Reactor auto trip block
Malfunction ED01	Value: On When: Event #7	Loss of Offsite Power
Malfunction MS05A	Value: 100 When: Event #7	MSSV on 'B' OTSG fails 100% open
Malfunction MS05B	Value: 100 When: Event #7	MSSV on 'B' OTSG fails 100% open
TRIGGER 10	Value: DRF MSR04 When: RATPW<92	Deletes MSIV Inadvertent Closure
Alarm PRF1-3-3	Value: ON When: Event #12	HSPS door opening when swapping instruments
REMOTE ICR32	Value: Def When: Event #13 w/ 30 sec TD	Clears SASS mismatch alarms in step 3.8
REMOTE HSR09	Value: 1046 When: Event #14 w/ 10 sec TD	Sets HSPS channel to 1046
REMOTE HSR10	Value: 1044 When: Event #14 w/ 20 sec TD	Sets HSPS channel to 1044
REMOTE HSR11	Value: 1054 When: Event #14 w/ 30 sec TD	Sets HSPS channel to 1054

Scenario Set-up
NRC Scenario 3

REMOTE HSR12	Value: 1052 When: Event #14 w/ 40 sec TD	Sets HSPS channel to 1052
REMOTE CHR04	Value: ON When: Event #15	Starts AH-E-26

Required procedures to have on hand:

1. 1104-15A, AUX AND FUEL HANDLING BUILDING SUPPLY AND EXHAUST SYSTEM, SECTION 4.3

Op Test No.: NRC Scenario # 3 Event # 1

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Event Description: LT-806 RB Flood Level Instrument Fails High

Time	Position	Applicant's Actions or Behavior
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BOOTH OPERATOR: When directed by the Lead Examiner INITIATE Event #1.**Indications Available: PRF1-4-6 Alarm and Containment Flood Level Indicator**

	CRS	Direct entry into OP-TM-PRF1-0406, RB Flood Level Hi
	ARO	ARO should diagnose the failure of the RB Flood Level instrument LT-806 based on other RB level instrumentation and RCS conditions.
	CRS	Reviews TS 3.5.5.2 and TS Table 3.5-3 for RB Flood Level Instrument requirements.

EXAMINER NOTE:

TS 3.5.5.2 The channels identified for the instruments specified in Table 3.5-3 shall be OPERABLE. With the number of instrumentation channels less than required, restore the inoperable channel(s) to OPERABLE in accordance with the action specified in Table 3.5-3.

**TABLE 3.5-3
POST ACCIDENT MONITORING INSTRUMENTATION**

Instrument or Control Parameter	Required Number of Channels	Minimum Number of Channels	Action
Containment Water Level Containment Flood (LT-806/807)	2	1	B

TS Table 3.5-3 ACTIONS – B.1: With the number of OPERABLE accident monitoring instrumentation channels less than the Required Channels OPERABLE requirements, restore the inoperable channel(s) to OPERABLE status within 30 days or be in at least HOT SHUTDOWN within the next 12 hours.

EXAMINER NOTE: Once the TS call is made, Go To Event 2.

Op Test No.: NRC Scenario # 3 Event # 2/3

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Event Description: MS-V-1D closure, ULD fails to lower power

Time	Position	Applicant's Actions or Behavior
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BOOTH OPERATOR: When directed by the Lead Examiner INITIATE Event #2.**Indications Available: PPC-L2207 in alarm, MS-V-1D indicates closed on CC, "B" OTSG Pressure/Level rise.**

BOOTH CUE: If contacted as maintenance, inform the crew that "I see no damage to MS-V-1D and the valve may be reopened when Ops is ready to open it"

CRS

Direct entry into OP-TM-PPC-L2207, MAIN STEAM ISOL MS-V1D.

EXAMINER NOTE: Step 4.1 is N/A.

PROCEDURE NOTE: The following steps are designed to prevent an overpressure condition that could challenge the RC-RV-2 (PORV) and to prevent operation in an unbalanced steam flow condition.

OP-TM-PPC-L2207, MAIN STEAM ISOL MS-V1D

CRS

Step 4.2: VALIDATE actual valve movement by rising RCS pressure and temperature or local valve position.

CRS

Step 4.3: REDUCE reactor power to less than 90% power IAW 1102-4, "Power Operation".

EXAMINER NOTE: The CRS may perform either section 3.2 or 3.3 of 1102-4. The steps are similar and therefore, only section 3.3 is scripted.

EXAMINER CUE: If directed as Shift Manager to perform or initiate Enclosure 2A, acknowledge the direction.

1102-4, POWER OPERATION

CRS

Step 3.3.2.A.1: PERFORM Enclosure 2A (for an emergency (forced) power reduction INITIATE Enclosure 2A).

Op Test No.: NRC Scenario # 3 Event # 2/3

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Event Description: MS-V-1D closure, ULD fails to lower power

Time	Position	Applicant's Actions or Behavior
		EXAMINER CUE: Acknowledge as the personnel listed in the next step, or acknowledge as Shift Manager to notify the personnel listed in the next step. Also acknowledge Logging the notifications.
	CRS	Step 3.3.2.A.2: If power change is greater than 10 MWe, then perform the following: a) NOTIFY the following: - Power Team - TSO - NDO b) LOG notifications to Power Team, TSO, and NDO in Control Room Log.
	ARO	Step 3.3.2.A.3.a: MAINTAIN Generator Reactive Load IAW OP-TM-301-472.
	URO	Step 3.3.2.A.3.b: If SG/REACTOR DEMAND is in AUTO, then REDUCE reactor power as follows: 1. ENSURE ULD is in HAND by observing White HAND light lit, red AUTO light not lit (CC).
		EXAMINER NOTE: The Load Rate of Change adjustment knob does not read in "%". If the CRS directs a 1%/Min load rate of change, the URO will dial the adjustment knob to 10. If the CRS directs a 3%/Min load rate of change, the URO will dial the adjustment knob to 30.
	URO	Step 3.3.2.A.3.b: If SG/REACTOR DEMAND is in AUTO, then REDUCE reactor power as follows: 2. SET ULD LOAD RATE OF CHANGE to ≤ 1 %/minute for PLANNED reductions or at a rate determined by CRS for Forced power reductions by changing the Load Rate of Change adjustment knob in the clockwise direction until the corresponding value is achieved.

Op Test No.:	<u>NRC</u>	Scenario #	<u>3</u>	Event #	<u>2/3</u>	Page 13 of 31
Event Description:		MS-V-1D closure, ULD fails to lower power				
Time	Position	Applicant's Actions or Behavior				

EXAMINER NOTE: The URO will decide MWe corresponding to the power level directed by the CRS by looking at the placard next to the ULD.

	URO	Step 3.3.2.A.3.b: If SG/REACTOR DEMAND is in AUTO, then REDUCE reactor power as follows: 3. SET ULD Target Load Demand to desired setpoint by placing the ULD Control Station toggle switch in the down direction until the target MWe is targeted by the indicator.

BOOTH NOTE: Ensure Event #3 is inserted at approximately 98% power.

	URO	At ~ 95% power, the ULD will stop responding. This will be identified by the generated MWe output on the PPC not lowering any longer.
	CRS	Directs ICS to be put in manual in accordance with OP-TM-621-471, ICS MANUAL CONTROL to the SG/RX demand.

OP-TM-621-471, ICS MANUAL CONTROL

	URO	Step 4.2.1 – Places the SG/Reactor Demand station in HAND
	URO	Step 4.2.2 – Ensures control rod position does not change.
	ARO	Step 4.2.3 – Verifies alarm H-2-1 “ICS in Track” in

1102-4, POWER OPERATIONS

	URO	Step 3.3.2.A.3.c – URO uses the SG/Reactor demand toggle switch to lower power.

Op Test No.: NRC Scenario # 3 Event # 2/3

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Event Description: MS-V-1D closure, ULD fails to lower power

Time	Position	Applicant's Actions or Behavior
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BOOTH NOTE: Ensure Event #10 is automatically entered at 92% power to remove the MSIV fault. If not, then remove Remote MSR04 prior to the crew attempting to open the MSIV.

EXAMINER NOTE: Once Reactor Power is below 90%, the CRS will continue in OP-TM-PPC-L2207, MAIN STEAM ISOL MS-V1D.

OP-TM-PPC-L2207, MAIN STEAM ISOL MS-V1D

	ARO	Step 4.4 RE-OPEN MSIV as soon as possible by pressing the red open pushbutton and observing all three lights lit during travel, and only the red open light lit (green and white lights not lit) at the end of valve travel.
--	-----	--

EXAMINER NOTE: Once MS-V-1D is open, go to Event #4.

Op Test No.:	<u>NRC</u>	Scenario #	<u>3</u>	Event #	<u>4</u>	Page 15 of 31
Event Description:		Loss of Vital Bus 'C' (VBC)				
Time	Position	Applicant's Actions or Behavior				

BOOTH CUE:		When directed by the Lead Examiner INITIATE Event #4.
INDICATIONS AVAILABLE: Multiple Main Annunciator Panel Alarms illuminated, "C" RPS Cabinet deenergized, 1 of 2 Control Rod Position Indication Panels deenergized, 1 Row of HSPS lights lit.		
BOOTH CUE:		If dispatched to investigate, report that the 'C' inverter AC and DC input supply breakers are open for not apparent cause.
	Crew	Diagnosis a loss of Vital Bus "C".
	CRS	Direct entry into OP-TM-AOP-017, Loss of VBC.
OP-TM-AOP-017, LOSS OF VBC		
	ARO	Step 3.1 - Announces entry into OP-TM-AOP-017, "Loss of VBC," over the plant page and radio.
	CRS	Step 3.2 – Verifies PPC alarm L3461 "CRD AC Power Fault (B)" is clear
EXAMINER NOTE:		If asked, notify the CRS that there are no fuel moves in progress in the spent fuel pool.
	CRS	Step 3.3 – N/A no fuel move is in progress.
	ARO	Step 3.4 – Selects group 5-7 on CRD-FPM-B on the right side of the PI panel.
PROCEDURE NOTE:		Loss of power to RM-A-8 trips AH-E-10, AH-E-11, and WDG-V-47.

Op Test No.: NRC Scenario # 3 Event # 4

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Event Description: Loss of Vital Bus 'C' (VBC)

Time	Position	Applicant's Actions or Behavior
	ARO	Step 3.5 – Places RM-A-8G interlock switch in DEFEAT position.
	ARO	Step 3.6: Initiates 1104-15A to restore AUX and FHB ventilation.
EXAMINER NOTE:		The CRS/ARO may prioritize initiate 1104-15A to restore ventilation. If so, the highlights are below.
1104-15A, AUX AND FUEL HANDLING BUILDING SUPPLY AND EXHAUST SYSTEM, Section 4.3		
	ARO	Step 4.3.2.1 – Verify open / open AH-D-120, 121, 122, FH BLDG Isolation Dampers
	ARO	Step 4.3.2.2 – Starts AH-E-14 A/C or AH-E-14 B/D
	ARO	Step 4.3.2.3.A– Start AH-E-10
	ARO	Step 4.3.2.3.B– Start AH-E-11
BOOTH CUE:		When directed to operate AH-E-26, use remote function on Event #15, CHR04 to ON and wait ~ 2 minutes and report status of AH-E-26.
		AH-E-21, 90 & 91 are not modeled. When directed to operate these fans; wait 1 minutes and report the following status: AH-E-90 and 91 are running
	ARO	Step 4.3.2.34 – Restore control tower first floor ventilation by: <ol style="list-style-type: none"> 1. Press AH-D-28/617 Reset PB” and Start AH-E-20A or AH-E-20B 2. Verify open AH-D-28/617 on ESAS indication on PCR or the white light on H&V panel 3. Dispatches an operator to start AH-E-21 (Not modeled) 4. Dispatches an operator to secure AH-E-90 and 91 5. Dispatches an operator to start AH-E-26

Op Test No.: NRC Scenario # 3 Event # 4

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Event Description: Loss of Vital Bus 'C' (VBC)

Time	Position	Applicant's Actions or Behavior
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OP-TM-AOP-017, Loss of VBC		
	ARO	Step 3.7 – Reviews Control room annunciators in alarm.
BOOTH CUE:	When dispatched to perform OP-TM-621-452, “Defeating SASS Mismatch ALARM inputs”, insert Event #13 and report back as complete after ~ 1 minute.	
BOOTH CUE:	To acknowledge the SASS alarm locally, use ICR15.	
EXAMINER CUE:	Swapping HSPS instruments is not necessary to move on in the scenario. Once the T.S. call is made, the scenario can continue.	
	ARO	Step 3.8 – Dispatches an operator to perform “OP-TM-621-452 to defeat the SASS mismatch alarms for OTSG A & B SU LVL”
BOOTH CUE:	When directed to swap HSPS level inputs insert Event #12. This will simulator opening the HSPS doors (PRF1-3-3) and swap the instruments. When all of the instruments are swapped, change event #12 to OFF, to close the HSPS door. Notify the control room when completed.	
	ARO	Step 3.9 – Dispatches an operator to swap to operable HSPS instruments for EF-V-30A and EF-V-30C control.
EXAMINER NOTE: The CRS will initiate the following Tech Specs:		
<ul style="list-style-type: none"> • 3.1.6.8 – When the reactor is critical above 2 percent, two reactor coolant leak detection systems of different operating principles shall be in operation for the Reactor Building with one of the two systems sensitive to radioactivity. The systems sensitive to radioactivity may be out-of-service for not more than 72 hours provided a sample is taken of the Reactor Building atmosphere every 8 hours and analyzed for radioactivity and two other means are available to detect leakage. • Table 3.5-1, D – Channel III level signals – 2 min operable channels with 1 min degree of redundancy. Only 1 will be operable. Restore the channel within 72 hours or place the unit in HOT SHUTDOWN within the next 12 hours. • RM-A-8 and 15 timeclocks are not entered because RM-A-4, 5, and 6 are still operable. 		

Op Test No.: NRC Scenario # 3 Event # 4Page **18** of **31**

Event Description: Loss of Vital Bus 'C' (VBC)

Time	Position	Applicant's Actions or Behavior
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	CRS	Step 3.10 – Initiates TS timeclock 3.1.6 and 3.5.1.9
	CRS	Step 3.11 – Notifies Rad Pro to obtain RB air sample within 8 hours.

EVALUATOR NOTE: When the Tech Specs are declared, go to Event #5.

Op Test No.: NRC Scenario # 3 Event # 5

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Event Description: Isolable steam leak in the Turbine Building

Time	Position	Applicant's Actions or Behavior
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BOOTH CUE:		When directed by the lead examiner, insert Event #5
INDICATIONS AVAILABLE: Lowering Generated MWe, Lowering Tave, Reactor Power rising		
BOOTH CUE:		Report, as Auxiliary Operator, "There is a large steam leak on the North Side of the Turbine Building. Specific location is unknown"
	Crew	Diagnoses the steam leak
	CRS	Announces entry into OP-TM-AOP-051, Secondary Side High Energy Leak.
OP-TM-AOP-051, SECONDARY SIDE HIGH ENERGY LEAK		
	ARO	Step 3.1: ANNOUNCE entry into OP-TM-AOP-051, "Secondary Side High Energy Leak" and to evacuate turbine building over the plant page and radio.
	URO	Step 3.2: MAINTAIN reactor power < 100%.
EXAMINER NOTE:		Steps 3.3 through 3.6 are IAAT statements that are expected to remain N/A for the duration of the scenario.
BOOTH CUE:		As Shift Manager, acknowledge the request to evaluate EAL's.
	CRS	Step 3.7: REQUEST SM to evaluate EALs.

Op Test No.: NRC Scenario # 3 Event # 5

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Event Description: Isolable steam leak in the Turbine Building

Time	Position	Applicant's Actions or Behavior
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EXAMINER NOTE: Steps 3.8 through 3.9 are N/A.		
	CRS	Step 3.10: If leak is in Turbine Building, then GO TO Section 6.0.
OP-TM-AOP-051, Section 6.0, TURBINE BUILDING		
	CRS	Step 6.1: CONSIDER evacuating the following: <ul style="list-style-type: none"> - Operations Office Building using the back stairwell. - Telephone Equipment Room in the Service Building.
EXAMINER NOTE: There is a procedure note that states that the crew can perform isolation of A and B side of the Turbine Bldg in any order. If the crew performs the "B" side first (Step 6.3), the steam leak will be isolated and step 6.2 will not be performed.		
BOOTH CUE: When requested by the Control Room to report the status of the steam leak following closure of MS-V-5A, report "The steam leak IS NOT isolated." When requested by the Control Room to close MS-V-5B, delete malfunction MS19B and report the status of the steam leak following closure of MS-V-5B, report "The steam leak IS isolated".		
	ARO	Step 6.2: If power >40% or FW-P-1B is tripped, then determine if leak is downstream of MS-V-5A by performing the following: <ul style="list-style-type: none"> - CLOSE MS-V-5A - If steam leak is isolated, the GO TO Section 7.0 (The steam leak is NOT isolated) - OPEN MS-V-5A
	ARO	Step 6.3: If power >40% or FW-P-1B is tripped, then determine if leak is downstream of MS-V-5B by performing the following: <ul style="list-style-type: none"> - CLOSE MS-V-5B - If steam leak is isolated, the GO TO Section 7.0 (The

Op Test No.: NRC Scenario # 3 Event # 5

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Event Description: Isolable steam leak in the Turbine Building

Time	Position	Applicant's Actions or Behavior
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		steam leak IS isolated)

EXAMINER NOTE: Once the leak is isolated and plant is stable, then GO TO Event #6.

Op Test No.: NRC Scenario # 3 Event # 6Page **22** of **31**

Event Description: Turbine Trips, Reactor does not trip automatically, Entry into OP-TM-EOP-001, Reactor Trip

Time	Position	Applicant's Actions or Behavior
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BOOTH CUE:		When directed by the lead examiner, insert EVENT #6
INDICATIONS AVAILABLE: Turbine Trip alarm, generated megawatts go to zero, RCS pressure rises.		
EXAMINER NOTE:		The reactor will not automatically trip, the URO will have to trip the reactor from the console during the OP-TM-EOP-001 Immediate actions.
EXAMINER NOTE:		Due to loss of Vital Bus 'C' the normal stop valve indication on console left is not available. The crew may use other redundant indications to verify the stop valves are closed.
	Crew	Recognizes the turbine trip, and that the reactor did not trip.
	URO	Performs OP-TM-EOP-001 Reactor Trip IMA's
OP-TM-EOP-001, REACTOR TRIP		
	URO	Step 2.1: (IMA) : Presses Both Reactor Trip and DSS pushbuttons (CC).
	URO	Step 2.2: (IMA) : Verifies that the reactor is shutdown by one of the following: <ul style="list-style-type: none"> • Power Range nuclear instrumentation indicates less than 5% (CC) • All control rods are inserted (PC) • Source Range count rate is continuously lowering (CC)
	URO	Step 2.3: (IMA) : Presses the Turbine Trip pushbutton (CL).
	URO	Step 2.4: (IMA) : Verifies the Turbine Stop valves are closed by observing the indication on CL.

Op Test No.:	<u>NRC</u>	Scenario #	<u>3</u>	Event #	<u>6</u>	Page 23 of 31
Event Description:	Turbine Trips, Reactor does not trip automatically, Entry into OP-TM-EOP-001, Reactor Trip					
Time	Position	Applicant's Actions or Behavior				

OP-TM-EOP-001 Symptom check		
	ARO	Verifies power to 1D and 1E 4kV bus
	ARO	Verifies SCM > 25F
	ARO	Verifies no symptoms of XHT exist.
	ARO	Verifies no symptoms of LOHT exist.
	ARO	Verifies no symptoms of an OTSG tube leak exist.
EXAMINER'S NOTE: Once the Reactor Trip IMA's are complete, the ARO will perform a symptom check. At the end of the symptom check, go to the Event #7.		

Op Test No.: NRC Scenario # 1 Event # 7/8

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Event Description: Loss of Offsite Power, Stuck open MSSV's

Time	Position	Applicant's Actions or Behavior
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BOOTH OPERATOR: When directed by the Lead Examiner INITIATE Event 7.

INDICATIONS AVAILABLE: Loss of all Control Room lighting, RCP's secured, loss of power to non-vital powered equipment.

EXAMINER NOTE: After the loss of offsite power, the crew will perform a symptom check, at which time they will identify an excessive heat transfer from the 'B' OTSG. This portion will be written that the URO restores SI, and the ARO isolates 'B' OTSG. After both are accomplished, the scenario can be terminated.

BOOTH CUE: Two minutes after the reactor trip announcement, inform the control room that 2 MSSV's are stuck open. The symptom check regarding the entry into XHT are presented below. The crew may enter XHT by using approaching criteria or wait until all of the conditions exist.

SYMPTOM CHECK

The crew will be continuously performing a symptom check. After the loss of power, 2 MSSV's will stay open. The crew must enter OP-TM-EOP-003 based on approaching or meeting the following criteria:

- RCS average temperature below 540F
- Uncontrolled lowering of RCS temperature
- Tsat for OTSG pressure is less than Tcold on affected OTSG(s)

This may be entered right after the event or shortly thereafter.

	Crew	Diagnoses Loss of Offsite Power.
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	CRS	Announces entry into OP-TM-AOP-020, Loss of Station Power.
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Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>7/8</u>	Page 25 of 31
Event Description: Loss of Offsite Power, Stuck open MSSV's						
Time	Position	Applicant's Actions or Behavior				

OP-TM-AOP-020, LOSS OF STATION POWER		
	ARO	Step 3.1: Initiates Emergency Feedwater
	ARO	Step 3.2: Initiates OP-TM-861-901, "EG-Y-1A Emergency Operations" and OP-TM-861-902, "EG-Y-1B Emergency Operations".
	CRS	Step 3.3: Verifies 1D 4160V and 1E 4160V busses are energized
	CRS	Steps 3.4: Verifies IC-P-1B is running.
	ARO	Step 3.5: Announces entry into AOP-020, breaking vacuum, and venting generator hydrogen over the RED plant page and radio.
	URO	Step 3.6: SI is not > 22 gpm, RNO: Initiates OP-TM-AOP-041 for loss of Seal Injection.
	ARO	Step 3.7 Initiate OP-TM-EOP-010 Guide 10, "Natural Circulation".
OP-TM-EOP-010 Guide 10, "Natural Circulation"		
CT-12	ALL	<p>IAAT all RCPs are off, then</p> <p>A If all of the following conditions exist, then adequate natural circulation is present:</p> <ul style="list-style-type: none"> - RCS Thot minus Tcold stabilizes at less than 50 °F. - THOT < 600 °F. - Incore temperature stabilizes and tracks Thot. - Cold leg temperatures approach saturation temperature for secondary side pressure. - OTSG heat removal is indicated by feeding or steaming with stable OTSG pressure. - SCM > 25°F.

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>7/8</u>	Page 26 of 31
Event Description:		Loss of Offsite Power, Stuck open MSSV's				
Time	Position	Applicant's Actions or Behavior				

OP-TM-AOP-041, LOSS OF SEAL INJECTION (IF THERE IS AN ES ACTATION, THIS SECTION WILL NOT BE PERFORMED)		
EXAMINER NOTE: Steps 3.1 and 3.2 are N/A for this scenario		
	URO	Step 3.3: Places MU-V-32 in HAND by pressing the White HAND pushbutton and verifying the White HAND light lit red AUTO light not lit.
	CRS	Step 3.4: 1D and 1E 4160V busses are both energized.
	URO	Step 3.5: Determines that a Makeup Pump is not running and IAW the RNO, performs the following: <ol style="list-style-type: none"> 1. Places MU-V-17 in HAND by pressing the White HAND pushbutton and verifying the White HAND light lit red AUTO light not lit (CC). 2. Dials MU-V-17 to full closed (CC).
	CRS	Step 3.5, RNO 4: Goes to Section 4.0.
OP-TM-AOP-041, LOSS OF SEAL INJECTION, SECTION 4.0		
EXAMINERS NOTE: Step 4.0 is N/A for this scenario		
	URO	Step 4.1: Verifies MU-P-1A is ES selected.
	URO	Step 4.2: Verifies that MU-V-36 and 37 are open.
	URO	Step 4.3: Starts DR-P-1A and DC-P-1A
	URO	Step 4.4: Starts MU-P-1A.

Op Test No.: NRC Scenario # 1 Event # 7/8

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Event Description: Loss of Offsite Power, Stuck open MSSV's

Time	Position	Applicant's Actions or Behavior
	URO	Step 4.5: MU-V-77A & B are Open, go to step 3.5
EXAMINER NOTE: The stuck open MSSV's on the "B" OTSG will cause conditions to be met for an Excessive Primary to Secondary Heat Transfer condition.		
	Crew	Diagnoses Excessive Heat Transfer and enters OP-TM-EOP-003, Excessive Primary To Secondary Heat Transfer.
OP-TM-EOP-003, EXCESSIVE PRIMARY TO SECONDARY HEAT TRANSFER		
	ARO	Step 3.1: Perform Rule 3, XHT
OP-TM-EOP-010, RULE 3 EXCESSIVE HEAT TRANSFER		
	ARO	Step 1: Verifies OTSG level <97.5%.
	ARO	Step 2: Verifies that primary to secondary heat transfer is excessive.
CT-17	ARO	Step 3: Performs Phase 1 isolation of "B" OSTG by: <ul style="list-style-type: none"> - Closing MS-V-1C by pushing the Close pushbutton and observing the Close light lit and the Open and Test lights not lit (CC).
CT-17	ARO	Step 3: Performs Phase 1 isolation of "B" OSTG by: <ul style="list-style-type: none"> - Closing MS-V-1D by pushing the Close pushbutton and observing the Close light lit and the Open and Test lights not lit (CC).
CT-17	ARO	Step 3: Performs Phase 1 isolation of "B" OSTG by: <ul style="list-style-type: none"> - Closing FW-V-17B by pushing the Close pushbutton and observing the Close light lit and the Open not lit (CC).

Op Test No.: NRC Scenario # 1 Event # 7/8

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Event Description: Loss of Offsite Power, Stuck open MSSV's

Time	Position	Applicant's Actions or Behavior
CT-17	ARO	Step 3: Performs Phase 1 isolation of "B" OSTG by: <ul style="list-style-type: none"> - Closing FW-V-16B by pushing the Close pushbutton and observing the Close light lit and the Open not lit (CC).
CT-17	ARO	Step 3: Performs Phase 1 isolation of "B" OSTG by: <ul style="list-style-type: none"> - Closing FW-V-5B by pushing the Close pushbutton and observing the Close light lit and the Open not lit (CC).
CT-17	ARO	Step 3: Performs Phase 1 isolation of "B" OSTG by: <ul style="list-style-type: none"> - Closing FW-V-92B by pushing the Close pushbutton and observing the Close light lit and the Open not lit (CC).
CT-17	ARO	Step 3: Performs Phase 1 isolation of "B" OSTG by: <ul style="list-style-type: none"> - Verifying MS-V-3A, MS-V-3B, and MS-V-C are closed by verifying green indicating light is present on CC.
CT-17	ARO	Step 3: Performs Phase 1 isolation of "B" OSTG by: <ul style="list-style-type: none"> - Closes MS-V-4B by directing ensuring the indicating light on CC is green.
	ARO	Step 4: Verifies the steam leak is not in the RB or Intermediate Building.
	ARO	Step 5: Throttles EFW IAW Rule 4, "Feedwater Control".
	ARO	Step 6: Verifies that OTSG level and pressure are NOT stabilized, RNO: Performs Phase 2 isolation of the 'B' OTSG

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>7/8</u>	Page 29 of 31
Event Description:		Loss of Offsite Power, Stuck open MSSV's				
Time	Position	Applicant's Actions or Behavior				

CT-17	ARO	Step 6: Performs Phase 2 isolation of the "B" OTSG by: <ul style="list-style-type: none"> - Closes EF-V-30B by taking the EFW controller to manual and pinning the toggle switch to the left (CC)
CT-17	ARO	Step 6: Performs Phase 2 isolation of the "B" OTSG by: <ul style="list-style-type: none"> - Closes EF-V-30C by taking the EFW controller to manual and pinning the toggle switch to the left (CC)
CT-17	ARO	Step 6: Performs Phase 2 isolation of the "B" OTSG by: <ul style="list-style-type: none"> - Closes MS-V-2B pressing the green closed pushbutton on console center.
OP-TM-EOP-010, RULE 4, FEEDWATER CONTROL		
	ARO	Steps 1-3: Verifies two or more EFW pumps are running, SCM is greater than 25°F, and that the "A" OTSG is not dry.
	ARO	Step 4: Verifies that there is not a RCP running and that the "A" OTSG level is at 50% or approaching 50%
EXAMINER NOTE: Scenario can be terminated when OTSG "B" has been isolated, and Natural Circulation has been established. If ES has actuated, the crew should terminate HPI prior to scenario termination.		

Op Test No.: NRC Scenario # 1 Event # Attachment

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Event Description: Terminate HPI steps

Time	Position	Applicant's Actions or Behavior
EXAMINER NOTE:		If the crew isolates the "B" OTSG prior to an ES actuation, this section will not be performed. These steps are attachment 7.3 of OP-TM-211-901, and are found on the back of Rule 2 on the console.
	URO	Step 1 : Clears ESAS signals by pressing the 1600# BYPASS buttons for each train of ES that actuated.
	URO	Step 2 : N/A because only 2 MU pumps will be running due to the loss of offsite power.
	URO	Step 3: Throttling is permitted IAW Rule 2 based on SCM >25F and HPI cooling not needed.
	URO	Step 4: Examinee will open MU-V-36 and MU-V-37 by pressing the RED open pushbuttons on CC. The GREEN closed lights will become dim, the RED lights will become bright.
	URO	Step 5: Emergency boration may or may not be required.
	URO	Step 6a: Examinee shutdown MU-P-1C by taking the pistol grip (CR) to the trip position. The RED light will become dim. The GREEN light will become bright.
	URO	Step 6a: Examinee shutdown MU-P-1A by taking the pistol grip (CC) to the trip position. The RED light will become dim. The GREEN light will become bright.
	URO	Step 6b: Examinee verifies MU-V-36 and 37 are open.
	URO	Step 6c: Examinee presses the MU-V-16A&B GREEN (CC) closed pushbuttons. The WHITE stop light and the GREEN closed light become bright. Only the GREEN closed light will remain bright when the valve is fully closed.

Op Test No.: NRC Scenario # 1 Event # AttachmentPage **31** of **31**

Event Description: Terminate HPI steps

Time	Position	Applicant's Actions or Behavior
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	URO	Step 6d: Examinee presses the MU-V-16C&D GREEN (CR) closed pushbuttons. The WHITE stop light and the GREEN closed light become bright. Only the GREEN closed light will remain bright when the valve is fully closed.
EXAMINER NOTE:		HPI is terminated with the Makeup Pumps that started on ES and the MU-V-16's are closed with the recirculation path (MU-V-36 and 37) is established.

Facility:	Three Mile Island	Task No.:	OF010009
Task Title:	Given a set of conditions, determine the Emergency Action Level (EAL) and make a Protective Action Recommendation (PAR) IAW the facility Emergency Plan.	JPM No.:	ILT 16-01 NRC JPM SA4
K/A Reference:	2.4.44 (4.4)	Modified Bank JPM	

To be conducted one on one.

Examinee:	NRC Examiner:
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Facility Evaluator:	Date:
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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.

Initial Conditions:

- T= 0 minutes:
 - Plant is at 100% Power.
 - Weather: Breezy. Temp: 60°F. Wind: from 291° at 8 mph.
 - AH-E-1C is out of service.
 - A loss of the '8' bus occurs and EG-Y-1B fails to power on the 1E 4160V bus
- T= 10 minutes:
 - Seismic motion is felt, PRF-1-3 Operating Basis Earthquake alarm is in
 - RCS pressure starts dropping, the reactor operator trips the reactor and the crew performs the Immediate Manual Actions of OP-TM-EOP-001.
 - UNISOLABLE RCS leakage exists at 500 gpm.
- T= 12 minutes:
 - Reactor Building pressure peaks at 31 psig, then drops rapidly to 0 psig
 - RM-G-23 reads 1.96 E+03 R/hr
 - The Maintenance Supervisor has informed you that, EG-Y-1B is inoperable and will take 10 hours to repair.

Task Standard:

Correctly identifies EAL and PAR.

Required Materials:

- Perform in a location with:
- EAL Matrix
 - Shift Emergency Director Book

General References:

- EP-AA-111, EMERGENCY CLASSIFICATION AND PROTECTIVE ACTION RECOMMENDATIONS, Revision 19
- EP-AA-111-F-09, TMI PLANT BASED PAR FLOWCHART, Revision F
- EP-AA-112-100-F-01, SHIFT EMERGENCY DIRECTOR CHECKLIST, Revision W
- EP-AA-112-F-09, EMERGENCY PUBLIC ADDRESS ANNOUNCEMENTS, Revision E
- EP-MA-114-100-F-01, STATE/LOCAL EVENT NOTIFICATION FORM, Revision P
- EP-AA-1009 Addendum 3 EXELON NUCLEAR EMERGENCY ACTION LEVELS FOR THREE MILE ISLAND (TMI) STATION, Revision 2

Appendix C	Job Performance Measure Worksheet	Form ES-C-1
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- EP-AA-112-100-F-06 ERO NOTIFICATION OR AUGMENTATION Revision V
- EP-AA-114-F-01 PWR RELEASE IN PROGRESS DETERMINATION GUIDANCE, Revision E
- EP-MA-114-100, MID-ATLANTIC STATE/LOCAL NOTIFICATIONS, Revision 23

Handouts:

- EP-AA-112-100-F-01, SHIFT EMERGENCY DIRECTOR CHECKLIST.
- Emergency Director Binder

Initiating Cue:

- You are the Shift Manager and have the responsibilities of the Shift Emergency Director from the Control Room. I will act as your communicator. Declare the appropriate EAL and respond in accordance with the EP-AA-112-100-F-01, SHIFT EMERGENCY DIRECTOR CHECKLIST.

Ensure all communications are marked as a DRILL.

Time Critical Task: Yes

Validation Time: 23 minutes

SIMULATOR SETUP

N/A

(Denote Critical Steps with a check)

EVALUATOR CUE: The Time Critical Start Time is when the Cue is acknowledged.

#1 Time Critical Start Time: _____

Performance Step: 1 Compares conditions to the EAL Table.

- √ **Standard:**
- Examinee:**
- Determines UNISOLABLE RCS leakage is present at 500 GPM and/or RM-G-22 / Rm-G-23 Readings.
 - Reactor Building pressure peaks at 31 psig, then drops rapidly to 0 psig
 - RM-G-23 reads 1.96 E+03 R/hr

The examinee should declare FG1

Comment:

EVALUATOR NOTE: The Examinee may announce his E-Plan Declaration to the Control Room, prior to implementing EP-AA-112-100-F-01. This would be the STOP Time #1.

EP-AA-112-100-F-01

Performance Step: 2 Locate and Implement EP-AA-112-100-F-01 for GE.

- Standard:**
- Examinee locates EP-AA-112-100-F-01.
 - Examinee determines that Section 1.4 is to be implemented for General Emergency Initial Actions.

Comment:

EVALUATOR NOTE: The #1 Time Critical Stop Time is when the General Emergency is declared.

#1 Time Critical Stop Time: _____

#2 Time Critical Start Time: _____
(This is the same time as #1 Stop Time)

EP-AA-112-100-F-01, Step 1.4.A

Performance Step: 3 Announce the event classification, possible escalation paths, and declaration time to the Control Room staff.

✓ **Standard:** Examinee announces FG1 based on RCS leakage > 150 gpm, reactor building pressure rapidly dropping, and RM-G-23 reading greater than 1.96 E+03 R/hr

Comment:

EVALUATOR NOTE: Time Critical #1 must be equal to or less than 15 minutes.

Time Critical #1= (Time of declaration) _____
(#1 Time start) - _____
= _____ mins

EP-AA-112-100-F-01, Step 1.4.B

Performance Step: 4 Record the EAL, threshold(s) (as applicable) and declaration time.

Standard: Examinee records EAL FG1 on EP-AA-112-100-F01.

Examinee records the time of declaration on EP-AA-112-100-F01.

Comment:

EVALUATOR NOTE: Step 1.4C and 1.4D are N/A.

EVALUATOR CUE: Repeat Back any direction given to you with regards to EP-AA-112-F-09. (Tab #1)

EP-AA-112-100-F-01, Step 1.4.E

Performance Step: 5 SELECT the Emergency Public Address Announcements from the form and DIRECT performance of the public address announcement within 15 minutes of event classification.

✓ **Standard:** Examinee fills out EP-AA-112-F-09 (found at tab 1), section 4.2.A, and hands to communicator (NRC examiner) to make the announcement.

Comment: Description: Loss of Fission Product Barriers / Words to that effect.

EVALUATOR CUE: Repeat Back any direction given to you with regards to EP-AA-112-100-F-06. (Tab #2)

EP-AA-112-100-F-01, Step 1.4.F

Performance Step: 6 If the ERO has not been activated, then DIRECT activation of the ERO Notification using Scenario 1, "Actual Event Respond to Facility," or Scenario 3, "Actual Event Alternate Reporting Location," as appropriate, per EP-AA-112-100-F-06. (Tab #2)

Standard: Examinee hands out EP-AA-112-100-F-06 and directs activation of the ERO notification using Scenario 1.

Comment:

EVALUATOR CUE: If requested to provide DAPAR information, then respond "Offsite dose projections are < 1 REM TEDE and < 5REM CDE thyroid".

EP-AA-112-100-F-01, Step 1.4.G

- Performance Step: 7** Determine the PAR per the Emergency Classification and Protective Action Recommendations procedure.
- Emergency Classification and PAR Procedure: EP-AA-111 (Tab 6)
 - Plant Based PAR Flowchart: EP-AA-111-F-09 (Tab 7)

Examinee follows the flowchart of EP-AA-111-F-09, Page 1, as follows:

- Initial PAR after GE declared – **Yes**
- Any Loss of Containment? – **Yes**
- 1. Loss of Primary Containment: **Yes**
AND EITHER:
2. Containment Rad Monitors $\geq 4.40\text{E}+3$ R/Hr? **NO**
OR
EAL RG1 been met? **NO**
- Is there a Hostile Action event in Progress?– **No**
- Is this PAR from the Control Room?– **Yes**

✓ **Standard:**

Examinee determines the following actions are required:

- Evacuate 2-mile radius, AND
- Evacuate 2-5 miles in the following downwind sectors per Table 2:
 - NE / ENE / E / ESE / SE / SSE / S

Comment:

EVALUATOR CUE: Repeat Back any direction given to you with regards to EP-MA-114-100-F-01.

EVALUATOR CUE: If asked, radioactive liquid is not expected to be transported beyond the protected area boundary, liquid effluent radiation monitors are reading normal, and no abnormal radioactivity has been detected beyond the protected area boundary.

EP-AA-112-100-F-01, Section 1.4.H

Performance Step: 8 Direct performance of State/Local notifications within 15 minutes of the event classification as required per the Notifications procedure.
Notification Procedure EP-MA-114-100: (Tab 3)
Notification Form EP-MA-114-100-F-01): (Tab 4)
Release in Progress Determination Guidance EP-AA-114-F-01: (Tab 21)

✓ **Standard:**

- Examinee fills out EP-MA-114-100-F-01 (while using EP-MA-114-100 and EP-AA-114-F-01 for guidance) as follows:
 - Block 1: This is a DRILL (**This step NOT critical**)
 - Block 2: C- TMI
 - Block 3: A- ONE
 - Block 4: D- GENERAL EMERGENCY
 - Block 5: Time and Date of declaration
 - Block 6: A- INITIAL DECLARATION
 - Block 7: FG1
 - Block 8: B – Fission Product Barrier Degradation
 - Block 9: B – AIRBORNE radiological release in progress
 - Block 10: 291 (degrees) / 8 (miles per hour)
 - Block 11: B-
 - Ⓔ 360 DEGREES FROM 0 MILES (SITE BOUNDARY) TO 2 MILES
 - AND
 - THE FOLLOWING SECTORS FROM 2 MILES TO 5 MILES:
 - Ⓔ NE / ENE / E / ESE / SE / SSE / S
- THIS PARIS NOT THE RESULT OF A RAPIDLY PROGRESSING SEVERE ACCIDENT.
- Examinee hands the filled out form to the communicator.

Comment:

EVALUATOR NOTE: Time Critical #2 must be equal to or less than 15 minutes.

Time Critical #2= **(#2 Critical Stop Time)** _____
 (# 2Critical Start Time) - _____
 = _____ mins

Terminating Cue: **When the candidate hands the completed Emergency Notification Form to the Communicator: Evaluation on this JPM is complete.**

Job Performance Measure No.: ILT 16-01 NRC JPM SA4

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Initial Conditions:

- T= 0 minutes:
 - Plant is at 100% Power.
 - Weather: Breezy. Temp: 60°F. Wind: from 291° at 8 mph.
 - AH-E-1C is out of service.
 - A loss of the '8' bus occurs and EG-Y-1B fails to power on the 1E 4160V bus
- T= 10 minutes:
 - Seismic motion is felt, PRF-1-3 alarm is in
 - RCS pressure starts dropping, the reactor operator trips the reactor and the crew performs the Immediate Manual Actions of OP-TM-EOP-001.
 - UNISOLABLE RCS leakage exists at 500 gpm.
- T= 12 minutes:
 - Reactor Building pressure peaks at 31 psig, then drops rapidly to 0 psig
 - RM-G-23 reads 1.96 E+03 R/hr
 - The Maintenance Supervisor has informed you that, EG-Y-1B is inoperable and will take 10 hours to repair.

Initiating Cue:

You are the Shift Manager and have the responsibilities of the Shift Emergency Director from the Control Room. I will act as your communicator. Declare the appropriate EAL and respond in accordance with the EP-AA-112-100-F-01, SHIFT EMERGENCY DIRECTOR CHECKLIST.

Ensure all communications are marked as a DRILL.

Time Critical

Yes

Facility: Three Mile Island Task No.: ADM08016
Task Title: REVIEW RB ENTRY SURVEY LOG JPM No.: ILT 16-01 NRC JPM SA3
K/A Reference: 2.3.13 (3.8) Bank JPM: 2011 CERT SRO A3

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: _____ Actual Performance: X
Classroom X Simulator _____ Plant _____

Task Standard: Faults identified: Particulate and Oxygen are not within limits and the RWP does NOT identify any Respirator Requirements.

Required Materials:

- RP-TM-460-1007 Rev 8, Access to TMI-1 Reactor Building
- A current copy of a Radiation Work Permit for the Reactor Building that does NOT include respiratory protection requirements
- Attachment#1 of RP-TM-460-1007 Rev 8, filled out per the setup on the next page.

General References:

- RP-TM-460-1007 Rev 8, Access to TMI-1 Reactor Building

Handouts: RP-TM-460-1007 Access to TMI-1 Reactor Building, including a completed Attachment#1 of RP-TM-460-1007 and RWP #00305 Containment Work at Power.

Validation Time: 10 minutes.

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.

Initial Conditions:

- The plant has been steady at full power for 6 months.
- Neither the Kidney Filter System nor RB Purge System has been operated.

Initiating Cue: You are the Shift Manager on duty. Review a RB Entry Survey Log IAW RP-TM-460-1007, Access to TMI-1 Reactor Building, for a routine Reactor Building entry that is scheduled within the next 2 Hours. Verify the lab results are within allowable range to allow RB entry using RWP # 00305.

Time Critical Task: N/A

Validation Time: 15 Minutes

SIMULATOR SETUP**N/A**Attachment 1
Reactor Building Entry Survey Log
Setup

RM-A- Sample Lab Results

			Air Sample Log#
Particulate:	3E-8 $\mu\text{Ci/cc}$	0.5 DAC Fraction	A161012-0001
Iodine:	0.7E-8 $\mu\text{Ci/cc}$	0.28 DAC Fraction	A161012-0001
Gas:	2.31E-5 $\mu\text{Ci/cc}$	0.62 DAC Fraction	A161012-0002
Tritium (H3):	7.51E-6 $\mu\text{Ci/cc}$	0.38 DAC Fraction	A161012-0003
Oxygen (O2)	18.9	% on Gas Partitioner	
Explosive Gas	<0.05	% on Gas Partitioner	
Carbon Monoxide	60	(ppm)	

(Denote Critical Steps with a check)

START TIME: _____

Evaluator Cue: Provide a completed Attachment#1 of RP-TM-460-1007 and a copy of same procedure and RWP#00305 Containment Work at Power

✓ **Performance Step: 1** Examinee reviews RM-A-2 sample lab results for Particulate.
Procedure Step: 3.2

Standard: Examinee verifies Particulate is **NOT** below 30% DAC as determined by analysis RM-A-2 air samples and identifies that respiratory protection is required for RB entry per section 3.2.

CUE: If Examinee calls Rad Con to verify RWP does NOT include any respiratory protection, confirm that it does not require respiratory protection.

If examinee wants to stop review, inform him/her to review all data on the Survey Log.

Comment:

Performance Step: 2 Examinee reviews RM-A-2 sample lab results for Iodine.
Procedure Step: 3.2

Standard: Examinee verifies Iodine is below 30% DAC as determined by RM-A-2 analysis of air samples.

Comment:

Performance Step: 3 Examinee reviews RM-A-2 sample lab results for Gas.
Procedure Step: 3.2

Standard: Examinee verifies Gas is below 1 DAC as determined by RM-A-2 analysis of air samples

Comment:

CUE When examinee reviews the Tritium Value, inform the examinee the value is within required limits.

Performance Step: 4 Examinee reviews sample results for Tritium.

Standard: Examinee verifies Tritium is within required limits.

-
- √ **Performance Step: 5** Examinee reviews RM-A-2 sample results for Oxygen.
Procedure Step: 3.2
- Standard:** Examinee verifies Oxygen is below 19.5% as determined by analysis of air samples and notifies Occupational Safety and the Control Room of the result.
- Comment:**
-
- Performance Step: 6** Examinee reviews RM-A-2 sample results for Explosive Gas.
Procedure Step: 3.2
- Standard:** Examinee verifies Explosive Gas is below 0.4% as determined by analysis of air samples.
- Comment:**
- CUE:** **When examinee reviews Carbon Monoxide value inform the examinee the value is within required limits.**
-
- Performance Step: 7** Examinee reviews sample results for Carbon Monoxide.
- Standard:** Examinee verifies Carbon Monoxide is within required limits.
- Comment:**
-
- √ **Performance Step: 8** Examinee may sign the RB Survey Log but
- Standard:** Examinee does **NOT** approve RB entry due to:
- Respiratory protection is required per RP-TM-460-1007, but not specified on the RWP.
- Comment:**
-
- Terminating Cue:** **When examinee has completed the paperwork and hand it in the JPM is terminated.**
-
- STOP TIME:** _____

Job Performance Measure No.: ILT 16-01 NRC JPM SA3

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- The plant has been steady at full power for 6 months.
- Neither the Kidney Filter System nor RB Purge System has been operated.

INITIATING CUE:

You are the Shift Manager on duty. Review a RB Entry Survey Log IAW RP-TM-460-1007, Access to TMI-1 Reactor Building, for a routine Reactor Building entry that is scheduled within the next 2 Hours.

Verify the lab results are within allowable range to allow RB entry using RWP # 00305.

Reactor Building Entry Survey Log

DATE: Today
 %

REACTOR POWER: 100START TIME: 0700

TECHNICIAN: RP Tech / Rp Tech
Print/Sign

1. RM-A2 SAMPLE LAB RESULTS

Air Sample Log #

PARTICULATE	<u>3.0E-8</u>	μCi/cc	<u>0.5</u>	DAC FRACTION	<u>A161012-0001</u>
IODINE	<u>0.7E-8</u>	μCi/cc	<u>0.28</u>	DAC FRACTION	<u>A161012-0001</u>
GAS	<u>2.31E-5</u>	μCi/cc	<u>0.62</u>	DAC FRACTION	<u>A161012-0002</u>
TRITIUM (H3)	<u>7.51E-6</u>	μCi/cc	<u>0.38</u>	DAC FRACTION	<u>A161012-0003</u>
OXYGEN (O2)	<u>18.9</u>	% on Gas Partitioner			
EXPLOSIVE GAS	<u><0.05</u>	% on Gas Partitioner			
CARBON MONOXIDE	<u>60</u>	(ppm)			

2. Readings from inside Reactor Building (If Required) **N/A**

			DAC Fraction	Air Sample Log #
Particulate	_____	μCi/cc (Gross βγ)	_____	_____
Gaseous	_____	μCi/cc	_____	_____
Iodine	_____	μCi/cc	_____	_____
Tritium (H ³)	_____	μCi/cc	_____	_____
Oxygen (O ₂)	_____	% CG/O ₂ Meter		
	_____	% on Gas Partitioner		
Explosive Gas (H ₂)	_____	% CG/O ₂ Meter		
	_____	% on Gas Partitioner		
Carbon Monoxide	_____	(ppm)		

See Attached HPGe Scan Results

- ☐ Reactor Bldg. Purged Prior to Entry
- ☐ Kidney Filter System Operated Prior to Entry
- ☐ Iodines and Particulates < 30% DAC

COMMENTS: NONE

REVIEWED BY: _____ Shift Manager
Print/Sign

Manager/Supervisor _____ Radiation Protection
Print/Sign

Facility: THREE MILE ISLAND UNIT 1 Task No.:

Task Title: Use Station Drawing to Predict Impact of Component Failure and Evaluate Technical Specification Implications JPM No.: ILT 16-01 NRC JPM SA2

K/A Reference: G 2.2.41 (3.5/3.9) Bank JPM: TMI08 NRC JPM A2 SRO

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.

Initial Conditions: You are the CRS
Plant is at 100% power
Electricians have reported a broken cam connecting rod on G11-02 EG-Y-1B output breaker.
Electricians have provided a copy of 208-164.
Only contacts associated with 52 MOC(2) are affected (Grid A-6)

Task Standard: Determine that 27/86 lockouts will not occur for condition of Diesel breaker closed and ESAS and declares a 7 day timeclock to return to service IAW Tech Spec 3.7.2.c and 3.7.2.f, Lockout inoperable.

Required Materials: Copies of site 208 and 209 electrical diagram books.

General References: 208-314 1S 480 Volt Swgr, 208-316 1T 480 Volt Swgr., 208-169 Bus 1E UV and Potential Indicating Circuits, 208-300 Bus 1T UV Lock-out Relays, 208-318 Bus 1S UV Lock-out Relays
Tech Spec 3.7.2.c and 3.7.2.f

Appendix C	Job Performance Measure Worksheet	Form ES-C-1
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Handout: • 208-164, G11-02

Initiating Cue: You are directed to determine impact to operations based on this failure.

Time Critical Task: No

Validation Time: 20 Minutes

SIMULATOR SETUP

N/A

PERFORMANCE INFORMATION

(Denote Critical Steps with a check mark)

START TIME: _____

EXAMINER CUE: Direct the examinee to determine the impact of operations based on the failure. Hand the examinee the 208-164 drawing.

EXAMINER NOTE: A 208 and 209 will be used for the examinee to find the drawings.

Performance Step: 1 Obtains 208-164 G11-02 Elementary Electrical Diagram
Standard: Drawing obtained.
Comment:

Performance Step: 2 52 MOC(2) located on drawing at grid A-6 (52 MOC(2))
Standard: Contacts located.

Comment:

Performance Step: 3 When Requested, Provide Electrical Prints 314 and/or 316 to determine contact effect.

Standard: 208-314 and/or 208-316 referred to

Evaluator Note: After student obtains appropriate diagram you may hand the candidate a copy they can mark up.

Comment:

PERFORMANCE INFORMATION

- √ **Performance Step: 4** **Determines from 208-314 or 316 that 52/G11-02 contact remaining open will prevent 27/86 actuation for bus 1S or 1T, dependent on sheet 314 or 316 respectively.**
- Standard:** Examinee verbalizes 27/86 for bus 1S or 1T will not work for the condition of diesel breaker closed with ESAS actuated.

Comment:

- √ **Performance Step: 5** **Determines from 208-314 or 316 (which ever was not evaluated in previous step) that 52/G11-02 contact remaining open will prevent 27/86 actuation for bus 1S or 1T, dependent on sheet 314 or 316 respectively.**
- Standard:** Examinee verbalizes 27/86 for bus 1S or 1T will not work for the condition of diesel breaker closed with ESAS actuated.

Comment:

- √ **Performance Step: 6** **Reviews section 3.7.2.c and 3.7.2 .f of Technical Specifications and identifies that due to the failed load shedding ability Diesel is inoperable and declares a 7 day timeclock to repair.**
- Standard:** Declares a 7 day time clock IAW Tech Specs due to the failed load shedding ability.

Comment:

Terminating Cue: **When Tech Specs have been addressed this JPM may be terminated.**

STOP TIME: _____

TIME CRITICAL STOP TIME: N/A

VERIFICATION OF COMPLETION

Job Performance Measure No.: ILT 16-01 NRC JPM SA2

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

You are the CRS
Plant is at 100% power
Electricians have reported a broken cam connecting rod on G11-02 E
G-Y-1B output breaker.
Electricians have provided a copy of 208-164.
Only contacts associated with 52 MOC(2) are affected: (Grid A-6)

INITIATING CUE:

You are directed to determine impact to operations based on this failure.

Appendix C	Job Performance Measure Worksheet	Form ES-C-1
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Facility: THREE MILE ISLAND Task No.: GOP002003

Task Title: PERFORM AN ESTIMATED CRITICAL ROD POSITION CALCULATION JPM No.: ILT 16-01 NRC JPM SA1-2

K/A Reference: 2.1.43 (4.1/4.3) Bank JPM: TQ-TM-104-ADM-403-J100

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.

- Initial Conditions:
- A sequential trip of both feedwater pumps and reactor trip 72 hours ago
 - 100% power for 150 days prior to the trip
 - Cycle Burnup is 300 EFPD from hourly log
 - Tave = 532 °F
 - Final critical boron concentration = 1469 ppm
 - FINAL MIXED BORON DEPLETION CORRECTION FACTOR in the control room log is 0.95
 - The Plant Process Computer is not available.
 - No reactor engineering personnel are on site.

Task Standard: Identify all errors with the ECP. Calculate and approve an ECP.

- Required Materials:
- OP-TM-300-000, REACTIVITY AND POWER DISTRIBUTION CALCULATIONS, Rev 8
 - OP-TM-300-403, ESTIMATED CRITICAL ROD POSITION, Rev 5
 - Ruler
 - Calculator

Appendix C	Job Performance Measure Worksheet	Form ES-C-1
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- General References:
- OP-TM-300-000, REACTIVITY AND POWER DISTRIBUTION CALCULATIONS, Rev 8
 - OP-TM-300-403, ESTIMATED CRITICAL ROD POSITION, Rev 5

Initiating Cue: Perform a review and approval of an Estimated Critical Rod Position calculation. Make any corrections, if required.

Time Critical Task: No

Validation Time: 25 mins

PERFORMANCE INFORMATION

(Denote Critical Steps with a check mark)

START TIME: _____

EVALUATOR NOTE: This JPM may be administered without direct interaction between the examiner and examinee. Once the calculation has been completed, review the calculation for accuracy.

EVALUATORS CUE: Role play as SM and direct the Examinee to calculate, review, and approve an ECP for current plant conditions IAW OP-TM-300-403

Provide a copy of OP-TM-300-000 Reactivity and Power Distribution Calculations and OP-TM-300-403 Attachment 7.1 and Attachment 7.2. (Last two pages of JPM)

OP-TM-300-403, Attachment 7.1

Performance Step: 1 Calculation is for an ECP at Date/Time

Standard: Examinee verifies the current date and time on Attachment 7.1.

Comment:

OP-TM-300-403, Attachment 7.1, Step 1

Performance Step: 2 Enter the average reactor coolant temperature, TAVE, from the Initial Conditions

Standard: Examinee verifies 532F on Line 1.

Comment:

OP-TM-300-403, Attachment 7.1, Step 2

Performance Step: 3 **OBTAIN** the cycle burn-up from the Initial Condition Sheet.

Standard: Examinee verifies 300 EFPD on Line 2

Comment:

PERFORMANCE INFORMATION

OP-TM-300-403, Attachment 7.1, Step 3a

Performance Step: 4 **OBTAIN** the Final Measured Boron Concentration, Initial Conditions.

Standard: Examinee verifies 1469 ppmB on Line 3a

Comment:

EXAMINER NOTE: If the Examinee states that he/she is complete with the review, inform the examinee to perform the entire calculation.

OP-TM-300-403, Attachment 7.1, Step 3b

✓ **Performance Step: 5** Obtain the Boron Depletion Correction Factor from Initial Conditions.

Standard: Examinee finds 1.0
Examinee verifies 0.95 on line 3b.

Comment:

OP-TM-300-403, Attachment 7.1, Step 3c

✓ **Performance Step: 6** Calculate the Final Corrected Boron Correction.

Standard: Examinee finds 1469
Examinee verifies: $1469 \times 0.95 = \underline{1396}$ ppmB on Line 3c
(between 1395.5 – 1396)

Comment:

OP-TM-300-403, Attachment 7.1, Step 4

Performance Step: 7 **DETERMINE** the fuel excess reactivity per Figure 2.

Standard: Examinee verifies 11.4 on Line 4.
(Between 11.2 and 11.4% $\Delta k/k$)

Comment:

PERFORMANCE INFORMATION

OP-TM-300-403, Attachment 7.1, Step 5a

Performance Step: 8 **DETERMINE** the Inverse Boron Worth from Figure 8.

Standard: Examinee verifies 140.5 on Line 5a
(between: 140 and 141 ppmB /%Δk/k)

Comment:

OP-TM-300-403, Attachment 7.1, Step 5b

✓ **Performance Step: 9** **DETERMINE** the Boron reactivity Worth by dividing the current concentration (Step 3c) by the HZP Inverse Boron Worth (Step 5a) X (-1).

Standard: Examinee finds -10.46 on Line 5b.
Examinee calculates -9.94
(between -9.91 and -9.95 %Δk/k)

Comment:

OP-TM-300-403, Attachment 7.1, Step 6

Performance Step: 10 **OBTAIN** the xenon worth from Figure 13

Standard: Examinee verifies -0.1 on Line 6.
(between -0.05 and -0.15 %Δk/k)

Comment:

PERFORMANCE INFORMATION

OP-TM-300-403, Attachment 7.1, Step 7

Performance Step: 11 Obtain the Samarium and Plutonium Buildup after shutdown by using Figure 15.

Standard: Examinee verifies time since last S/D on Line 7

72 hours

Examinee verifies **-0.10** on Line 7

(between -0.09 and -0.11 % Δ k/k)

Comment:

OP-TM-300-403, Attachment 7.1, Step 8

✓ **Performance Step: 12** **DETERMINE** the inserted CRG 5-7 worth required for Criticality

Standard: Examinee finds **-0.74** on Line 8

Examinee calculates **-1.26**

(Between -1.20 and -1.30 % Δ k/k)

Comment:

EXAMINER NOTE: The Rod Tolerance and Rod Index bands are **CRITICAL**, NOT the value associated with the reactivity values.

OP-TM-300-403, Attachment 7.1, Step 9

✓ **Performance Step: 13** **DETERMINE** the Estimated Critical Rod Position from Figure 5a.

Standard: Examinee finds **236%**

Examinee determines **175%** on line 9.

(between 165 and 185% Rod Index)

Comment:

PERFORMANCE INFORMATION

OP-TM-300-403, Attachment 7.1, Step 10

- ✓ **Performance Step: 14** **DETERMINE** the Critical Rod Position Tolerance Band from Figure 5A.

Circle 0.5% $\Delta k/k$

Determine Minimum Rod Withdrawal Limit using Fig 5a

Determine the Maximum Rod Withdrawal Limit Fig 5a

Standard:

Examinee verifies that the Steady State condition adjustments need to be made and 0.5% $\Delta K/K$ is circled in Line 10a.

Examinee finds -1.24 and 183%

Examinee determines -1.76±.02 $\Delta k/k$ for a Rod Index of 118% on Line 10b for Minimum

Examinee finds -0.24 and 284%

Examinee determines -0.76±.02 $\Delta k/k$ for a Rod Index of 235% on Line 10c for Maximum :

(Rod Positions: minimum between 110 and 130% and maximum between 225 and 245%)

Comment:**OP-TM-300-403, Attachment 7.1, Step 11**

- Performance Step: 15** If this is a Transient Xenon Startup, then record the interval that ECP is valid.

Standard: Examinee verifies Step 11 is N/A

Comment:**OP-TM-300-403, Attachment 7.1, Approval**

- Performance Step: 16** **Note** that an anomaly exists between the two calculations

Standard: Examinee notifies the Shift Manager about the discrepancies.

Comment:

Terminating Cue: When examinee has notified the Shift Manager of an anomaly with the calculations, this JPM may be terminated.

STOP TIME: _____

TIME CRITICAL STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: ILT 16-01 NRC JPM SA1-2

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- A sequential trip of both feedwater pumps and reactor trip 72 hours ago
- 100% power for 150 days prior to the trip
- Cycle Burnup is 300 EFPD from hourly log
- Tave = 532 °F
- Final critical boron concentration = 1469 ppm
- FINAL MIXED BORON DEPLETION CORRECTION FACTOR in the control room log is 0.95
- The Plant Process Computer is not available.
- No reactor engineering personnel are on site.

INITIATING CUE:

Perform a review and approval of an Estimated Critical Rod Position calculation. Make any corrections, if required.

TIME CRITICAL:

No

ATTACHMENT 7.1
Estimated Critical Position Calculation Data Sheet

Page 1 of 1

NOTE: Refer to Attachment 7.2 to complete this Data Sheet. Data may be entered in any sequence. Sign-off verifies all data entered as required. Approval signature indicates an "Independent Verification".

CALCULATION IS FOR AN ECP AT

DATE/TIME Today / Now

1. T_{AVE} (Assume $T_{AVE} = 532 \pm 2^\circ\text{F}$) 532 °F
2. CYCLE BURNUP 300 EFPD
3. 3a. FINAL MEASURED BORON CONCENTRATION 1469 ppmB
- 3b. BORON DEPLETION CORRECTION FACTOR 1.0
(PPC, Control Room Log, Reactor Engineering, Reactivity Datasheet)
- 3c. FINAL CORRECTED BORON CONCENTRATION (3.a) X (3.b) = 1469 ppmB
4. FUEL EXCESS REACTIVITY (FIG 2) 11.4 % $\Delta k/k$
5. 5a. INVERSE BORON WORTH (FIG 8) 140.5 ppmB/% $\Delta k/k$
- 5b. BORON REACTIVITY WORTH (3c / 5a) x (-1) = -10.46 % $\Delta k/k$
6. XENON REACTIVITY WORTH (PPC, REACTOR ENGR., FIG 13) -0.1 % $\Delta k/k$
7. SAMARIUM AND PLUTONIUM BUILDUP (FIG 15)
 - TIME SINCE LAST SHUTDOWN 72 HRS
 - REACTIVITY DUE TO BUILDUP -0.10 % $\Delta k/k$
8. INSERTED CRG 5-7 WORTH REQUIRED FOR CRITICALITY (IRW)
(4 + 5b + 6 + 7) x (-1) = -0.74 % $\Delta k/k$
9. ESTIMATED CRITICAL ROD POSITION (FIG 5A) 236 % ROD INDEX
10. CRITICAL ROD POSITION TOLERANCE BAND (FIG 5A)
 - 10a. Circle One: 0.5% $\Delta k/k$ 0.8% $\Delta k/k$
 Use 0.5% $\Delta k/k$ for Steady State conditions if xenon (6) is 0.0 to -0.5%
 Use 0.8% $\Delta k/k$ for Transient conditions if xenon (6) is more negative than -0.5% $\Delta k/k$
 - 10b. MINIMUM ROD WITHDRAWAL LIMIT
 (8 - 10a) = -1.24 % $\Delta k/k$ \Rightarrow 183 %ROD INDEX (FIG 5a)
 - 10c. MAXIMUM ROD WITHDRAWAL LIMIT
 (8 + 10a) = -0.24 % $\Delta k/k$ \Rightarrow 284 %ROD INDEX (FIG 5a)
11. If this is a transient Xenon startup, then record the interval that ECP is valid
 From: Date/Time N/A To: Date/Time N/A

CALCULATED BY: RO #1 DATE/TIME Today / Now

APPROVED BY (SRO): _____ DATE/TIME _____

ATTACHMENT 7.2
Estimated Critical Position Calculation Instructions
Page 1 of 1

NOTE: Figure numbers refer to attachments in OP-TM-300-000.

Data may also be obtained from approved references, e.g., current cycle Physics Data Manual or Reactivity Datasheet.

1. T_{AVE} : The reactor coolant temperature is assumed to be $532 \pm 2^\circ\text{F}$
2. Cycle Burnup: From FIDMS Display 1 or the Hourly Log
- 3a. Measured Boron Concentration: Obtain the latest measured boron concentration from the RCS chemistry analysis, and check the Control Room log to verify that no major boron concentration changes have been made since the analysis. If major boron concentration changes have been made since the latest sample, request a new RCS boron concentration measurement. Until the new boron concentration is available, use OP-TM-300-409, Final RCS Boron Concentration Estimate Following RCS Feed and Bleed, to estimate the current boron concentration to calculate a preliminary ECB.
- 3b. Boron Depletion Correction Factor: From PPC, Control Room Log, or Reactor Engineering.
- 3c. Final Corrected Boron Concentration: Adjust the measured boron concentration to account for boron-10 depletion by multiplying the Measured Boron Concentration by the Boron Depletion Correction Factor.
3. Fuel Excess Reactivity: From Figure 2.
- 5a. Inverse Boron Worth: From Figure 8
- 5b. Boron Reactivity Worth: Quotient of 3c and 5a.
6. Xenon Reactivity Worth: Obtain xenon worth using the PPC, FIDMS Display 22 or from program XENC# (where # is the current cycle number). Figure 13 may be used if the PPC and Reactor Engineering are unavailable, provided that power prior to shutdown was constant ($\pm 2\%\text{FP}$) for at least 40 hours.
7. Samarium and Plutonium Buildup Reactivity Worth: Record the number of hours since 0% FP and obtain Sm and Pu worth per Figure 15. If startup at any time during the cycle is within 5 days of a previous startup, contact Reactor Engineering for the appropriate reactivity worth.
8. Inserted CRG 5-7 Worth Required for Criticality: Add reactivity contributions from Lines 4 through 7.
9. Estimated Critical Rod Position: Rod position from Figure 5A corresponding to the reactivity value from Line 8.
10. Critical Rod Position Tolerance Band: As noted on the Calculation Data Sheet. Combine the reactivity value from Line 8 with the tolerance value from Line 10a and find the corresponding rod positions on Figure 5A.
11. For the purposes of this procedure, "Transient Xenon" conditions exist when the pre-critical Xe concentration is more negative than $-0.5\% \Delta k/k$. Use the Xe value from Line 6 and a plot or table of Xe behavior with time. Estimate when Xe worth will be more or less negative than the value in Line 6 by $0.5\% \Delta k/k$.

NOTE: Refer to Attachment 7.2 to complete this Data Sheet. Data may be entered in any sequence. Sign-off verifies all data entered as required. Approval signature indicates an "Independent Verification".

SA1-2 ANSWER KEY
DO NOT GIVE TO EXAMINEE

CALCULATION IS FOR AN ECP AT

DATE/TIME Today / Now

1. T_{AVE} (Assume $T_{AVE} = 532 \pm 2^\circ\text{F}$) 532 °F
2. CYCLE BURNUP 300 EFPD
3. 3a. FINAL MEASURED BORON CONCENTRATION 1469 ppmB
- 3b. BORON DEPLETION CORRECTION FACTOR 0.95
(PPC, Control Room Log, Reactor Engineering, Reactivity Datasheet)
- 3c. FINAL CORRECTED BORON CONCENTRATION (3.a) X (3.b) = 1396 ppmB
4. FUEL EXCESS REACTIVITY (FIG 2) 11.4 % $\Delta k/k$
5. 5a. INVERSE BORON WORTH (FIG 8) 140.5 ppmB/% $\Delta k/k$
- 5b. BORON REACTIVITY WORTH (3c / 5a) x (-1) = -9.94 % $\Delta k/k$
6. XENON REACTIVITY WORTH (PPC, REACTOR ENGR., FIG 13) -0.1 % $\Delta k/k$
7. SAMARIUM AND PLUTONIUM BUILDUP (FIG 15)
 - TIME SINCE LAST SHUTDOWN 72 HRS
 - REACTIVITY DUE TO BUILDUP -0.10 % $\Delta k/k$
8. INSERTED CRG 5-7 WORTH REQUIRED FOR CRITICALITY (IRW)
(4 + 5b + 6 + 7) x (-1) = -1.26 % $\Delta k/k$
9. ESTIMATED CRITICAL ROD POSITION (FIG 5A) 175 % ROD INDEX
10. CRITICAL ROD POSITION TOLERANCE BAND (FIG 5A)
 - 10a. Circle One: 0.5% $\Delta k/k$ 0.8% $\Delta k/k$
 Use 0.5% $\Delta k/k$ for Steady State conditions if xenon (6) is 0.0 to -0.5%
 Use 0.8% $\Delta k/k$ for Transient conditions if xenon (6) is more negative than -0.5% $\Delta k/k$
 - 10b. MINIMUM ROD WITHDRAWAL LIMIT
 (8 - 10a) = -1.76 % $\Delta k/k$ \Rightarrow 118 %ROD INDEX (FIG 5a)
 - 10c. MAXIMUM ROD WITHDRAWAL LIMIT
 (8 + 10a) = -0.76 % $\Delta k/k$ \Rightarrow 235 %ROD INDEX (FIG 5a)
11. If this is a transient Xenon startup, then record the interval that ECP is valid
 From: Date/Time N/A To: Date/Time N/A

CALCULATED BY: RO #1 DATE/TIME Today / Now

APPROVED BY (SRO): _____ DATE/TIME _____

Facility: Three Mile Island Task No.: OF1000005

Task Title: Maintain Minimum Shift Staffing,
Control Overtime JPM No.: ILT 16-01 NRC JPM
SA1-1

K/A Reference: 2.1.5 (3.9) Previous Exam: ILT 14-01 NRC

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.

- Initial Conditions:
- You are the Control Room Supervisor.
 - I will act as all other personnel.
 - Plant is at 100% power.
 - The time is 2300 on the Exam Date.
 - The shift Scheduler is unavailable.
 - The shift is staffed as follows:
 - SRO 1 – Shift Manager
 - You – CRS (not STA qualified)
 - SRO 3 – STA
 - RO 1 – URO
 - RO 2 – ARO
 - RO 3 – C&T RO
 - The Shift Technical Advisor (STA), SRO 3, reports that his contact lenses have popped out and are lost. He reminds you that he has a license restriction that requires him to wear corrective lenses. His backup eyeglasses are missing and cannot be located, so he is going to get a pair of old prescription glasses from his locker.
 - No other SRO's are currently at the station.

Task Standard:	Examinee identifies required actions to restore minimum staffing, and selects personnel in accordance with qualification and overtime requirements.
Required Materials:	<ul style="list-style-type: none">• OP-TM-112-101-1002, Shift Staffing Requirements, Rev. 10• Tech Spec 6.2.2 and Table 6.2-1, Amendment 219• LS-AA-119, Overtime Controls, Rev. 12• LMS Qual Matrix Report (Attachment #1)• Prepared Overtime List (Attachment #2)• LAPTOP for LMS Access• A disconnected phone for simulation
General References:	<ul style="list-style-type: none">• Technical Specifications
Handout:	<ul style="list-style-type: none">• OP-TM-112-101-1002, Shift Staffing Requirements, Rev. 10• LS-AA-119, Overtime Controls, Rev. 12• LMS Qual Matrix Report (Attachment #1)• Prepared Overtime List (Attachment #2)
Initiating Cue:	You are to perform the steps necessary to ensure your shift is properly staffed. A phone is provided for any calls, if required.
Time Critical Task:	N/A
Validation Time:	7 minutes

PERFORMANCE INFORMATION

(Denote Critical Steps with a check mark)

START TIME: _____

EVALUATOR NOTE: **Provide Examinee with OP-TM-112-101-1002, LS-AA-119, Shift Staffing Report.**

√ **Performance Step: 1** Examinee references Technical Specifications and/or OP-TM-112-101-1002 to determine minimum shift staffing requirements for current conditions.

Standard: Examinee determines from OP-TM-112-101-1002, Section 4.1, that three SROs are required.
Examinee determines that due to the prescription being old, the STA cannot be considered one of the shift SRO's.
Examinee determines that a call out must be made to get shift staffing back to allowable numbers.

Comment:

EVALUATOR NOTE: **Tech Specs allow for, except for Shift Manager, that shift crew composition may be one less than the minimum requirements for a period of time not to exceed 2 hours in order to accommodate unexpected absence of on-duty shift crew members provided immediate action is taken to restore the shift crew composition to within the minimum requirements.**

Performance Step: 2 Examinee initiates action to comply with Technical Specification requirements for three licensed SROs.
LOGS into LMS to verify qualifications.

CUE: **After examinee demonstrates ability to log into LMS and locate qualifications, provide LMS Qual Matrix Report-Attachment 1, and Overtime list attachment 2.**

Standard: Action initiated by referring to LMS Qual Matrix and Overtime list

Comment:

PERFORMANCE INFORMATION

Performance Step: 3 Examinee seeks a replacement for the third licensed SRO position left vacant by the inability of the STA to meet requirements for the job.

Standard: Examinee references the Overtime Callout list to identify a replacement SRO to be called.

Comment:

EVALUATOR CUE: Once it is decided that someone must be called in, direct the examinee to use Attachment #2 in the order of personnel listed.

If examinee asks the status of a STA qualification with an "O" status, reply they have 20 days left on the qualification status.

The Shift Manager has directed NO waivers are to be used.

PERFORMANCE INFORMATION

EVALUATOR CUE: If examinee calls Miscavage to report to work, answer that you are on your way.

EVALUATOR NOTE: If examinee tells Miscavage to report to work, the JPM is completed UNSAT due to Miscavage not being qualified.

√ **Performance Step: 4** Examinee references the provided materials to evaluate the STA watch standing ability of Miscavage.

Standard: Examinee skips Miscavage as he is inactive per the LMS Qual Matrix Report.

Comment:

Evaluator's Cue: If examinee calls Johnson to report to work, answer "I just had three beers at a friend's house. If you need me though, I'll come in as soon as I can"

EVALUATOR NOTE: If examinee tells Johnson to report to work, the JPM is completed UNSAT due to Johnson not being Fit for Duty.

√ **Performance Step: 5** Examinee references the provided materials to evaluate the STA watchstanding ability of Johnson.

Standard: Examinee initially informs Johnson to report to work immediately, then acknowledges alcohol consumption and informs Johnson NOT to report at this time due to Fit For Duty concerns.

Comment:

PERFORMANCE INFORMATION

Evaluator's Cue: If examinee calls Adams to report to work, answer "This is my one day off in the past seven days since I validated NRC exams in the simulator yesterday. If you need me though, I'll come in as soon as I can"

EVALUATOR NOTE: If examinee tells Adams to report to work, the JPM is completed UNSAT due to Adams violating Work Hour Rule limitations.

√ **Performance Step: 6** Examinee references the provided materials to evaluate the STA watchstanding ability of Adams.

Standard: Examinee initially informs Adams to report to work immediately, then informs Adams NOT to report at this time due to LS-AA-119 Section 5.1.1 requirement.

Comment:

Evaluator's Cue: If examinee calls Shuff to report to work, answer "I am making a self-declaration of fatigue and do not wish to report to work".

EVALUATOR NOTE: If examinee tells Shuff to report to work, the JPM is completed UNSAT due to Shuff being not Fit for Duty.

√ **Performance Step: 7** Examinee references the provided materials to evaluate the STA watchstanding ability of Shuff.

Standard: Examinee initially informs Shuff to report to work immediately then acknowledges self-declaration of fatigue and informs Shuff NOT to report at this time IAW LS-AA-119 Section 5.6.

Comment:

PERFORMANCE INFORMATION

EVALUATOR CUE: If examinee calls Lewis to report to work, answer that you are on your way.

EVALUATOR NOTE: If examinee calls Lewis to report to work, the JPM is completed UNSAT due to Lewis not being qualified,

√ **Performance Step: 8** Examinee references the provided materials to evaluate the STA watch standing ability of Lewis.

Standard: Examinee skips Lewis as he is inactive per the LMS Qual Matrix Report.

Comment:

Evaluator's Cue: If examinee calls Harris to report to work, answer "I am on vacation but I am home and if you need me though, I'll come in as soon as I can"

√ **Performance Step: 9** Examinee references the provided materials to evaluate the STA watch standing ability of Harris.

Standard: Examinee informs Harris to report to work immediately.

Comment:

Terminating Cue: After examinee demonstrates ability to contact an SRO at home to have the appropriate one report to work, JPM may be terminated.

STOP TIME: _____

TIME CRITICAL STOP TIME: N/A

VERIFICATION OF COMPLETION

Job Performance Measure No.: ILT 16-01 NRC JPM SA1-1

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- You are the Control Room Supervisor.
- I will act as all other personnel.
- Plant is at 100% power.
- The time is 2300 on the Exam Date.
- The shift Scheduler is unavailable.
- The shift is staffed as follows:
 - SRO 1 – Shift Manager
 - You – CRS (not STA qualified)
 - SRO 3 – STA
 - RO 1 – URO
 - RO 2 – ARO
 - RO 3 – C&T RO
- The Shift Technical Advisor (STA), SRO 3, reports that his contact lenses have popped out and are lost. He reminds you that he has a license restriction that requires him to wear corrective lenses. His backup eyeglasses are missing and cannot be located, so he is going to get a pair of old prescription glasses from his locker.
- No other SRO's are currently at the station.

INITIATING CUE:

You are to perform the steps necessary to ensure your shift is properly staffed. A phone is provided for any calls, if required.

Attachment #1**LMS Qual Matrix Report**
Date: Exam Date 1:15:00 AM

Y = Currently Qualified (will not expire in the next 60 days) O = Currently Qualified (due to expire in 60 days or less) N = Not qualified (expired) (blank) = Qualification Never Assigned

Qualification ID	Qualification Title	Qualification Parent	Adams, M	Anders, D	Bracke, A	Brady, R	Brown, F	DeSantis, N	Favorito, N	Harris, R	Harty, M	Johnson, E	Kulasinsky, J	Lewis, D	Miscavage, B	Price, W	Shuff, J	Smith, B	Smith, C	Valent, J	Williams, D	Yockey, G
N-TM-OP-STA QUAL	TMI STA: SHIFT QUALIFIED	Root Qual	O	N	Y	N	N	Y	O	O	Y	Y	O	N	N	O	Y	Y	O	N	N	N

Attachment #2

OVERTIME CALLOUT FOR Ops Shift Schedule
STARTING AT (Exam Date) 17:30:00 AND ENDING AT (Exam Date +1) 06:00:00
SRO # 2 STA QUALIFICATION Shift Technical Advisor
REPORT CREATION DATE exam date 23:00:00
NOTES:

Crew	Currently Working Shift	Name Phone	OT Hours	Accept	Refuse	Comments
Day	None	Miscavage, B	0			
Day	None	Johnson, E	0			
Day	None	Adams, M	0			
Day	None	Shuff, J	0			
Day	None	Lewis, D	0			
Day	None	Harris, R	0			

Note: List created by PQS IAW LS-AA-119

Facility: Three Mile Island Task No.: OF010009
Task Title: ERO Notification JPM No.: ILT 16-01 NRC JPM
RA4
K/A Reference: 2.4.39 (3.9) Previous NRC Exam: ILT 12-01

Examinee: NRC Examiner:

Facility Examiner: Date:

Method of testing:

Simulated Performance: X Actual Performance:
Classroom Simulator X Plant

READ CUE SHEET ON LAST PAGE 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.

Initial Conditions:

- You are the Third Reactor Operator on shift.
- A General Emergency has been declared.

Task Standard: All notifications made satisfactorily.

Required Materials: None

General References: EP-AA-112-100-F-06, ERO NOTIFICATION OR AUGMENTATION, Revision V.

Handouts: EP-AA-112-100-F-06, ERO NOTIFICATION OR AUGMENTATION, Revision V.

Initiating Cue: You are directed to call out the Three Mile Island Emergency Response Organization IAW EP-AA-112-100-F-06, ERO Notification or Augmentation.

Time Critical Task: No

Validation Time: 15 minutes

SIMULATOR SETUP

Ensure the ERO Notification Phone is set up in the Simulator Observation area and is UNPLUGGED AND if using a phone in the simulator ENSURE it is ISOLATED.

Procedure: EP-AA-112-100-F-06 ERO Notification or Augmentation

1. Page 1:
 - a. Circle the Number "1.1"
 - b. Circle: "TMI", "threemileisland3" and "simulator10#"
2. Page 2:
 - a. Section 1.2: Circle "1.2" and "Block 01"
3. Log on the Simulator Computer and verify the shortcut for EVERBRIDGE icon is available.

(Denote Critical Steps with an asterisk)

Start Time _____

EXAMINER CUE: Direct the examinee to make the appropriate notifications per EP-AA-112-100-F-06, ERO Notification or Augmentation. Provide the Examinee a copy of EP-AA-112-100-F-06

PROCEDURE NOTE: The automated system will initiate the call out of management and bargaining unit personnel required to meet the ERO staffing requirements. Additional staffing of personnel shall be the responsibility of the individual Managers and Directors in the TSC / OSC / EOF / ENC /JIC following initial activation of those facilities.

Section 1 - Initiate Activation / Termination of Notification System using World Wide Web

Section 2 - Initiate Activation / Termination of Notification System using live Everbridge Agent

Section 3 - Initiate Activation / Termination of Notification System using a Standard Phone

EP-AA-112-100-F-06, Step 1.3

Performance Step: 1 OPEN (double-click) the Everbridge Aware shortcut icon from your desktop computer. If shortcut Icon is not available or does not open, then ACCESS the World Wide Web and go to <https://manager.everbridge.net/login>

Standard: Examinee opens the Everbridge Aware shortcut from the desktop computer.

Comment:

EP-AA-112-100-F-06, Step 1.4

Performance Step: 2 **ENTER** the appropriate station specific User name and Password from Step 1.1 **and SELECT** (click) "Sign In."

Standard:

- Examinee enters TMI as Station
- Examinee enters threemileisland3 as User Name
- Examinee enters simulator10# as Password

Comment:

EP-AA-112-100-F-06, Step 1.5

Performance Step: 3 **VERIFY** the appropriate Station Name is displayed, **SELECT** (click) "Proceed".

Standard: Examinee verifies TMI is displayed

Comment:

EP-AA-112-100-F-06, Step 1.6

Performance Step: 4 **SELECT** (click) the +Launch Incident button.

Standard: Examinee clicks on+ Launch Incident button.

Comment:

EP-AA-112-100-F-06, Step 1.7

Performance Step: 5 **SELECT** (Click) on the appropriate Scenario from Step 1.2..

Standard: Examinee selects Scenario 1

Comment:

EP-AA-112-100-F-06, Step 1.8

Performance Step: 6 VERIFY the appropriate scenario is displayed.

Standard: Examinee verifies Scenario 1 is displayed.

Comment:

EXAMINER NOTE: Step 1.09 is N/A.

EP-AA-112-100-F-06, Step 1.10

Performance Step: 7 If the scenario displayed is correct, **then SELECT** (click) "Send x template(s) Now".

Standard: Examinee determines that the scenario displayed is correct and selects "Send x template(s) Now".

Comment:

EP-AA-112-100-F-06, Step 1.11

Performance Step: 8 On **the** next screen, **VALIDATE** there is a date and time stamp for each notification listed.

RECORD Time _____

Standard: Examinee validates "date and time stamp" for each notification and records time.

Comment:

EP-AA-112-100-F-06, Step 1.12

Performance Step: 9 SELECT "Log Out" to exit the Everbridge Aware Notification program.

Standard: Examinee selects "Log Out".

Comment:

EXAMINER CUE: State: "Two minutes has elapsed and no call to the Control Room has been received".

EP-AA-112-100-F-06, Step 1.13

Performance Step: 10 **VERIFY** that a call to the Control Room from the ERO notification system is received within 2 minutes after the system was initiated..

Standard: Examinee recognizes that a confirmation call has not been received.

Comment:

EXAMINER NOTE: Step 1.14 is N/A

EP-AA-112-100-F-06, Step 1.15

Performance Step: 11 If a confirmation call is not received in the Control Room within 2 minutes confirming scenario activation, then proceed to Section 2, Initiate Activation / Termination of Notification System Using Live Everbridge Agent.

Standard: Examinee recognizes that a confirmation call has not been received and goes to Section 2.

Comment:

EP-AA-112-100-F-06, Step 2.1

Performance Step: 12 CIRCLE the appropriate station specific Account Name, Organization Name, First Name, Last Name, and Response to Hint Question from the table below.

Standard: Examinee circles the following:

- Exelon – TMI under Organization Name
- TMI under first name
- ERONS Activator under last name
- Exelon under Response to Hint Question

Comment:

EP-AA-112-100-F-06, Step 2.2

Performance Step: 13 **CIRCLE** the appropriate Activation Scenario Number for the event from the table below..

Standard:

Examinee circles the following:

- Scenario 1 - Actual Event Respond to Facility - For Alert, Site Area, or General Emergency, or Security Events with On Site ERO reporting.

Comment:**EXAMINER CUE:**

State: "You hear a busy signal" when the examinee attempts to make a phone call in the next step and after the 2nd attempt.

EP-AA-112-100-F-06, Step 2.3

Performance Step: 14 **DIAL** the ERO Notification System Activation phone number: 1-877-220- 4911.

Standard:

Examinee dials 1-877-220-4911, recognizes that there is a busy signal, and continues on.

Comment:***EP-AA-112-100-F-06, Step 2.4***

Performance Step: 15 If the number is busy or does not answer after a 2nd attempt, then **PROCEED** to Section 3 Initiate Activation / Termination of Notification System Using Standard Phone.

Standard:

Examinee goes to Section 3.

Comment:

EP-AA-112-100-F-06, Step 3.1

Performance Step: 16 CIRCLE the appropriate station specific User ID, Station Password number and Organization ID from the table below.

Standard: Examinee circles the following:

- TMI under Station
- 730145# under User ID
- 143311# under Password
- 730145# under Organization ID

Comment:

EP-AA-112-100-F-06, Step 3.2

Performance Step: 17 CIRCLE the appropriate Activation / Termination Scenario Number for the event from the table below.

Standard: Examinee circles the following:

- Scenario 1 - Actual Event Respond to Facility - For Alert, Site Area, or General Emergency, or Security Events with On Site ERO reporting.

Comment:

EXAMINER CUE: When the examinee attempts to make a phone call in the next step, state: "Welcome to EverBridge Aware. Please enter user ID followed by the pound SIGN".

EP-AA-112-100-F-06, Step 3.3

Performance Step: 18 DIAL the Everbridge AWARE system activation phone number - 1-857-444-0443

✓ **Standard:** Examinee dials 1-857-444-0443.

Comment:

EXAMINER NOTE: Steps 3.4 and 3.5 are N/A.

EXAMINER CUE: ENSURE the examiner hangs up the phone before entering any data.
If the examinee enters a number other than 730145#, then state: "Number not recognized".

EP-AA-112-100-F-06, Step 3.6

Performance Step: 19 When the System prompts "Enter your USER ID followed by the # sign", then ENTER the User ID provided in step 3.1.

✓ **Standard:** Examinee enters 730145#

Comment:

EXAMINER CUE: State: "Please enter your password followed by the pound BUTTON".

EP-AA-112-100-F-06, Step 3.7

Performance Step: 20 When the system prompts "Enter your Password followed by the # sign" then **ENTER** the Password provided in step 3.1..

✓ **Standard:** Examinee enters 143311#

Comment:

EXAMINER CUE: State: "Please enter your organization ID followed by the Pound BUTTON".

EP-AA-112-100-F-06, Step 3.8

Performance Step: 21 When the system prompts "Enter your Organization ID followed by the # sign", then **ENTER** the Organization ID provided in step 3.1.

✓ **Standard:** Examinee enters 730145#

Comment:

EXAMINER CUE: State: "Select a template or scenario".

EP-AA-112-100-F-06, Step 3.9

Performance Step: 22 When prompted, "To select a template or scenario, Enter the ID followed by the # sign", **then ENTER** the ID provided in step 3.2.

For "Actual Event with Respond to Facility" **PRESS 1** Then #

✓ **Standard:** Examinee presses 1 then #

Comment:

EXAMINER CUE: State: "Actual Event Respond to Facility, Press 1 to send the message now, or press 2 to select a different scenario".

EP-AA-112-100-F-06, Step 3.10

Performance Step: 23

The System will state the name of the scenario. To select this scenario press 1 to send the message now or 2 to select a different scenario.

If the event name is correct, then PRESS 1.

Standard:

✓ Examinee presses 1.

Comment:

EXAMINER CUE: State: "Your message has been sent"

Terminating Cue: When the time of the scenario broadcast has been sent.

STOP TIME: _____

Job Performance Measure No.: ILT 16-01 NRC JPM RA4

Examinee's Name:

Date Performed:

Facility Examiner:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- You are the Third Reactor Operator on shift.
- A General Emergency has been declared.

INITIATING CUE:

You are directed to call out the Three Mile Island Emergency Response Organization IAW EP-AA-112-100-F-06, ERO Notification or Augmentation.

TIME CRITICAL: No

Facility: Three Mile Island

Task No.: COO0028

Task Title: Perform the "SHIFTLY CHECKS"
IAW 1301-1, DATA SHEET 1JPM No.: ILT 16-01 NRC JPM
RA2

K/A Reference: 2.2.12 (3.7)

Bank JPM: TMI09 CERT JPM RO
A2

Examinee:

NRC Examiner:

Facility Evaluator:

Date:

Method of testing:

Simulated Performance: _____

Actual Performance: X Classroom _____ Simulator X Plant _____**READ CUE SHEET ON LAST PAGE 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.

- Initial Conditions:
- Operating at Full Power
 - No evolutions in progress

Task Standard: Shift and Daily logs completed with out of specification readings identified.

Required Materials: Frozen Simulator @ Normal Power Ops

General References: 1301-1, SHIFT AND DAILY CHECKS, Revision 176

Handout: 1301-1, Sections 1.0 thru 9.0 and DATA SHEET 1, Sections A.6 thru A.22 (only)

Initiating Cue: It is night shift you are the 3rd CRO. The Control Room Supervisor has directed you to perform 1301-1, SHIFT AND DAILY CHECKS, DATA SHEET 1, Sections A.6 thru A.22, to verify the current status. **For the purpose of this JPM, the simulator is FROZEN.**

Time Critical Task: No

Validation Time: 20 minutes

SIMULATOR SETUP

- IC 016 (or Temporary IC 55)
- Malfunctions
 - MS02A set to 1% severity
 - NN-2-7 Annunciator window input fails set to off.
- Overrides
 - 02A3M08-ZAOMU17PIPRS MU-17PI set to 33
 - 06A3A6-ZAOTI978 TMP TI978 set to 12.2
 - 06A3A5-ZAOTI977 TMP TI977 set to 10.3
- Once RB building pressure is greater than 2.0 psig, Freeze the simulator.
- Freeze the simulator for the duration of this ADMIN JPM.

VERIFICATION OF COMPLETION

(Denote Critical Steps with a check mark)

START TIME: _____

Initiating Cue: It is night shift you are the 3rd CRO. The Control Room Supervisor has directed you to perform 1301-1, SHIFT AND DAILY CHECKS, DATA SHEET 1, Sections A.6 thru A.22, to verify the current status. For the purpose of this JPM, the simulator is FROZEN.

EVALUATORS NOTE: The examinee may choose to print the logs from the PPC.

Performance Step: 1 Locate/review procedure.

Standard: Reviews Sections 1.0 through 9.0

Evaluator CUE: Provide JPM handout and state "the handout contains only those sections of 1301-1 that apply to the task".

Comment:

1301-1 DATA Sheet 1, A.6

Performance Step: 2 **RPS T HOT**
Compare: RC4A-TE2 (A0590) with RC4A-TE3 (A0592) and
RC4B-TE2 (A0591) with RC4B-TE3 (A0593)

- Does each comparison agree within $\pm 1.75^{\circ}\text{F}$?

Standard: Circles Y

Comment:

1301-1 DATA Sheet 1, A.7

Performance Step: 3 **RPS IMBALANCE**
• Do NI-5 (A0626), NI-6 (A0627), NI-7 (A0628) and NI-8 (A0629) values all agree within 2.5%?

Standard: Circles Y

Comment:

VERIFICATION OF COMPLETION

1301-1 DATA Sheet 1, A.8**Performance Step: 4****RPS TOTAL RCS FLOW**

- Do RC14-DPT1 (A0602), RC14-DPT2 (A0603), RC14-DPT3 (A0604), RC14-DPT4 (A0605) values all agree within 7.2 MLB/hr?

Standard:

Circles Y

Comment:**1301-1 DATA Sheet 1, A.9****Performance Step: 5****INTERMEDIATE RANGE FLUX**

- Do NI-3 (A0576) and NI-4 (A0577) values agree within one-half log amp?

Standard:

Circles Y

Comment:**1301-1 DATA Sheet 1, A.9****Performance Step: 6****INTERMEDIATE RANGE FLUX**

- Do NI-3 (A0580) and NI-4 (A0581) SUR values agree within one-half DPM?

Standard:

Circles Y

Comment:**1301-1 DATA Sheet 1, A.10****Performance Step: 7****ES WIDE RANGE RCS PRESSURE**

- Do RC3A-PT-3 (A0505), RC3A-PT4 (A0506), RC3B-PT3 (A0507) values agree within 50 psi?

Standard:

Circles Y

Comment:**1301-1 DATA Sheet 1, A.11****Performance Step: 8****ES RB PRESSURE**

- Do BS-PT-282 (A0101), BS-PT-285 (A0102) & BS-PT-288 (A0103) values agree within 0.5 psi?

Standard:

Circles Y

Comment:

VERIFICATION OF COMPLETION

1301-1 DATA Sheet 1, A.12

- ✓ **Performance Step: 9** **REACTOR BUILDING**
- Is Reactor Building pressure greater than 1.0 psi vacuum and less than 2.0 psig?
- Standard:** Circles N

Comment:

1301-1 DATA Sheet 1, A.13

- Performance Step: 10** **REACTOR BUILDING 4# ESAS ACTUATION**
- Are all blue lights for channels RB1, 2 & 3 A&B (groups 1, 2, & 3) de-energized?
- Standard:** Circles Y

Comment:

1301-1 DATA Sheet 1, A.13

- Performance Step: 11** **REACTOR BUILDING 4# ESAS ACTUATION**
- Are ESAS actuation channels RB1, 2 & 3 A&B all enabled?
- Standard:** Circles Y

Comment:

1301-1 DATA Sheet 1, A.14

- Performance Step: 12** **REACTOR COOLANT SYSTEM 1600# ESAS ACTUATION**
- Are all blue lights for channels RC1, 2 & 3 A&B (groups 1 & 2) de-energized?
- Standard:** Circles Y

Comment:

1301-1 DATA Sheet 1, A.14

- Performance Step: 13** **REACTOR COOLANT SYSTEM 1600# ESAS ACTUATION**
- Are ESAS actuation channels RC1, 2 & 3 A&B all enabled?
- Standard:** Circles Y

Comment:

VERIFICATION OF COMPLETION

1301-1 DATA Sheet 1, A.15**Performance Step: 14 REACTOR COOLANT SYSTEM 500# ESAS ACTUATION**

- Are ESAS actuation channels RC4, 5 & 6 A&B all enabled?

Standard: Circles Y

Comment:

1301-1 DATA Sheet 1, A.16**Performance Step: 15 REACTOR BUILDING 30# ESAS ISOLATION**

- Are all blue lights for channels RB4, 5 & 6 A&B de-energized?

Standard: Circles Y

Comment:

1301-1 DATA Sheet 1, A.16**Performance Step: 16 REACTOR BUILDING 30# ESAS ISOLATION**

- Are ESAS actuation channels RB4, 5 & 6 A&B all reset?

Standard: Circles Y

Comment:

1301-1 DATA Sheet 1, A.17**Performance Step: 17 REACTOR TRIP CONTAINMENT ISOLATION**

- Are RTI actuation channels RT1, 2 & 3 A&B all enabled?

Standard: Circles Y

Comment:

VERIFICATION OF COMPLETION

1301-1 DATA Sheet 1, A.18**Performance Step: 18****CORE FLOODING SYSTEM/CORE FLOOD TANK LEVEL**

Using the operable instruments only: (Circle Y/N for each)

- Is CF2-LI1 (A0480) and CF2-LI2 (A0481) ≥ 11.29 and ≤ 11.87 ft?
- Is A0476 and A0477 ≥ 585 psig and ≤ 615 psig?
- Is CF-V-1A open?
- Is CF2-LI3 (A0482) and CF2-LI4 (A0483) ≥ 11.29 and ≤ 11.87 ft?
- Is A0478 and A0479 ≥ 585 psig and ≤ 615 psig?
- Is CF-V-1B open?

Standard:

Circles Y for all

Comment:**1301-1 DATA Sheet 1, A.18****Performance Step: 19****CORE FLOODING SYSTEM/CORE FLOOD TANK LEVEL**

Is CF-T-1A boron concentration between 2317 and 2850 PPM?

Standard:

Circles Y

CUE:**When requested, CF-T-1A boron Concentration is 2400 PPM****Comment:****1301-1 DATA Sheet 1, A.18****Performance Step: 20****CORE FLOODING SYSTEM/CORE FLOOD TANK LEVEL**

Is CF-T-1B boron concentration between 2317 and 2850 PPM?

Standard:

Circles Y

CUE:**When requested, CF-T-1B boron Concentration is 2450 PPM****Comment:**

VERIFICATION OF COMPLETION

1301-1 DATA Sheet 1, A.19**Performance Step: 21****MAKEUP TANK LEVEL & PRESSURE**

- Do CPT #A0498 and A0426 agree within 2 inches and MU14/RC1-LR CH1 & MU-LI-778A agree within 3 inches?

Standard:

Circles Y

Comment:**1301-1 DATA Sheet 1, A.19**✓ **Performance Step: 22****MAKEUP TANK LEVEL & PRESSURE**

- Record local MU tank pressure indication, MU-PI-1752.

Standard:

Records MU tank pressure indication, MU-PI-1752.

CUE:**When requested, local MU tank pressure is 26.5 psig****Comment:**✓ **1301-1 DATA Sheet 1, A.19****Performance Step: 23****MAKEUP TANK LEVEL & PRESSURE**

- Do A1028 and MU17-PI agree with the local MU Tank pressure indication (MU-PI-1752) within 3 psi?

Standard:

Circles N

Comment:**1301-1 DATA Sheet 1, A.20****Performance Step: 24****PRESSURIZER LEVEL**

- Do RC-LT-777 (A1029), RC1-LT1 (C1720) and RC1-LT3 (C1722) values agree within 12 inches? (Circle Y/N)

Standard:

Circles Y

Comment:**1301-1 DATA Sheet 1, A.20****Performance Step: 25****PRESSURIZER LEVEL**

- Do MU14/RC1-LR CH2 (LT1 or LT3) and its corresponding XMTR on the PPC (C1720 or C1722) agree within 10"?

Standard:

Circles Y

Comment:

VERIFICATION OF COMPLETION

1301-1 DATA Sheet 1, A.20**Performance Step: 26 PRESSURIZER LEVEL**

- Do RC-LI-777A and PPC point A1029 agree within 10"?

Standard: Circles Y

Comment:

1301-1 DATA Sheet 1, A.20**Performance Step: 27 PRESSURIZER LEVEL**

- Is pressurizer level between 80 to 385 inches?

Standard: Circles Y

Comment:

1301-1 DATA Sheet 1, A.21**Performance Step: 28 PRESSURIZER TEMPERATURE**

- Record Pressurizer temp RC2-TI (CC)

Standard: Records Pressurizer temp RC2-TI (CC)

Comment:

1301-1 DATA Sheet 1, A.21**Performance Step: 29 PRESSURIZER TEMPERATURE****NOTE**

PPC A0504 is the non-selected pwr temperature instrument.

- Do RC2-TE1 & RC2-TE2 values agree within 20°F?

Standard: Circles Y

Comment:

1301-1 DATA Sheet 1, A.22**Performance Step: 30 SATURATION MARGIN MONITOR**

- Record RCS Loop A sat margin RC-TI-977 (PCL)

Standard: Records RCS Loop A sat margin RC-TI-977 (PCL)

Comment:

VERIFICATION OF COMPLETION

1301-1 DATA Sheet 1, A.22**Performance Step: 31 SATURATION MARGIN MONITOR**

- Record RCS Loop B sat margin RC-TI-978 (PCL)

Standard: Records RCS Loop B sat margin RC-TI-978 (PCL)

Comment:

1301-1 DATA Sheet 1, A.22**✓ Performance Step: 32 SATURATION MARGIN MONITOR**

- Do RC-TI-978, CPT #A0406, RC-TI-977, & CPT #A0938 all agree within 6.5°F?

Standard: Circles N

Comment:

Terminating Cue: When DATA SHEET 1, A.6 THRU A.22 have been returned to the CRS: Evaluation on this JPM is complete.

Time: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: ILT 16-01 NRC JPM RA2

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- Operating at Full Power
- No evolutions in progress

INITIATING CUE:

It is night shift you are the 3rd CRO. The Control Room Supervisor has directed you to perform 1301-1, SHIFT AND DAILY CHECKS, DATA SHEET 1, Sections A.6 thru A.22, to verify the current status. **For the purpose of this JPM, the simulator is FROZEN.**

TIME CRITICAL:

No

Facility: THREE MILE ISLAND

Task No.: 22001027

Task Title: PERFORM A TRANSIENT
LEAK RATE CALCULATIONJPM No.: ILT 16-01 NRC JPM
RA1-2

K/A Reference: 2.1.23 4.3 / 4.4

Bank JPM: TQ-TM-104-ADM-
OS24-J102

Examinee:

NRC Examiner:

Facility Evaluator:

Date:

Method of testing:

Simulated Performance: _____

Actual Performance: X Classroom X Simulator _____ Plant _____**READ CUE SHEET ON LAST PAGE 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.

- Initial Conditions:
- 100% power
 - You have been assigned the duties of the Unit Reactor Operator (URO)
 - The examiner will act as the Control Room Supervisor (CRS)

Task Standard: Calculate a leak rate of between 80 and 81 gpm.

- Required Materials:
- OS-24, CONDUCT OF OPERATIONS DURING ABNORMAL AND EMERGENCY EVENTS, Rev. 28
 - Calculator

- General References:
- OS-24, CONDUCT OF OPERATIONS DURING ABNORMAL AND EMERGENCY EVENTS, Rev. 28

Initiating Cue: The following data has been obtained from console indications and the plant computer:

DATA RECORDING TIME	0300	0303	0310
PRESSURIZER LEVEL (RC-LI-777A / PPC C4017)	220 inches	220 inches	210 inches
MAKEUP TANK LEVEL (MU-LI-778A / PPC A0498)	86 inches	84 inches	80 inches
RCS T _{ave} (RC12-TIA / PPC A5066)	579.3°F	579.2°F	578.8°F
Total Water Added to the Makeup Tank from 0300	N/A	60 gal	420 gal

- A step change in leakage is suspected at 0303 and the feed rate was raised on the batch controller as a result.
- The CRS has directed you to perform a Transient RCS Leakrate Calculation IAW OS-24, Attachment F, that will most accurately determine **CURRENT** leak rate.

Time Critical Task: No

Validation Time: 10 minutes

PERFORMANCE INFORMATION

(Denote Critical Steps with a check mark)

START TIME: _____

EVALUATORS CUE: Role Play as CRS: When the examinee has requested a copy of the appropriate procedure, HAND a copy of OS-24, Attachment F to the examinee.

EVALUTORS NOTE: The longer the time interval between collecting data points, the more reliable the leakrate estimate will be. At a minimum leak rates should not be calculated for time intervals of < 5 minutes.

Performance Step: 1 Obtain copy of appropriate procedures.

Standard: Examinee will request a copy of OS-24, Attachment F.

Comment:

Performance Step: 2 Determine sets of data to use

- √ **Standard:**
- Examinee determines that from 0300-0303 is less than 5 minutes and therefore not accurate.
 - Examinee determines that a step rise in leak rate occurred at 0303, and therefore going from 0300-0310 will not be the most accurate leak rate calculated.
 - Examinee determines that a larger leak rate is occurring in the 7 minute timeframe between 0303 and 0310, and uses those data points.

Comment:

PERFORMANCE INFORMATION

✓ **Performance Step: 3** Determine Pressurizer level change.

$$(\Delta PL) * (12) =$$

$$(220 - 210) (12) = 120$$

Standard:

Examinee calculates Pressurizer level change over the time period given by;

Pressurizer level initial = 220"

Pressurizer level final = 210"

Examinee determines the level change in inches (10) and multiplies this number by 12.

120

Comment:

✓ **Performance Step: 4** Determine Makeup Tank level change

$$(\Delta MTL) * (30) =$$

$$(84 - 80) (30) = 120$$

Standard:

Examinee calculates Makeup Tank level change over the time period given by:

Makeup Tank level initial = 84"

Makeup Tank level final = 80"

Examinee then records this level change (4) in inches and multiplies this number by 30.

120

Comment:

PERFORMANCE INFORMATION

- ✓ **Performance Step: 5** Determine RCS T_{ave} temperature change.
 $(\Delta T_{avg}) * (COEFF) =$
 $(579.2 - 578.8) (95) = 38$
- Standard:** Examinee calculates RCS T_{ave} change over the time period given by:
RCS T_{ave} initial – RCS T_{ave} final
Examinee then records this temperature change in $(0.4)^{\circ}F$ and multiply this number by a coefficient from the Table on the bottom of Attachment F. (94 Gal/ $^{\circ}F$)
38
- Comment:**
- Performance Step: 6** Determine the number of gallons added to the MU/RCS systems.
Total Gallons added – gallons added during 1st 3 minutes = 360 Gallons
- Standard:** Examinee during the period of time the calculation is in progress observes and records ALL inventory added to the RCS.

Then records this makeup to the RCS in gallons
360
- Comment:**
- Performance Step: 7** Determine the total time period between the start and finish of the Leak Rate determination.
TIME final – TIME initial.
0310 – 0303 = 7 minutes
- Standard:** Examinee calculates the time period for the Leak Rate determination by;

Then records this time change in minutes
7
- Comment:**

PERFORMANCE INFORMATION

- ✓ **Performance Step: 8** Determine the transient RCS Leak Rate.
- Standard:** Examinee calculates TOTAL RCS Leak Rate using Attachment F formula;
80.3 gpm. (80-81 gpm)
- Comment:**

EVALUATOR NOTE: When the examinee has finished the calculation and is reporting the Total Leak Rate to the CRS, respond with "I understand you have calculated Total RCS Leak Rate at (whatever number the examinee uses) gpm."

Terminating Cue: When the Total RCS Leak Rate number is delivered to the CRS, this JPM may be terminated.

STOP TIME: _____ **TIME CRITICAL STOP TIME:** N

EVALUATION NOTE:

- If the student incorrectly uses the data for 0300 and 0303, they will come up with 36.3 GPM
- If the student incorrectly uses the data for 0300 and 0310, they will come up with 67.2 GPM
- Calculated Leak Rate is 80.3 gpm. (0303 to 0310)
$$\text{Leak Rate} = [(\Delta\text{PL}) \cdot (12) + (\Delta\text{MTL}) \cdot (30) - (\Delta\text{Tavg}) \cdot (\text{COEFF}) + \text{GAL ADD}] / \Delta\text{TIME}$$
$$\text{Leak Rate} = ((10 \times 12) + (4 \times 30) - (0.4 \times 95) + 360) / 7$$
$$\text{Leak Rate} = (120 + 120 - 38 + 360) / 7$$
$$\text{Leak Rate} = 562 / 7$$
$$\text{Leak Rate} = 80.28 \text{ gpm}$$

VERIFICATION OF COMPLETION

Job Performance Measure No.: ILT 16-01 Cert JPM

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

- INITIAL CONDITIONS:
- 100% power
 - You have been assigned the duties of the Unit Reactor Operator (URO)
 - The examiner will act as the Control Room Supervisor (CRS)

INITIATING CUE: The following data has been obtained from console indications and the plant computer:

DATA RECORDING TIME	0300	0303	0310
PRESSURIZER LEVEL (RC-LI-777A / PPC C4017)	220 inches	220 inches	210 inches
MAKEUP TANK LEVEL (MU-LI-778A / PPC A0498)	86 inches	84 inches	80 inches
RCS T _{ave} (RC12-TIA / PPC A5066)	579.3°F	579.2°F	578.8°F
Total Water Added to the Makeup Tank from 0300	N/A	60 gal	420 gal

- A step change in leakage is suspected at 0303 and the feed rate was raised on the batch controller as a result.
- The CRS has directed you to perform a Transient RCS Leakrate Calculation IAW OS-24, Attachment F, that will most accurately determine **CURRENT** leak rate.

TIME CRITICAL: No

Facility: THREE MILE ISLAND Task No.: 62201020

Task Title: Shutdown Margin for Low Temperature Conditions JPM No.: ILT 16-01 NRC JPM RA1-1

K/A Reference: 2.1.43 (4.1/4.3) New JPM

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom X Simulator _____ Plant _____

READ CUE SHEET ON LAST PAGE 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.

- Initial Conditions:
- RCS temperature 350°F at 1300 on 6/30/17, which coincides with 20 hours after shutdown from 100%.
 - Previous power change was refueling outage 16 months ago.
 - 600 EFPD
 - Boron Concentration is 220 ppm
 - Boron Depletion factor from the PPC is .8006
 - Xenon Reactivity Worth from the PPC is -2.638 %Δk/k
 - The Control Rod in location 5-9 is stuck, fully withdrawn

Task Standard: Calculate a Quantitative shutdown margin for this low temperature situation, and determine that the SDM will not be more negative than -1 %Δk/k

Required Materials:	<ul style="list-style-type: none">• OP-TM-300-000, REACTIVITY AND POWER DISTRIBUTION CALCULATIONS, Rev 8• OP-TM-300-206, SHUTDOWN MARGIN FOR LOW TEMPERATURE CONDITIONS, Rev 3• OP-TM-300-401, INOPERABLE ROD WORTH, Rev 1• Calculator• Ruler
General References:	<ul style="list-style-type: none">• OP-TM-300-000, REACTIVITY AND POWER DISTRIBUTION CALCULATIONS, Rev 8• OP-TM-300-206, SHUTDOWN MARGIN FOR LOW TEMPERATURE CONDITIONS, Rev 3• OP-TM-300-401, INOPERABLE ROD WORTH, Rev 1
Initiating Cue:	The Shift Manager has directed you to calculate a QUANTITATIVE (Determine a Numerical Value) assessment of Shutdown Margin (SDM), IAW OP-TM-300-206 for a temperature of 350 °F, and the parameters provided in the cue sheet.
Time Critical Task:	No
Validation Time:	25 mins

PAPERWORK SETUP

1. Print copies of:
 - A. OP-TM-300-000, REACTIVITY AND POWER DISTRIBUTION CALCULATIONS
 - B. OP-TM-300-206, SHUTDOWN MARGIN FOR LOW TEMPERATURE CONDITIONS
 - i. Sign off Prerequisites
 - C. OP-TM-300-401, INOPERABLE ROD WORTH

PERFORMANCE INFORMATION

(Denote Critical Steps with a check mark)

START TIME: _____

EVALUATORS CUE: The Shift Manager directs you to calculate a **QUANTITATIVE (Determine a Numerical Value)** assessment of Shutdown Margin (SDM), IAW OP-TM-300-206 for a temperature of 350 °F, and the parameters provided in the cue sheet.

OP-TM-300-206, Precautions, Limitations, and Prerequisites

Performance Step: 1 Examinee reviews precautions, limitations, and prerequisites

Standard: Examinee reviews section 3.0 of OP-TM-300-206

Comment:

OP-TM-300-206, Step 4.1

Performance Step: 2 DETERMINE whether a qualitative or quantitative assessment of Shutdown Margin is desired.

Standard: Per SM Direction is to perform a Quantitative assessment of SDM

Comment:

OP-TM-300-206, Step 4.1.1

Performance Step: 3 If a qualitative assessment of Shutdown Margin is desired, the DETERMINE Shutdown margin IAW section 4.2.

Standard: Examinee determines a qualitative assessment of Shutdown Margin is not desired, and N/A's the step.

Comment:

PERFORMANCE INFORMATION

OP-TM-300-206, Step 4.1.2

Performance Step: 4 If a quantitative assessment of Shutdown Margin is desired, the DETERMINE Shutdown margin IAW section 4.3.

Standard: Examinee determines a quantitative assessment of Shutdown Margin is desired, signs off the step. The examinee will go to section 4.3

Comment:

EXAMINER NOTE: If the examinee asks, there is no Reactor Engineer or DTSQA-approved software available.

OP-TM-300-206, Step 4.3.1

Performance Step: 5 PERFORM calculation per Attachment 7.3 and instructions in Attachment 7.4 or DTSQA-approved software.

Standard:

Comment:

OP-TM-300-206, Attachment 7.3

Performance Step: 6 CALCULATION FOR A SDM AT: DATE TIME

Standard: Examinee fills in 06/30/17 and 1300 from the cue sheet.

Comment:

OP-TM-300-206, Attachment 7.3, Step 1

Performance Step: 7 Tave (<530 °F)

Standard: Examinee fills in 350 °F from the cue sheet.

Comment:

PERFORMANCE INFORMATION

OP-TM-300-206, Attachment 7.3, Step 2**Performance Step: 8** Cycle burnup**Standard:** Examinee fills in 600 EFPD from the cue sheet.**Comment:*****OP-TM-300-206, Attachment 7.3, Step 3a*****Performance Step: 9** Measured Boron Concentration**Standard:** Examinee fills in 220 ppm from the cue sheet.**Comment:*****OP-TM-300-206, Attachment 7.3, Step 3b*****Performance Step: 10** Boron Depletion Correction Factor**Standard:** Examinee fills in .8006 from the cue sheet**Comment:*****√ OP-TM-300-206, Attachment 7.3, Step 3c*****Performance Step: 11** Corrected Boron Concentration (3a X 3b) =**Standard:** Examinee divides 220 ppm X .8006 = 176.13 ppm
(BAND: 176.1 to 176.132)**Comment:*****OP-TM-300-206, Attachment 7.3, Step 4*****Performance Step: 12** Excess Reactivity (Fig 1.)**√ Standard:** Examinee uses figure 1 of OP-TM-300-000 and gets a value of
~.6 %Δk/k (Band: .5 to .7%Δk/k)**Comment:**

PERFORMANCE INFORMATION

OP-TM-300-206, Attachment 7.3, Step 5

Performance Step: 13 Xenon Reactivity Worth (PPC, Reactor Engr.)

Standard: Examinee fills in -2.638% Δ k/k from the cue sheet.

Comment:

OP-TM-300-206, Attachment 7.3, Step 6a

Performance Step: 14 Samarium and Plutonium Buildup Reactivity Worth (Fig 15):
Time since shutdown ___ hrs

Standard: Examinee fills in 20 hours from the cue sheet.

Comment:

OP-TM-300-206, Attachment 7.3, Step 6b

Performance Step: 15 Samarium and Plutonium Buildup Reactivity Worth (Fig 15):
Reactivity due to samarium and plutonium buildup.

✓ **Standard:** Examinee uses OP-TM-300-000, Figure 15 and fills in
-0.055% Δ k/k. (Band: -0.05 to -0.06% Δ k/k)

Comment:

OP-TM-300-206, Attachment 7.3, Step 7a

Performance Step: 16 Inoperable Control Rods:
No. of known inoperable rods (>0%WD)

Standard: Examinee fills in 1 from the cue sheet.

Comment:

PERFORMANCE INFORMATION

OP-TM-300-206, Attachment 7.3, Step 7b

Performance Step: 17 Inoperable Control Rods:
Total inoperable rod worth (OP-TM-300-401)

- √ **Standard:** Examinee performs OP-TM-300-401 section 1. Examinee identifies that the rod in location 5-9 is fully withdrawn and uses attachment 7.3 of OP-TM-300-000 to determine the worth of the control rod in that position is 0.851%Δk/k. Examinee fills in line 7b with 0.851%Δk/k and attaches Attachment 7.1 of OP-TM-300-401 to OP-TM-300-206.

Comment:

OP-TM-300-206, Attachment 7.3, Step 8

Performance Step: 18 Reactivity Addition Due to Reduced Tave (Fig. 17)

- √ **Standard:** Examinee uses OP-TM-300-000, Figure 17 and fills in 3.8%Δk/k. (BAND: 3.7 to 3.9%Δk/k)

Comment:

√ **OP-TM-300-206, Attachment 7.3, Step 9a**

Performance Step: 19 Boron Reactivity Worth at Reduced Tave:
Reduced temperature Inverse Boron Worth (Fig. 7)

Standard: Examinee uses OP-TM-300-000, Figure 7 and fills in a value of 104 ppmB/%Δk/k (BAND: 102 to 106 ppmB/%Δk/k)

Comment:

OP-TM-300-206, Attachment 7.3, Step 9b

Performance Step: 20 Total Worth (3c/9a) x (-1) =

- √ **Standard:** Total Worth (176.13 / 104) x (-1) = - 1.69%Δk/k
(BAND: -1.73 to -1.66)

Comment:

PERFORMANCE INFORMATION

OP-TM-300-206, Attachment 7.3, Step 10

Performance Step: 21 Shutdown Margin $(4 + 5 + 6b + 7b + 8 + 9b) =$

✓ **Standard:** Shutdown Margin $(0.6 + (-2.638) + (-0.055) + 0.851 + 3.8 + (-1.69) = 0.868\% \Delta k/k$
(BAND: 0.62 to 1.1)

Comment:

OP-TM-300-206, Attachment 7.3, Acceptance Criteria

Performance Step: 22 Examinee determines that the calculated SDM does not meet the acceptance criteria, and notifies the examiner.

Standard: Examinee determines that the calculated SDM does not meet the acceptance criteria, and notifies the examiner.

Comment:

Terminating Cue: This JPM can be terminated after the examinee completes the calculation and determines that SDM is NOT satisfied.

STOP TIME: _____

TIME CRITICAL STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: ILT 16-01 NRC JPM RA1-1

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- RCS temperature 350°F at 1300 on 6/30/17, which coincides with 20 hours after shutdown from 100%.
- Previous power change was refueling outage 16 months ago.
- 600 EFPD
- Boron Concentration is 220 ppm
- Boron Depletion factor from the PPC is .8006
- Xenon Reactivity Worth from the PPC is -2.638 % Δ k/k
- The Control Rod in location 5-9 is stuck, fully withdrawn

INITIATING CUE:

The Shift Manager has directed you to calculate a QUANTITATIVE (Determine a Numerical Value) assessment of Shutdown Margin (SDM), IAW OP-TM-300-206 for a temperature of 350 °F, and the parameters provided in the cue sheet.

TIME CRITICAL:

No

Facility: THREE MILE ISLAND Task No.: 21101013

Task Title: Emergency Borate Using the BAMT as the Source – Alternate Path JPM No.: ILT 16-01 NRC JPM A

K/A Reference: 004 A2.14 3.8/3.9 Bank JPM: TQ-TM-104-211-J110

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: _____ Actual Performance: X
Classroom _____ Simulator X Plant _____

READ CUE SHEET ON LAST PAGE 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.

- Initial Conditions:
- The plant is stable post trip, with one control rod stuck out.
 - You are the URO
 - The examiner will act as the CRS and ARO
 - The booth operator will be the Auxiliary Operator

Task Standard: Initiate an alternate method of emergency boration.

- Required Materials:
- OP-TM-EOP-010, 'Emergency Procedure Rules, Guides and Graphs', Rev 19.

- General References:
- OP-TM-EOP-010, 'Emergency Procedure Rules, Guides and Graphs', Rev 19.

Initiating Cue: As the URO, Initiate Emergency Boration IAW Rule 5, Emergency Boration

Time Critical Task: No

Validation Time: 4 minutes

SIMULATOR SETUP

1. Reset the simulator to IC 246 or similar 100% IC.
2. Run the setup:
 - Initialize the simulator and go to run.
 - INSERT malfunction **RD0202** IMMEDIATELY, stuck rod Group 4.
 - OVERRIDE **MU-V-14B** Open Pushbutton to **OFF**
 - 02A5S77-ZDIPBOMUV14B
 - TRIP the Rx and carry out immediate manual actions.
 - Stabilize the plant post trip
 - INSERT malfunction MUR69, MU-V-14A Breaker Open
 - MONITOR:
 - **MUMMT** – Make Up Tank Mass
 - **MUBMUT1** – Make Up Tank Boron Concentration
3. When the above steps are completed for this and other JPMs to be run concurrently then validate, if not previously validated, the concurrently run JPMs using the JPM Validation Checklist.
4. This completes the setup for this JPM.

PERFORMANCE INFORMATION

(Denote Critical Steps with a check mark)

START TIME: _____

EVALUATORS CUE: As the CRS, direct the examinee to initiate Emergency Boration IAW Rule 5.

OP-TM-EOP-010, Rule 5, Step 1

Performance Step: 1

WAAT one of the following conditions exist:

- 1% dk/k SHUTDOWN has been achieved for the expected plant condition IAW Figure 10 of OP-TM-300-000, "Reactivity and Power Distribution Calculations", **or** OP-TM-300-205, "Shutdown Margin for Hot Shutdown Conditions", **or** OP-TM-300-206, "Shutdown Margin for Low Temperature Conditions."
- LPI > 1250 gpm per line
- Tavg > 525 °F and stable or rising **and** all Control Rods are inserted, and Neutron flux is lowering as expected.

then emergency boration **may** be terminated.

Standard:

The examinee will read the step, and leave it open. It will be not applicable for this JPM.

Comment:

OP-TM-EOP-010, Rule 5, Step 2

Performance Step: 2

VERIFY a MU pump is operating.

Standard:

Examinee verifies that MU-P-1B is operating.

Comment:

BOOTH CUE:

If the examinee contacts the Primary AO to Manually open MU-V-14A/B, wait 10 seconds and report that MU-V-14A/B will not manually operate.

PERFORMANCE INFORMATION

OP-TM-EOP-010, Rule 5, Step 3**Performance Step: 3**Perform one of the following:

- **OPEN** MU-V-14A,

Standard:

Examinee recognizes MU-V-14A does not have power.

Comment:***OP-TM-EOP-010, Rule 5, Step 3*****Performance Step: 4**Perform one of the following:

- **OPEN** MU-V-14B,

Standard:

Examinee presses the MU-V-14B Open PB. Examinee diagnoses that MU-V-14B is not opening and informs the CRS.

Comment:***OP-TM-EOP-010, Rule 5, Step 3*****Performance Step: 5**Perform one of the following:

- **PERFORM** Guide 1 "Emergency Boration Backup Methods."

Standard:

Examinee goes to GUIDE 1 to perform Emergency Boration

Comment:

PERFORMANCE INFORMATION

Alternate Path Begins

EXAMINER NOTE: There are two possible backup sources for boration, the BAMT and the RBAT.

EXAMINER CUE: If the examinee asks the backup Emergency Boration source, inform them that the BAMT is the source.

OP-TM-EOP-010, Guide 1, Step A.1

- √ **Performance Step: 6** If the backup Emergency Boration source is the BAMT, then perform the following:

OPEN MU-V-51

Standard: Examinee pushes the open pushbutton for MU-V-51 and observes the red "open" light comes on and the green "close" light goes out.

Comment:

OP-TM-EOP-010, Guide 1, Step A.2

- √ **Performance Step: 7** **START** boric acid pumps CA-P-1A and CA-P-1B

Standard: Examinee starts CA-P-1A by turning the control switch to the start position and observes the red light comes on and the green light goes out pump.

Examinee starts CA-P-1B by turning the control switch to the start position and observes the red light comes on and the green light goes out pump

Comment:

Terminating Cue: Once MU-V-51 is open and CA-P-1A and 1B are running, the JPM can be terminated.

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: ILT 16-01 NRC JPM A

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- The plant is stable post trip, with one control rod stuck out.
- You are the URO
- The examiner will act as the CRS and ARO
- The booth operator will be the Auxiliary Operator

INITIATING CUE:

As the URO, Initiate Emergency Boration IAW Rule 5, Emergency Boration

TIME CRITICAL:

No

Facility: THREE MILE ISLAND

Task No.: EOPG21001

Task Title: REMOVING MU-P-1B FROM
SERVICEJPM No.: ILT 16-01 NRC JPM B

K/A Reference: 004 A4.11 3.4/3.3

Bank JPM: TQ-TM-104-211-J108

Examinee:

NRC Examiner:

Facility Evaluator:

Date:

Method of testing:

Simulated Performance: _____

Actual Performance: XClassroom _____ Simulator X Plant _____**READ CUE SHEET ON LAST PAGE 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.

Initial Conditions:

- You are assigned the duties of the Unit Reactor Operator (URO).
- The Plant is at 100% power, with ICS in full automatic.
- MU-P-1B has developed a leak on the inboard seal, which has increased in severity over the past 3 days.
- The necessary repair parts have now been assembled, and it is necessary to remove MU-P-1B from service using MU-P-1A to affect the repairs.
- MU-P-1A cooling water is being supplied from NSCCW.

Task Standard: MU-P-1A is supplying seal injection, and MU-P-1B is secured. IC-P-1B is running.

Required Materials:

- OP-TM-211-433, Removing MU-P-1B From Service with procedure completed up to Section 4.0, Main Body
- OP-TM-211-437, Supplying Seal Injection From MU-P-1A
- OP-TM-541-438, Removing IC-P-1A From Service

- General References:
- OP-TM-211-433, Removing MU-P-1B From Service
 - OP-TM-211-437, Supplying Seal Injection From MU-P-1A
 - OP-TM-211-000, Makeup And Purification System
 - OP-TM-543-439, Swapping MU-P-1A Cooling to NS
 - OP-TM-543-401, Operating DC-P-1A For Other Than Decay Heat Removal Operations
 - OP-TM-541-438, Removing IC-P-1A From Service
 - OP-TM-211-440, Supplying Seal Injection From MU-P-1C

Initiating Cue: The Control Room Supervisor has directed you to remove MU-P-1B from service IAW OP-TM-211-433

Time Critical Task: No

Validation Time: 25 minutes

SIMULATOR SETUP

1. Reset the simulator to IC 16 or equivalent 100% power IC
2. Place simulator in FREEZE.
 - A. No malfunctions required to complete the task.
3. This completes the setup for this JPM.

PERFORMANCE INFORMATION

(Steps with a check mark Denote Critical Steps)

START TIME: _____

EVALUATORS CUE: Provide examinee copy of OP-TM-211-433. Prerequisites have been completed and signed off (Step 3.3.1).

OP-TM-211-433

Performance Step 1: Examinee reviews procedure (purpose, material and special equipment, precautions, limitations, and prerequisites) and proceeds to Section 4.0, Main Body

Standard: Procedure is reviewed and proceeds to Section 4.0, Main Body

Comment:

EXAMINER CUE: Once determined that MU-P-1A is available for supplying seal injection, provide a blank copy OP-TM-211-437, Supplying Seal Injection from MU-P-1A

OP-TM-211-433, Step 4.1

Performance Step 2: If MU-P-1A is available, then **INITIATE** OP-TM-211-437 Supplying Seal Injection from MU-P-1A.

Standard: Examinee determines MU-P-1A is available and enters OP-TM-211-437, Supplying Seal Injection from MU-P-1A and obtains a copy of OP-TM-211-437.

Comment:

OP-TM-211-437

Performance Step 3: Examinee reviews procedure (purpose, material and special equipment, precautions, limitations, and prerequisites) and proceeds to Section 4.0, Main Body

Standard: Procedure is reviewed and proceeds to Section 4.0, Main Body

Comment:

PERFORMANCE INFORMATION

OP-TM-211-437

Performance Step 4: Examinee reviews procedure (purpose, material and special equipment, precautions, limitations, and prerequisites) and proceeds to Section 4.0, Main Body

Standard: Procedure is reviewed and proceeds to Section 4.0, Main Body

Comment:

OP-TM-211-437 Step 4.1

Performance Step 5: If MU-P-1A may be in service > 4 hours, **then INITIATE** OP-TM-543-439, Swapping MU-P-1A Cooling To NS.

Standard: OP-TM-543-439, Swapping MU-P-1A Cooling To NS will be initiated.

Comment:

OP-TM-211-437 Step 4.2

EXAMINER NOTE: Steps 4.2.1 through 4.2.7 will be verified. Use of OP-TM-543-401 to start Decay Closed Cooling is NOT required

OP-TM-211-437 Step 4.2.8

✓ **Performance Step 6:** **START** MU-P-1A (CC).

Standard: MU-P-1A is Placed in start position and left in Normal After Start. Verify Red light ON, Green light is NOT LIT

Comment:

OP-TM-211-437 Step 4.2.9

Performance Step 7: VERIFY the following:

- D-1-4, MU P 1A/B/C GEAR LUBE OIL PRESS LO is Clear.
- MU-P-1A/B ES Indication (PCR) is Blue / On.
- Makeup Flow (MU24AFI) (CC) is stable.
- Seal Injection Flow (MU42 FI)(CC) is stable (36 – 40 gpm).
- MU Pump Discharge Pressure (MU2PI)(CC) is stable

Standard: Examinee verifies indications.

Comment:

PERFORMANCE INFORMATION

OP-TM-211-437 Step 4.3

- ✓ **Performance Step 8:** **PLACE** MU-P-1B in Normal After Stop
- Standard:** MU-P-1B is placed in Normal After Stop
Verify Green light is ON, Red light NOT LIT
- Comment:**

OP-TM-211-437 Step 4.3.1

- Performance Step 9:** VERIFY the following:
- D-1-4, MU P 1A/B/C GEAR LUBE OIL PRESS LO is Clear.
 - Makeup Flow (MU24AFI) (CC) is stable.
 - Seal Injection Flow (MU42 FI)(CC) is stable (36 – 40 gpm).
 - MU Pump Discharge Pressure (MU2PI)(CC) is stable
- Standard:** Above indications are verified
- Comment:**

OP-TM-211-437 Step 4.4

- Performance Step:** **INITIATE** OP-TM-541-438, Remove IC-P-1A from Service (to start IC-P1B and place IC-P-1A in standby).
- Standard:** OP-TM-541-438, Remove IC-P-1A from Service is entered.
- Comment:**

OP-TM-541-438

- Performance Step:** Examinee reviews procedure (purpose, material and special equipment, precautions, limitations, and prerequisites) and proceeds to Section 4.0, Main Body
- Standard:** Procedure is reviewed and proceeds to Section 4.0, Main Body
- Comment:**

EXAMINER NOTE: When examinee requests **OP-TM-541-438, REMOVE IC-P-1A** from service, hand them the provided copy.

OP-TM-541-438 Step 4.1.1

- ✓ **Performance Step:** **PLACE** IC-P-1B-EX1 in Normal-After-Start
- Standard:** IC-P-1B is started by placing IC-P-1B-EX1 in Normal-After-Start
Verify Red light ON, Green light is NOT LIT
- Comment:**

PERFORMANCE INFORMATION

OP-TM-541-438 Step 4.1.2 and 4.1.3

- √ **Performance Step:** **VERIFY** system flow is stable on IC-5FI (CR) and **PLACE** IC-P-1A-EX1 in Normal-After-Stop
- Standard:** System flow is verified to be stable and IC-P-1A is places in Normal-After-Stop and returns to OP-TM-211-437
Verifies IC-P-1A Green Light LIT, Red Light OFF
- Comment:**

OP-TM-211-437 Step 4.4.1

- Performance Step:** **VERIFY** IC-P-1B is operating
- Standard:** IC-P-1B is verified to be operating by verifying Red light is ON and Green light NOT LIT and returns to OP-TM-211-433
- Comment:**

OP-TM-211-433 Step 4.2

- Performance Step:** If MU-P-1A is not available, **then INITIATE** OP-TM-211-440 Supplying Seal Injection from MU-P-1C.
- Standard:** Step 4.2 is N/A
- Comment:**

OP-TM-211-433 Step 4.3

- Performance Step:** **VERIFY** MU-P-1B is shutdown
- Standard:** Examinee verifies MU-P-1B Green Light LIT, Red Light OFF
- Comment:**

Examiner CUE: When asked, inform examinee you will make appropriate logs

OP-TM-211-433 Step 4.4

- Performance Step:** **NOTIFY** Control Room Supervisor **and LOG** MU-P-1B removed from service
- Standard:** Examinee Notifies CRS and Logs MU-P-1B removed from service
- Comment:**

Terminating Cue: JPM may be terminated when examinee has reported Seal Injection is being supplied from MU-P-1A, IC-P-1B is running, and MU-P-1B is shutdown

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: ILT 16-01 NRC JPM B

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

- INITIAL CONDITIONS:
- You are assigned the duties of the Unit Reactor Operator (URO).
 - The Plant is at 100% power, with ICS in full automatic.
 - MU-P-1B has developed a leak on the inboard seal, which has increased in severity over the past 3 days.
 - The necessary repair parts have now been assembled, and it is necessary to remove MU-P-1B from service using MU-P-1A to affect the repairs.
 - MU-P-1A cooling water is being supplied from NSCCW

INITIATING CUE: The Control Room Supervisor has directed you to remove MU-P-1B from service IAW OP-TM-211-433.

TIME CRITICAL: No

Facility: THREE MILE ISLAND

Task No.: 64201006

Task Title: Respond to an Inadvertent ESAS
Actuation-Alternate PathJPM No.: ILT 16-01 NRC JPM C

K/A Reference: 006 A2.13 3.7/4.2

Modified JPM: TQ-TM-104-A46-
J100

Examinee:

NRC Examiner:

Facility Evaluator:

Date:

Method of testing:

Simulated Performance: _____

Actual Performance: XClassroom _____ Simulator X Plant _____**READ CUE SHEET ON LAST PAGE 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.

- Initial Conditions:
- 100% power
 - You are the URO
 - The examiner will act as the ARO and CRS
 - The ICO will act as the Auxiliary Operators in the plant.

Task Standard: Makeup Pump 1C is secured, MU-V-16B is throttled open to establish MU PUMP FLOW of > 115 gpm.

- Required Materials:
- OP-TM-AOP-046, 'Inadvertent ESAS Actuation', Rev 6

- General References:
- OP-TM-AOP-046, 'Inadvertent ESAS Actuation', Rev 6

Initiating Cue: Respond to the cues or indications provided by the examiner or the simulator.

Time Critical Task: No

Validation Time: 10 minutes

SIMULATOR SETUP

1. Reset the simulator to IC 16 or temporary IC 239.
2. ENSURE SI Flow is less than 40 gpm.
3. Insert:
 - a. MALFUNCTION **ES08B** on EVENT #1
 - b. MALFUNCTION **MU07** immediately to 45% (ensure this setting does not let SI flow go greater than 40 gpm)
 - c. REMOTE **RSR09** to EMERG on Event #2 with a 20 second time delay
 - d. Override ZDIMU42FIC(2) 02A5A03-ZDIMU42FIC(2) to OFF to ensure MU-V-32 will not transfer to hand.
4. Place the simulator in RUN.
5. When the above steps are completed for this and other JPMs to be run concurrently then validate, if not previously validated, the concurrently run JPMs using the JPM Validation Checklist.
6. This completes the setup for this JPM.

(Denote Critical Steps with a check mark)

START TIME: _____

EVALUATORS CUE: When the examinee is in role, direct the ICO to insert Event #1.

EVALUATORS NOTE: The examinee may perform immediate actions from memory, or pull the IMA book from below the console. Either method is acceptable.

BOOTH CUE: When directed by the examiner, insert EVENT #1.

Performance Step: 1 Diagnoses an inadvertent 500# ES signal on the 'B' train of ES.

Standard: Examinee recognizes the failure and makes an update on the 'B' train 500# signal failure.

Comment:

OP-TM-AOP-046, Immediate Actions, Step 2.1

Performance Step: 2 Defeat the invalid ESAS signals.

Standard: Examinee will attempt to defeat the invalid 'B' ES signals by pressing the 500# bypass and/or channel reset pushbuttons on console right. The signal will not be able to be cleared, and the RNO of Step 2.1 is entered.

Comment:

EXAMINER CUE: When the examinee GOES TO section 5.0, hand the examinee a copy of the procedure and direct the examinee to perform OP-TM-AOP-046.

PERFORMANCE INFORMATION

OP-TM-AOP-046, Immediate Actions, Step 2.1 RNO

Performance Step: 3 2. If "B" train can not be defeated then GO TO section 5.0.

Standard: The examinee recommends going to Section 5.0 of OP-TM-AOP-046.

Comment:

OP-TM-AOP-046, Section 5.0, Step 5.1

√ **Performance Step: 4** Shutdown the "B" train Makeup Pump NOT required for seal injection.

Standard: The examinee should recognize that MU-P-1C (on Console Right) and rotate the pistol grip counterclockwise to shutdown the pump. The green and amber lamps should light.

Comment:

OP-TM-AOP-046, step 5.2 is not applicable

BOOTH CUE: When the examinee directs an Auxiliary Operator to OPEN RSTSP "B" using key #98, and PLACE "Makeup & Purification" transfer switch in EMERG position, insert EVENT #2.

OP-TM-AOP-046, Step 5.3

Performance Step: 5 If B side RSD system available, then perform the following:

1. OPEN RSTSP "B" using key #98 (1S 480V Bus Room)
2. PLACE "Makeup & Purif" transfer switch in EMERG position.

Standard: Examinee will dispatch an operator to perform this step. When the step is completed, the examinee will move to the next step.

Comment:

PERFORMANCE INFORMATION

EXAMINER CUE: If the examinee requests the positions of MU-V-77A & B and MU-V-76A & B, reply that they are in their normal position. The examinee can verify the position of the above valves by using the configuration control placard on console center, below the makeup pump control switches.

EXAMINER CUE: In addition to raising the setpoint on the MU-V-32 controller (SI controller) the examinee may attempt to take the controller to hand, and demand MU-V-32 open to raise SI flow > 40 gpm. Either or both methods are acceptable, but neither method will work, as the valve is failed in the current position.

OP-TM-AOP-046, Step 5.4

Performance Step: 6 If all of the following conditions exist:

- MU-V-77A & B are Open
- MU-V-76A & B are Closed
- "A" train ESAS did not actuate, then perform the following:
 1. RAISE SI flow to > 40 gpm using setpoint controller.

Standard: The examinee will rotate the SI setpoint clockwise to raise SI demand. This will not get SI flow greater than 40 gpm, and the RNO should be entered.

Comment:

Alternate Path Begins

PERFORMANCE INFORMATION

BOOTH CUE: If dispatched as an Auxiliary Operator to investigate MU-V-32, wait 30 seconds and report that MU-V-32 appears normal.

EXAMINER NOTE: In OS-24, MU Pump Flow includes normal makeup (MU24-FI), seal injection (MU42-FI), HPI Flow and pump recirculation flow of 95 GPM per pump. In this JPM, there is no recirculation flow due to MU-V-37 closing on the inadvertent ES, therefore to get to >115 gpm, the operator will sum seal injection (~ 35 gpm) and the flow through MU-V-16B. The flows can easily be seen from the PPC on the makeup system overview screen.

OP-TM-AOP-046, Step 5.4 RNO

√ **Performance Step: 7** THROTTLE MU-V-16B to establish a MU PUMP FLOW of > 115 gpm.

Standard: The applicant should throttle open MU-V-16B by pressing the red OPEN pushbutton. The operator will have to press the white STOP pushbutton when MU-V-16B is in the desired position. The operator may choose to throttle open or closed MU-V-16B to establish 115 gpm flow rate.

Comment:

Terminating Cue: When MU-V-16B is throttle open to a MU PUMP Flow >115 gpm, the JPM can be terminated.

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: ILT 16-01 NRC JPM C

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

- INITIAL CONDITIONS:
- 100% power
 - You are the URO
 - The examiner will act as the ARO and CRS
 - The ICO will act as the Auxiliary Operators in the plant.

INITIATING CUE: Respond to the cues or indications provided by the examiner or the simulator.

TIME CRITICAL: No

Facility: THREE MILE ISLAND Task No.: EOPG21001

Task Title: Transfer to Reactor Building Sump JPM No.: ILT 16-01 NRC JPM D
Recirculation – Alt Path

K/A Reference: 005 A2.04 2.9/2.9 Bank JPM: TQ-TM-104-212-J100

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: _____ Actual Performance: X
Classroom _____ Simulator X Plant _____

READ CUE SHEET ON LAST PAGE 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.

- Initial Conditions:
- You are assigned the duties of the extra RO.
 - The examiner will act as the URO, ARO, and CRS.
 - The ICO will act as the Auxiliary Operators in the plant.
 - Reactor is shutdown with a LOCA in progress.
 - OP-TM-EOP-001 and OP-TM-EOP-006 are in progress.
 - OP-TM-EOP-010, Guide 20 has been completed.
 - BWST level is at 13 feet and lowering.
 - LPI throttling is in progress per Rule 2.
 - DH-V-38A/B are closed

Task Standard: LPI flow balanced ≤ 2800 gpm, but >1250 gpm per loop. If BWST level lowered to less than 6.33 feet, DH-V-5A and 5B must be closed.

- Required Materials:
- OP-TM-EOP-010, 'Emergency Procedure Rules, Guides and Graphs', Rev 19
 - OP-TM-211-901, 'Emergency Injection (HPI/LPI)', Rev 7

- General References:
- OP-TM-EOP-010, 'Emergency Procedure Rules, Guides and Graphs', Rev 19
 - OP-TM-211-901, 'Emergency Injection (HPI/LPI)', Rev 7

Initiating Cue: The CRS has directed you to transfer the reactor building sump to recirculation mode IAW OP-TM-EOP-010, Guide 21

Time Critical Task: No

Validation Time: 20 minutes

SIMULATOR SETUP

1. Reset the simulator to IC 16 or equivalent 100% power IC (Temporary IC 236)
2. Place simulator in FREEZE.
 - Insert Malfunction TH04 at 10% severity.
 - Insert remote DHR05 IN to energize CF-V-1A Breaker
 - Insert remote DHR06 IN to energize CF-V-1B Breaker
 - Insert remote DHR17 IN to energize DH-V-1 Breaker
 - Insert remote DHR18 IN to energize DH-V-2 Breaker
 - Insert remote DHR19 IN to energize DH-V-3 Breaker
 - Insert remote DHR11 at 100% to open DH-V-6A
 - Insert EVENT TRIGGER:
 - $dhvdhv6b > 0.01$ on EVENT 2 "Command" if dhr25 out. This will cause the breaker for DH-V-6B to trip when the examinee attempts to open DH-V-6B.
3. Place the simulator in RUN.
 - A. Using OP-TM-EOP-001 and OP-TM-EOP-006, control and monitor plant conditions.
 - B. Bypass/Reset all ESAS signals.
 - C. Complete all steps of Guide 20.
 - D. When BWST level is approximately 13 feet or, terminate HPI and place the Simulator in FREEZE.
4. When the above steps are completed for this and other JPMs to be run concurrently then validate, if not previously validated, the concurrently run JPMs using the JPM Validation Checklist.
5. This completes the setup for this JPM.

PERFORMANCE INFORMATION

(Denote Critical Steps with a check mark)

START TIME: _____

EVALUATORS CUE: Provide a copy of OP-TM-EOP-010, Guide 21.

OP-TM-EOP-010, Guide 21, Step 1

Performance Step: 1 **ANNOUNCE** initiation of RB sump recirculation over the page and radio.

Standard: Examinee announces initiation of RB sump recirculation over plant page and radio

Comment:

OP-TM-EOP-010, Guide 21, Step 2

Performance Step: 2 **VERIFY** RB Flood Level > 29 in.

Standard: Examinee will read Reactor Building Flood level indication on Panels CC and/or CR to verify that levels are greater than 29 inches.

Comment:

BOOTH CUE: When contacted to verify DH-V-38A or DH-V-38B is closed, wait one minute and report back that both DH-V-38A and DH-V-39B is closed.

PERFORMANCE INFORMATION

OP-TM-EOP-010, Guide 21, Step 3

Performance Step: 3 **VERIFY** either DH-V-38A or DH-V-38B is Closed

Standard: Contacts AO via radio to verify either DH-V-38A or DH-V-38B is Closed

Comment:

OP-TM-EOP-010, Guide 21, Step 4

√ **Performance Step: 4** **THROTTLE** both DH-V-4A and DH-V-4B to the maximum controllable flow ≤ 3000 gpm in each line

Standard: Examinee throttles DH-V-4A and DH-V-4B using the OPEN and STOP pushbuttons on Panels CC and CR to achieve max controllable flows of ≤ 3000 gpm in each line

Comment:

EXAMINER CUE: **As CRS acknowledge report of breaker trip for DH-V-6B and entry into RNO section.**

BOOTH CUE: **If asked, role-play as AO and respond to request to investigate tripped breaker.**

OP-TM-EOP-010, Guide 21, Step 5

√ **Performance Step: 5** **When** BWST level reaches 9.5 ft., **or** RB Flood Level > 56 inches, **then**

- OPEN DH-V-6A
- OPEN DH-V-6B

Standard: Examinee observes BWST level and Reactor Building Flood level on Panels CC and CR. When BWST level drops below 9.5 feet or flood level > 56 inches examinee will attempt to OPEN DH-V-6A and DH-V-6B by depressing the OPEN pushbutton for each on Panels CC and CR respectively.

WHEN the pushbutton for DH-V-6B is depressed the breaker for this valve will trip, leaving the valve in the CLOSED position. The examinee should announce that the breaker for DH-V-6B has tripped, and may request an AO to investigate the tripped breaker.

Examinee enters RNO section, announces same to CRS

Comment:

PERFORMANCE INFORMATION

OP-TM-EOP-010, Guide 21, Step 6

- √ **Performance Step: 6** **When** BWST level reaches 6.33 ft., **or** RB Flood Level > 56 inches, **then**

- CLOSE DH-V-5A
- CLOSE DH-V-5B

Standard:

Examinee observes BWST level and Reactor Building Flood level on Panels CC and CR. When BWST level drops below 6.33 feet or flood level > 56 inches examinee will CLOSE DH-V-5A and DH-V-5B by depressing the CLOSE pushbutton for each on Panels CC and CR respectively.

Examinee observes RED lights extinguish and GREEN Lights become bright for DH-V-5A and 5B.

Comment:

EXAMINER NOTE: Examinee could wait until BWST LEVEL is below 6.33 feet to initiate alternate path, or initiate alternate path and then perform steps for when BWST level is less than 6.33 feet. Either order is acceptable.

Alternate Path Begins**EXAMINER CUE:**

Acknowledge entry into OP-TM-211-901 if/when announced.
Provide copy of OP-TM-211-901

OP-TM-EOP-010, Guide 21, Step 5 RNO

- √ **Performance Step: 7**
1. **PLACE** affected DH pump in PTL
 2. **PLACE** affected BS pump in PTL
 3. **INITIATE** contingency actions for one DH pump IAW OP-TM-211-901, "Emergency Injection HPI/LPI"

Standard:

1. Examinee places extension control for DH-P-1B in PTL
2. Examinee places extension control for BS-P-1B in PTL
3. Examinee obtains copy of OP-TM-211-901 and announces entry into procedure

Comment:

PERFORMANCE INFORMATION

OP-TM-211-901, Precautions, Prerequisites, and Limitations

Performance Step: 8 Review precautions, limitations, & prerequisites.
Continue at step 4.2.7 under Contingency Actions

Standard: Examinee reviews precautions, limitations, & prerequisites.
Examinee determines, upon procedure review, that he/she needs to initiate contingency step 4.2.7.

Comment:

OP-TM-211-901, Step 4.2.7.1, 4.2.7.2 , and 4.2.7.3.A are not applicable. Examinee should proceed to step 4.2.7.3B.

BOOTH CUE: Role-play as AO and when requested, report back that it has been determined that both DH-V-38A and B are accessible in step 4.2.7.3.A.

OP-TM-211-901, Step 4.2.7.3.B

√ **Performance Step: 9** IAAT DH-P-1A or DH-P-1B is not operating, then perform the following:
B. If DH-V-38A and B are accessible, **then** perform the following:
1) **CLOSE** DH-V-4 on the train with the inoperable DH pump

Standard: Examinee closes DH-V-4B on Panel CR

Comment:

BOOTH CUE: Role-play as AO, respond when requested to open DH-V-38A and DH-V-38B and report back that both valves are open.
Remote function DHR14 opens both valves.

PERFORMANCE INFORMATION

OP-TM-211-901, Step 4.2.7.3.B

✓ **Performance Step: 10** 2) **OPEN** DH-V-38A and DH-V-38B (Aux Bldg 281' el.)

Standard: Requests AO to open DH-V-38A and DH-V-38B

Comment:

EXAMINER CUE: **Acknowledge performance of Rule 2 for LPI throttling in the next step.**

OP-TM-211-901, Step 4.2.7.3.B

Performance Step: 11 3) **THROTTLE** DH-V-4A and DH-V-4B to balance LPI flow IAW Rule 2

Standard: Examinee obtains laminated copy of Rule 2, LPI Throttling.
Announces performance of Rule 2

Comment:

EXAMINER NOTE: In all cases, throttle using DH-V-4A and DH-V-4B and flow indications on DH-FI-802A and DH-FI-803A

OP-TM-EOP-010, Rule 2B, Step 1

✓ **Performance Step: 12** **VERIFY both** DH-V-6A and DH-V-6B Closed

Standard: Examinee determines that
DH-V-6A is OPEN and DH-V-6B is CLOSED.
Examinee performs RNO section of Rule 2 for LPI throttling.

Comment:

PERFORMANCE INFORMATION

OP-TM-EOP-010, Rule 2B, Step 1 RNO Step 1 is not applicable

OP-TM-EOP-010, Rule 2B, Step 1 RNO

- √ **Performance Step: 13** 2. If both DH-V-38A and DH-V-38B are Open, then **THROTTLE both** trains for balanced total flow ≤ 2800 gpm
- Standard:** Examinee throttles DH-V-4A and DH-V-4B using the OPEN and STOP pushbuttons on Panels CC and CR, respectively, to achieve a balanced total LPI flow of ≤ 2800 gpm, but >1250 gpm per loop, as indicated on DH-FI-802A and DH-FI-803A
- Comment:**

Terminating Cue: **JPM may be terminated when examinee reports balanced LPI total flow ≤ 2800 gpm, but >1250 GPM per loop. In addition the examinee must close DH-V-5A and DH-V-5B if BWST level lowers to less than 6.33 feet.**

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: ILT 16-01 NRC JPM D

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- You are assigned the duties of the extra RO.
- The examiner will act as the URO, ARO, and CRS.
- The ICO will act as the Auxiliary Operators in the plant.
- Reactor is shutdown with a LOCA in progress.
- OP-TM-EOP-001 and OP-TM-EOP-006 are in progress.
- OP-TM-EOP-010, Guide 20 has been completed.
- BWST level is at 13 feet and lowering.
- LPI throttling is in progress per Rule 2.
- DH-V-38A/B are closed

INITIATING CUE:

The CRS has directed you to transfer the reactor building sump to recirculation mode IAW OP-TM-EOP-010, Guide 21

TIME CRITICAL:

No

Facility: THREE MILE ISLAND Task No.: 53401007

Task Title: Perform Emergency Operations of
Reactor Building Emergency
Cooling Water – Alternate Path JPM No.: ILT 16-01 NRC JPM E

K/A Reference: 022 A4.04 3.1 / 3.2 Modified JPM: TQ-TM-104-534-
J100

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: _____ Actual Performance: X
Classroom _____ Simulator X Plant _____

READ CUE SHEET ON LAT PAGE 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.

Initial Conditions:

- You are the ARO.
- The examiner will act as the URO and CRS.
- The Plant is at 100% power.
- There is a small steam leak inside Containment.
- The Director of Operations is informed of the situation.

Task Standard: "A" Reactor Building Emergency cooling is initiated, and RR-P-1B is in PTL.

Required Materials:

- OP-TM-534-901, RB EMERGENCY COOLING OPERATIONS, Rev 14

General References:

- OP-TM-534-901, RB EMERGENCY COOLING OPERATIONS, Rev. 14

Initiating Cue: The Control Room Supervisor has directed you to initiate Reactor Building Emergency Cooling using OP-TM-534-901, RB Emergency Cooling Operations.

ILT16-01 NRC JPM E

Time Critical Task: No

Validation Time: 8 minutes

SIMULATOR SETUP

- 1) Reset the simulator to IC16.
- 2) Insert override 03A6S05-ZDIRRV1B(2)CLS CR RR-V-1B CLOSE/OPEN to ON
- 3) Insert override 03A6S10-ZDIRR1B(1)OPN CR RR-V-1B CLOSE/OPEN to OFF
- 4) Insert Malfunction MS02B at 0.1% severity
- 5) Place the simulator in freeze.

PERFORMANCE INFORMATION

(Denote Critical Steps with a check mark)

START TIME: _____

EVALUATORS CUE: Direct the examinee to:
"Initiate RB Emergency Cooling in accordance with OP-TM-534-901".

EVALUATORS CUE: When the procedure is located, hand the examinee a copy of the procedure.

OP-TM-534-901, Precautions, Limitations and Prerequisites

Performance Step: 1 Examinee reviews Precautions, Limitations, and Prerequisites.
Standard:

Comment:

BOOTH CUE: When directed, respond as the AO and use Remote Function CCR 32 to close NS-V-85. Immediately report that NS-V-85 is closed.

OP-TM-534-901, Step 4.1.1

Performance Step: 2 **DISPATCH** an operator to CLOSE NS-V-85 (IB 295: S of RR Valve Room)

Standard: An AO is dispatched via radio to close NS-V-85.

Comment:

EXAMINER NOTE: The NOTE in the procedure allows the examinee to perform either train first or both trains in parallel.

PERFORMANCE INFORMATION

OP-TM-534-901, Step 4.1.2

Performance Step: 3 **IAAT** expected equipment response is not obtained when initiating the desired train(s) of RBEC, **then INITIATE** Section 4.2, Contingency Actions

Standard: Step is left open.

Comment:

OP-TM-534-901, Step 4.1.3

✓ **Performance Step: 4** **START or VERIFY** running:

- RR-P-1A
- RR-P-1B

Standard: RR-P-1A and RR-P-1B are started on CC (CR) by turning the extension control to the Normal After Start position and verifying the RED/RUNNING light(s) lit and GREEN/OFF lights off.

Comment:

OP-TM-534-901, Step 4.1.4

✓ **Performance Step: 5** **ENSURE OPEN:**

- RR-V-3A (Train A)
- RR-V-3B (Train B)
- RR-V-3C (Train A or B)

Standard: The valves are verified open (RED/OPEN lights lit and GREEN/CLOSED lights off).

Comment:

EXAMINER NOTE: **RR-V-1B not opening is the beginning of the alternate path. The student may identify RR-V-1B not opening after they check the pressure indicators. The alternate path script begins after they check the pressure indicators.**

PERFORMANCE INFORMATION

OP-TM-534-901, Step 4.1.5**√ Performance Step: 6 ENSURE OPEN:**

- | | |
|-----------|-----------|
| – Train A | – Train B |
| – RR-V-4A | – RR-V-4B |
| – RR-V-4C | – RR-V-4D |
| – RR-V-1A | – RR-V-1B |

Standard:

Examinee presses the RED/OPEN pushbutton and verifies the RED/OPEN lights are lit and the GREEN/CLOSED LIGHTS are off for each valve listed.

Examinee notes that RR-V-1B open light does not become bright and the close light stays lit.

Comment:**OP-TM-534-901, Step 4.1.6****Performance Step: 7 VERIFY the coolers in service are controlled at 50 – 75 psig:**

- RR-PI-224
- RR-PI-225
- RR-PI-226

Standard:

Examinee checks in-service coolers controlled at 50 – 75 psig.

Comment:

PERFORMANCE INFORMATION

Alternate Path Begins

BOOTH Cue: If directed to open RR-V-1B, wait 30 seconds and report that the operator for RR-V1B is broken

OP-TM-534-901, Steps 4.2.1 through 4.2.9 are not applicable.

OP-TM-534-901, Step 4.2.10

√ **Performance Step: 8** If RR-V-1B is closed, then perform the following:

1. Open RR-V-1B
2. If RR-V-1B is NOT open, the place RR-P-1B in PTL.

Standard: Examinee attempts to open RR-V-1B. When the valve does not open, the examinee will place RR-P-1B in PTL.

Comment:

Terminating Cue: When RR-P-1B is in PTL, the JPM can be terminated.

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: ILT 16-01 NRC JPM E

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- You are the ARO.
- The examiner will act as the URO and CRS.
- The Plant is at 100% power.
- There is a small steam leak inside Containment.
- The Director of Operations is informed of the situation.

INITIATING CUE:

The Control Room Supervisor has directed you to initiate Reactor Building Emergency Cooling using OP-TM-534-901, RB Emergency Cooling Operations.

TIME CRITICAL:

No

Facility: THREE MILE ISLAND Task No.: 73101008

Task Title: Transfer BOP Busses from 1B to 1A JPM No.: ILT 16-01 NRC JPM F
Aux Transformer

K/A Reference: 062 A4.01 3.3/3.1 Modified JPM: TQ-TM-104-731-J100

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: _____ Actual Performance: X
Classroom _____ Simulator X Plant _____

READ CUE SHEET ON LAST PAGE 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.

- Initial Conditions:
- 100% power
 - No major equipment out of service
 - No surveillances in progress
 - You are the ARO
 - The examiner will act as the CRS
 - The booth operator will be the Auxiliary Operator

Task Standard: The 1C 4160V bus successfully transferred to the 1A Auxiliary Transformer.

- Required Materials:
- 1107-1, 'Normal Electrical System', Rev 98, Section 5.3
Section 5.3.1 are signed complete, 5.3.2.A is N/A. Examinee will start on 5.3.2.B
 - 2 copies of 1107-11, 'TMI Grid Operations', Rev 40, Section 3.5.3
 - Indicate Step 3.5.3.1.1 Prerequisites are complete, and sign off steps 3.5.3.1.2 1-4 as complete

- General References:
- 1107-1, 'Normal Electrical System', Rev 98
 - 1107-11, 'TMI Grid Operations', Rev 40

Initiating Cue: Place the 1C 4kV bus on the 'A' Auxiliary Transformer IAW 1107-1, Section 5.3, Manual Hot Bus Transfers of 4kV or 7kV busses.

Time Critical Task: No

Validation Time: 11 minutes

SIMULATOR SETUP

1. Reset the simulator to IC 16

NOTE: It is okay to use a similar IC to the IC listed above, provided the IC actually used is verified to be compatible with this and other JPMs that are scheduled to be run concurrently.

2. When the above steps are completed for this and other JPMs to be run concurrently then validate, if not previously validated, the concurrently run JPMs using the JPM Validation Checklist.
3. This completes the setup for this JPM.
4. Pull up Area 16 Group 13 trend on PPC

PERFORMANCE INFORMATION

(Denote Critical Steps with a check mark)

START TIME: _____

EVALUATORS CUE: Direct the examinee to place the 1C 4kV busses on the 1A Auxiliary Transformer, IAW Section 5.3, Manual Hot Bus Transfers of 4kV or 7kV busses.
Provide the examinee with a copy of the procedure.

1107-1, Prerequisites, Step 5.3.1

Performance Step 1: Examinee reviews the notes, caution, and prerequisites

Standard: Examinee reviews the notes, caution, and prerequisites

Comment:

Examiner's Note: *1107-1, Procedure, 5.3.2.A will be marked N/A and examinee will continue to Step 5.3.2.B*

EXAMINER CUE: Notify the examinee that the URO will be logging all events in the log book.

EXAMINER NOTE: The next section is for the 1C 4kV bus.

1107-1, Procedure, 5.3.2.B

Performance Step 2: At PR Panel, note tap changer positions:

1A_____ 1B_____

Standard: Examinee notes tap changer positions for 1A and 1B at Panel PR

Comment:

PERFORMANCE INFORMATION

EXAMINER NOTE: When requested by the examinee, provide a copy of 1107-11 TMI Grid Operations, Section 3.5.3. Indicate Steps 3.5.3.1.1 Prerequisites as completed. In addition sign off 3.5.3.1.2 Procedure Steps 1, 2, 3, and 4 as completed.

1107-1, Procedure, 5.3.2.B**Performance Step 3:**

- Verify or place Aux Xfmr 1A load tap changer switch in manual IAW 1107-11, TMI Grid Operations.
- Verify or place Aux Xfmr 1B load tap changer switch in manual IAW 1107-11, TMI Grid Operations.

Standard:

Examinee will request 1107-11 to place the 1A and 1B load tap changers in manual.

Comment:

EXAMINER NOTE: NEXT STEP IS IN 1107-11

1107-11, Procedure, 3.5.3.1.2 for both Load Tap Changers**√ Performance Step 4:**

- On panel PR SELECT "Manual" on the "Auto-Man" select switch for the Aux. Transformer LTC to be manipulated
- While monitoring voltage on CR, RAISE or LOWER the tap changer, as required, to maintain voltage between 4162 and 4218 volts using the "Raise – Lower" switch on panel PR.

Standard:

The examinee will select manual on each load tap changer, and ensure voltage is between 4162-4218 volts on CR.

Comment:

EXAMINER NOTE: NEXT STEP IS IN 1107-1

PERFORMANCE INFORMATION

1107-1, Procedure, 5.3.2.B

Performance Step 5: Verify that the 230 kV busses are cross tied.
– At least one cross-tie is required

Standard: Examinee should verify on panel SS-1 that at least one cross tie is energized.

Comment:

EXAMINER NOTE: A momentary low voltage alarm is acceptable. Use the below band until loads are transferred over to the other Aux Transformer.

1107-1, Procedure, 5.3.2.B

Performance Step 6: Verify the transformer that is to lose load is between 4150V and 4176V (4150V is the Low Voltage Alarm and 4176V is one tap above this) or adjust the LTC as needed.

Standard: If voltage is not with the band, the examinee will adjust voltage to the band using the LTC on the 1B Auxiliary Transformer.

Comment:

EXAMINER NOTE: A momentary high voltage alarm is acceptable.

1107-1, Procedure, 5.3.2.B

Performance Step 7: Adjust the voltage on the transformer that is picking up load so that the voltage is 4218V to 4244V (4218V is top of the Tap Changer Control Band and 4244V is 1 tap above this. The High Voltage Alarm is 4250V.

Standard: If the voltage is not in bank, the examinee will adjust voltage to the band using the LTC on the 1A Auxiliary Transformer.

Comment:

PERFORMANCE INFORMATION

1107-1, Procedure 5.3.2.B Step 7 is not applicable.

EXAMINER NOTE: Closing the feeder breaker to the 1C 4kV bus to the 1A Auxiliary Transformer, and opening the breaker for the 1C 4kV bus to the 1B Auxiliary Transformer should be done in rapid succession.

1107-1, Procedure, 5.3.2.B

- ✓ **Performance Step 8:** Close the feeder breaker from the transformer being loaded.
- Standard:** Examinee turns (FROM THE 1A AUXILIARY TRANSFORMER) 1SA-C2 breaker control to the CLOSE position and holds until the RED CLOSED light comes on.

Comment:

- ✓ **Performance Step 9:** Open the feeder breaker from the transformer being unloaded.
- Standard:** Examinee turns (FROM THE 1B AUXILIARY TRANSFORMER) 1SB-C2 breaker control to the TRIP position and holds until the GREEN TRIPPED light comes on.

Comment:

Terminating Cue: Once the 1C 4kV bus being supplied by the 1A Auxiliary Transformer only, the JPM can be terminated.

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: ILT 16-01 NRC JPM F

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- 100% power
- No major equipment out of service
- No surveillances in progress
- You are the ARO
- The examiner will act as the CRS
- The booth operator will be the Auxiliary Operator

INITIATING CUE:

Place the 1C 4kV bus on the 'A' Auxiliary Transformer IAW 1107-1, Section 5.3, Manual Hot Bus Transfers of 4kV or 7kV busses.

TIME CRITICAL:

No

Facility: THREE MILE ISLAND UNIT 1 Task No.: 53101011

Task Title: Cross Connect the Secondary River Water System to the Nuclear River Water System JPM No.: ILT 16-01 NRC JPM G

K/A Reference: 026 AA2.02 (2.9/3.6) Modified Bank TQ-TM-104-531-J001

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom _____ Simulator X Plant _____

READ CUE SHEET ON LAST PAGE 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.

Initial Conditions:

- For this event you are assigned the duties of the Unit RO.
- NR-P-1B is tagged out for maintenance, 12 hours in to a 36-hour outage.
- NR-P-1C tripped 6 minutes ago.
- OP-TM-AOP-031, LOSS OF NUCLEAR SERVICES COMPONENT COOLING, was entered due to NS cooler outlet temperature approaching 100°F. Progression through step 3.8 has just been completed.

Task Standard: Secondary River Water is cross connected with Nuclear River Water and temperatures are being controlled.

Required Materials: None

General References: OP-TM-EOP-001, REACTOR TRIP, Rev. 16
OP-TM-AOP-031, LOSS OF NUCLEAR SERVICES COMPONENT COOLING, Rev. 6
OP-TM-541-901, CROSS-TIE SECONDARY RIVER TO SUPPLY NUCLEAR RIVER, Rev. 3

Appendix C	Job Performance Measure Worksheet	Form ES-C-1
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Handout: OP-TM-541-901, CROSS-TIE SECONDARY RIVER TO SUPPLY
NUCLEAR RIVER, Rev. 3

Initiating Cue: The CRS has directed you to Cross-Tie Secondary River to supply
Nuclear River IAW OP-TM-541-901.

Time Critical Task: NO

Validation Time: 25 minutes

SIMULATOR SETUP

- IC16 or Temporary IC 184
1. Ensure NR-P-1A/C are running.
 2. Place NR-P-1B extension controls in PTL on CC and CR. Hang information tags on both switches.
 3. Insert remote function **RWR10** to OUT, to rack out breaker for NR-P-1B
 4. Open NR-V-4A and NR-V-4B on PL. (note, NR-V-4A is a jog control valve therefore opening requires the switch to be held down until only the open light is on.)
 5. Insert malfunction **RW02C** to trip NR-P-1C.
 6. Perform OP-TM-EOP-001 IMA's and execute OP-TM-AOP-031 up through Step 3.9
 7. Raise River Water temperature high enough to result in NS cooler outlet temperature > 100°F
 - Insert Remote Function **RWR14** at 100°F (It takes ~ 6 minutes in run for NS Cooler Outlet Temperatures to exceed 100°F)
 8. Adjust MUT level for current plant conditions (**MUMMT** to 27500)
 9. Set **Event 1** to close the following breakers:
 - **RWR47** 1A ES SHMCC Unit 2A (NR-V-1) Value – CLOSE
 - **RWR19** 1A ES SHMCC Unit 2B (NR-V-3) Value – CLOSE
 - **RWR20** 1A ESV MCC Unit 8D (NR-V-5) Value – CLOSE
 - **RWR21** 1B ESV MCC Unit 10D (NR-V-6) Value – CLOSE
 - **RWR48** 1B ES SHMCC Unit 2A (NR-V-7) Value – CLOSE
 10. Place the simulator in FREEZE
 11. When the above steps are completed for this and other JPMs to be run concurrently then validate, if not previously validated, the concurrently run JPMs using the JPM Validation Checklist.
 12. This completes the setup for this JPM.

PERFORMANCE INFORMATION

(Denote Critical Steps with a check mark)

START TIME: _____

EVALUATOR CUE: When OP-TM-541-901 has been located, provide a copy of OP-TM-541-901.

OP-TM-541-901, PRECAUTIONS, LIMITATIONS, AND PREREQUISITES

Performance Step: 1 Precautions - None

Limitations - To prevent SR pump motor overload, maintain secondary river header pressure (as read on SR-PI-134) greater than 21 psig.

Prerequisites - VERIFY one of the following conditions:

- Reactor is shutdown
- TS 3.0.1 action statement has been entered

Standard: Examinee verifies the reactor is shutdown.

Comment:

EVALUATOR NOTE: Step 4.1 is N/A

OP-TM-541-901, Step 4.2

Performance Step: 2 ENSURE NR-V-4A or NR-V-4B is Closed.

Standard: Close NR-V-4A or NR-V-4B are Closed as indicated by Green lights on PL or Blue lights on (PCR).

Comment:

PERFORMANCE INFORMATION

OP-TM-541-901, Step 4.3**Performance Step: 3**

ENSURE discharge valves are Closed on all NR or SR pumps which are shutdown.

Standard:

Examinee closes the discharge valves on all non-running NR and SR pumps, by depressing close PB NR-V-1C on (CR) and close PB SR-V-1A (CL).

Comment:**OP-TM-541-901, Step 4.4****Performance Step: 4**

DISPATCH an Operator to Close the following breakers:

- NR-V-2-BK (1A ES Screen House MCC Unit 2A)
- NR-V-3-BK (1A ES Screen House MCC Unit 2B)
- NR-V-7-BK (1B ES Screen house MCC Unit 2A)
- NR-V-5-BK (1A ES Valves MCC Unit 8D)
- NR-V-6-BK (1B ES Valves MCC Unit 10D)

Standard:

Examinee contacts an AO and directs closing of the breakers for NR-V-2, NR-V-3, NR-V-5, NR-V-6 and NR-V-7.

**BOOTH OPERATOR
CUE:**

When requested to close the breakers for NR-V-2, NR-V-3, NR-V-5, NR-V-6, and NR-V-7:

- **Acknowledge the request.**
- **Insert Event 1. Ensure RWR19, RWR20, RWR21, RWR47 and RWR48 inserted.**
- **Report that the breakers for NR-V-2, NR-V-3, NR-V-5, NR-V-6, NR-V-7 are closed**

Comment:

PERFORMANCE INFORMATION

OP-TM-541-901, Step 4.5**Performance Step: 5**

IAAT NR piping between NR-V-3 and NR-V-5 is ruptured or blocked, then CLOSE the following valves:

- NR-V-3
- NR-V-5

Standard:

Determines no rupture in piping, leaves the step open (IAAT).

Comment:**OP-TM-541-901, Step 4.6**✓ **Performance Step: 6****Standard:**

ENSURE the third Secondary River pump is operating.

Starts the third SR pump SR-P-1A by rotating extension control clockwise (CL) observes RED light on GREEN light off.

Comment:**OP-TM-541-901, Step 4.7**✓ **Performance Step: 7****Standard:**

ENSURE SR pump discharge valves are OPEN.

Opens the discharge valve for SR-P-1A, SR-V-1A by depressing Open PB. Notes GREEN light out, RED light lit.

Comment:**OP-TM-541-901, Step 4.8**✓ **Performance Step: 8****Standard:**

WAAT OPEN NR-V-2-BK is CLOSED, then OPEN NR-V-2.

Presses the OPEN pushbutton for NR-V-2 (CC). Notes green light out, red light lit.

Comment:

PERFORMANCE INFORMATION

OP-TM-541-901, Step 4.9

- ✓ **Performance Step: 9** WAAT NR-V-7-BK is closed, then OPEN NR-V-7.
Standard: Presses the OPEN pushbutton for NR-V-7 (CC). Notes green light out, red light lit.

Comment:

✓ **OP-TM-541-901, Step 4.10**

- Performance Step: 10** WAAT NR-V-6-BK is CLOSED, then OPEN NR-V-6..
Standard: Presses the OPEN pushbutton for NR-V-6. Notes green light out, red light lit.

Comment:

OP-TM-541-901, Step 4.11

- Performance Step: 11** THROTTLE SR-V-2 to maintain Secondary River discharge pressure (SR-PI-134) above 21 psig.
Standard: If necessary, Examinee throttles SR-V-2 to maintain Secondary River discharge pressure (SR-PI-134) above 21 psig.

Comment:

EVALUATOR NOTE: NR-V-16A is an Appendix R valve, power is removed and the valve is full open.

EVALUATOR NOTE: NR-V-16B/C are full open already.

EVALUATOR NOTE: NR-V-16D should not need to be manipulated (per validation results). NS cooler outlet temperature should be less than 95°F and slowly lowering.

OP-TM-541-901, Step 4.12

- Performance Step: 12** THROTTLE OPEN NR-V-16 A, B, C, D to maintains NS cooler outlet temperature less than 95 °F.
Standard: If needed, Examinee directs an NLO to throttle open NR-V-16D to maintains NS cooler outlet temperature less than 95 °F.

Comment:

PERFORMANCE INFORMATION

OP-TM-541-901, Step 4.13

Performance Step: 13 THROTTLE OPEN NR-V-15A, B to maintain IC cooler outlet temperature less than 100 °F.

Standard: Examinee throttles NR-V-15A/ B on (CR) by pressing open PB for short periods of time, to maintain IC cooler outlet temperature less than 100 °F.

Comment:

Terminating Cue: When candidate has control (giving the direction to throttle NR-V-16D and/or throttling an NR-V-15) of outlet temperatures JPM may be terminated.

STOP TIME: _____

TIME CRITICAL STOP TIME: N/A

VERIFICATION OF COMPLETION

Job Performance Measure No.: ILT 16-01 NRC JPM G

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- For this event you are assigned the duties of the Unit RO.
- NR-P-1B is tagged out for maintenance, 12 hours in to a 36-hour outage.
- NR-P-1C tripped 6 minutes ago.
- OP-TM-AOP-031, LOSS OF NUCLEAR SERVICES COMPONENT COOLING, was entered due to NS cooler outlet temperature approaching 100°F. Progression through step 3.8 has just been completed.

INITIATING CUE:

The CRS has directed you to Cross-Tie Secondary River to supply Nuclear River IAW OP-TM-541-901.

TIME CRITICAL:

No

Facility: THREE MILE ISLAND Task No.: 66101004
Task Title: Respond IAW OP-TM-MAP-C0101 JPM No.: ILT 16-01 NRC JPM H
Alarm Response with Failure –
Alternate Path
K/A Reference: 072 A3.01 (2.9 / 3.1) Previous JPM: 12-01 NRC Exam

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: _____ Actual Performance: X
Classroom _____ Simulator X Plant _____

READ CUE SHEET ON LAST PAGE 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.

Initial Conditions:

- 100% power
- You are the ARO.
- The examiner will act as the URO and CRS.
- The booth operator will be the Auxiliary Operators.
- No Maintenance or surveillances are scheduled for this shift.

Task Standard: Control Building is on Recirc with AH-E-18A running IAW OP-TM-826-901, CONTROL BUILDING VENTILATION SYSTEM RADIOLOGICAL RESPONSE OPERATIONS

Required Materials:

- OP-TM-MAP-C0101, Radiation Level HI, Rev 3
- OP-TM-826-901, CONTROL BUILDING VENTILATION SYSTEM RADIOLOGICAL RESPONSE OPERATIONS, Rev 3

General References:

- OP-TM-MAP-C0101, Radiation Level HI, Rev 3
- OP-TM-826-901, CONTROL BUILDING VENTILATION SYSTEM RADIOLOGICAL RESPONSE OPERATIONS, Rev 3

Initiating Cue: Respond to the cues and indications given by the simulator as well as any input from the CRS.

Time Critical Task: No

Validation Time: 15 mins

ILT 16-01 NRC JPM H

NUREG 1021, Revision 10

SIMULATOR SETUP

1. Reset the simulator to IC 16
2. Insert the following Malfunctions:
RM01G, AH-E-17A fails to trip on interlock, insert immediately
Set **RM24** = 3000 on **EVENT #1**
Set **RM27** = 4020 on **EVENT #1**
ZDICSAHE18B(2) to **ON** for **EVENT #2**
ZDICSAHE18B(4) to **OFF** for **EVENT #2**
HVB-6-11 to **ON** for **EVENT #2**
3. When the above steps are completed for this and other JPMs to be run concurrently then validate, if not previously validated, the concurrently run JPMs using the JPM Validation Checklist.
4. This completes the setup for this JPM.

(Denote Critical Steps with a check mark)

START TIME: _____

EVALUATORS CUE: The examinee may recognize that the Automatic actions of C-1-1 did not occur and may perform the actions IAW OS-24.

BOOTH CUE: When directed, insert EVENT #1

EVALUATORS CUE: Acknowledge condition and entry into OP-TM-MAP-C0101.

OP-TM-MAP-C0101, Step 4.1

Performance Step: 1 ANNOUNCE alarm over plant page and radio.

Standard:

- Announces RM-A-1 Hi Alarm over the plant page and radio.

Comment:

BOOTH CUE: Acknowledge, as RadPro to verify the alarm and determine the source.

OP-TM-MAP-C0101, Step 4.2

Performance Step: 2 Notify Radiation Protection to verify the alarm and determine the source.

Standard:

- Notifies Radiation Protection to verify the alarm and determine the source.

Comment:

Evaluator Cue: If addressed, state that SCBA's are not required.

OP-TM-MAP-C0101, Step 4.3.1

Performance Step: 3 IAAT High alarm is Lit, then PERFORM OP-TM-826-901, "Control Building Ventilation System Radiological Response Operations":

Standard:

- Verifies RM-A-1 High alarm is Lit (PRF), and PERFORMS OP-TM-826-901.

Comment:

OP-TM-826-901, Precautions, Limitations, and Prerequisites

Performance Step: 4 Examinee retrieves procedure and verifies prerequisites.

Standard: Examinee marks off steps.

Comment:

OP-TM-826-901, Step 4.1.1 is not applicable

EVALUATORS CUE: TIME AH-E-17A is secured: _____

OP-TM-826-901, Step 4.1.2

✓ **Performance Step: 5** ENSURE the following fans are shutdown:

- AH-E-17A and AH-E-17B
- AH-E-95A and AH-E-95B
- AH-E-20A and AH-E-20B

Standard:

- Ensures AH-E-17B, AH-E-95A/B, AH-E-20A/B are shutdown.
- Recognizes that AH-E-17A is running and secures AH-E-17A, by rotating extension control in the counter-clockwise direction (H&V A).
- Recognizes that AH-E-20A is running and secures AH-E-20A, by rotating extension control in the counter-clockwise direction (H&V A).

Comment:

OP-TM-826-901, Step 4.1.3**Performance Step: 6** SHUTDOWN AH-E-19A and AH-E-19B.**Standard:**

- Verifies AH-E-19B secure and secures AH-E-19A by rotating extension control in the counter-clockwise direction (H&V A).

Comment:***OP-TM-826-901, Step 4.1.4*****Performance Step: 7** ENSURE AH-D-28 or AH-D-617 are CLOSED.**Standard:**

- Ensures AH-D-28 or AH-D-617 is CLOSED by observation of indication on H&V Center and/or PCR.

Comment:***OP-TM-826-901, Step 4.1.5*****Performance Step: 8** PLACE ext. control for AH-E-93/94A and AH-E-93/94B to the OFF position.**Standard:**

- Places ext. controls for AH-E-93/94A and AH-E-93/94B to the OFF position on H&V Center.

Comment:**EXAMINER NOTE:** After AH-E-18B is started direct EVENT #2 inserted to trip AH-E-18B and start the alternate path.***OP-TM-826-901, Step 4.1.6*****Performance Step: 9** START AH-E-18B (A) if AH-E-17A (B) was previously operating.

- Standard:**
- STARTS AH-E-18B (H&V B), by rotating extension control to start and waiting for discharge damper to drive to the open position, recognizes it does not start.

Comment:

BOOTH CUE: When directed, insert Event #2 and verify AH-E-18B trips and alarm HVB-6-11 comes in.

Alternate Path Begins

EXAMINER NOTE: The 'B' train, which is the standby train, trips. The 'A' train must be used. Student must recognize and identify the need to allow a two minute time delay and then proceed with 'A' train vice expected 'B' train.

EXAMINER CUE: When the candidate states that there is a 2 minute wait, announce "time compression is in effect and 2 minutes has elapsed".

- ✓ **EVALUATORS CUE:** TIME AH-E-18A is started: _____
(must be greater than 2 mins from when AH-E-17A is secured.)

OP-TM-826-901, Step 4.1.7

- ✓ **Performance Step: 10** If the opposite train of ventilation is unavailable, then WAIT 2 minutes after AH-E-17A (B) was shutdown and START AH-E-18A (B).

- Standard:**
- Waits 2 minutes

- Starts AH-E-18A by rotating extension control on H&V A clockwise and holding until the discharge damper travels and the RED light comes on indicating AH-E-18 contactor picked up.

Comment:

OP-TM-826-901, Step 4.1.8

Performance Step: 11 ENSURE AH-E-19A or B is operating.

Standard:

- Ensures AH-E-19A is operating, by observing RED light (H&V A).

Comment:

OP-TM-826-901, Step 4.1.9**Performance Step: 12** ENSURE AH-E-95A or B is operating.**Standard:**

- Ensures AH-E-95A is operating by observing RED light H&V Center.

Comment:***OP-TM-826-901, Step 4.1.10*****Performance Step: 13** START AH-E-90 and AH-E-91.**Standard:**

- Orders an NLO to START AH-E-90 and AH-E-91.

ICO Cue: Acknowledge, as an NLO, to start AH-E-90 and AH-E-91.**Comment:****Terminating Cue:** When AH-E-18A has been started and the order has gone out to an NLO to start AH-E-90/91, the JPM may be terminated.**STOP TIME:** _____

Job Performance Measure No.: ILT 16-01 NRC JPM H

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- 100% power
- You are the ARO.
- The examiner will act as the URO and CRS.
- The booth operator will be the Auxiliary Operators.
- No Maintenance or surveillances are scheduled for this shift.

INITIATING CUE:

Respond to the cues and indications given by the simulator as well as any input from the CRS.

TIME CRITICAL

No

Facility: THREE MILE ISLAND Task No.: 44104015

Task Title: Manually/Locally operate the turbine bypass valves (MS-V-3A-F) JPM No.: ILT 16-01 NRC JPM I

K/A Reference: 041 A4.08 3.0/3.1 Bank JPM: TQ-TM-105-411-J100

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: X Actual Performance:

Classroom Simulator Plant X

READ CUE SHEET ON LAST PAGE 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.

Initial Conditions:

- Reactor trip and plant cooldown has commenced
- You are an Auxiliary Operator
- The examiner will be all control room operators

Task Standard: Take local manual control of MS-V-3C.

Required Materials:

- OP-TM-411-451, MANUAL CONTROL OF TBVs/ADVs, Rev 7

General References:

- OP-TM-411-451, MANUAL CONTROL OF TBVs/ADVs, Rev 7

Initiating Cue: The Control Room Supervisor has directed you to establish communication with the control room and take local manual control of MS-V-3C, IAW OP-TM-411-451, MANUAL CONTROL OF TBVs/ADVs , Attachment 7.1.

Time Critical Task: No

Validation Time: 6 minutes

SIMULATOR SETUP

N/A

PERFORMANCE INFORMATION

(Denote Critical Steps with a check mark)

START TIME: _____

- EVALUATORS CUE:** Direct the examinee to:
"Establish communications with the CRO and take local manual control of MS-V-3C, in accordance with OP-TM-411-451, Attachment 7.1 and await further direction from the control room".
- EVALUATORS CUE** A copy of the procedure should be located at the valve, or if requested by the examinee, the examiner may hand Attachment 7.1.
- EXAMINER CUE:** If asked the status of the MS-V-3A/B/C ICS hand station, inform the student that "MS-V-3/4 station for MS-V-3C is in HAND".

OP-TM-411-451, Attachment 7.1, Step 1

- Performance Step: 1** Establish communications with the control room.
- Standard:** Examinee **LOCATES** MS-V-3C on the west side of the Main Condenser, 322' elevation of the Turbine Building and **ESTABLISHES** communications with the CRO with a Radio or headset, which is located north west of MS-V-3C.

Comment:

- EXAMINER CUE:** If examinee describes rotating handwheel to align the holes in the sleeve and stem, inform him/her that holes are aligned.

OP-TM-411-451, Attachment 7.1, Step 2

- √ **Performance Step: 2** **TURN** handwheel to align holes in sleeve with hole in stem (either set of holes in sleeve will work).
- Standard:** Examinee **DESCRIBES** rotating handwheel to align the holes in the sleeve and the stem using either set of holes.

Comment:

PERFORMANCE INFORMATION

EXAMINER CUE: If examinee describes inserting the pin, inform him/her that the pin is inserted

OP-TM-411-451, Attachment 7.1, Step 3

✓ **Performance Step: 3** **INSERT** pin into sleeve/stem.

Standard: **INSERT** pin into the holes of the sleeve and stem for the manual operator.

Comment:

EXAMINER NOTE: Auto/Manual switch for MS-V-3s is located on side of positioner box.

EXAMINER CUE: If examinee describes how to position switch correctly, inform him/her the switch is in **MANUAL**.

OP-TM-411-451, Attachment 7.1, Step 4

✓ **Performance Step: 4** **PRESS and ROTATE** Auto/Manual switch, 90 degrees counterclockwise to Manual position

Standard: Examinee **DESCRIBES** **Pressing and Rotating** the AUTO / MANUAL Switch 90 degrees counter clockwise to the MANUAL position.

Comment:

EXAMINER CUE: If examinee describes how to open the actuator equalizing valve correctly, inform him/her the valve is open.

OP-TM-411-451, Attachment 7.1, Step 5

✓ **Performance Step: 5** **OPEN** Actuator Equalizer valve MS-V-1162 for MS-V-3C.

Standard: Examinee **OPENS** the actuator Equalizing Valve by turning it counterclockwise to the fully OPEN position.

Comment:

PERFORMANCE INFORMATION

OP-TM-411-451, Attachment 7.1, Step 6

Performance Step: 6 **MAINTAIN** Turbine Header Pressure within limits by adjusting TBV / ADV handwheel.

Standard: Examinee **INFORMS** CRO that MS-V-3C is in MANUAL control and awaiting instructions to position valve.

Comment:

Terminating Cue: **When examinee reports to CRO that MS-V-3C is in LOCAL / MANUAL control, JPM may be terminated**

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: ILT 16-01 NRC JPM I

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- Reactor trip and plant cooldown has commenced
- You are an Auxiliary Operator
- The examiner will be all control room operators

INITIATING CUE:

The Control Room Supervisor has directed you to establish communication with the control room and take local manual control of MS-V-3C, IAW OP-TM-411-451 MANUAL CONTROL OF TBVs/ADVs, Rev 7, Attachment 7.1.

TIME CRITICAL:

No

Facility: THREE MILE ISLAND Task No.: 54104005

Task Title: Emergency Makeup to Nuclear Service Closed Cooling Surge Tank (NS-T-1) JPM No.: ILT 16-01 NRC JPM J

K/A Reference: 008 A4.07 2.9/2.9 Bank JPM: TQ-TM-105-541-J100

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: X Actual Performance:

Classroom Simulator Plant X

READ CUE SHEET ON LAST PAGE 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.

- Initial Conditions:
- Reactor power is 67%, after a loss of 1C 4160V bus
 - NS-T-1 level is slowly lowering due to a small leak
 - You are an Auxiliary Operator
 - The examiner will be all control room operators

Task Standard: Fill NS-T-1 with the condensate system in accordance with OP-TM-541-921.

- Required Materials:
- OP-TM-541-921, EMERGENCY MAKEUP TO NS-T-1, Rev 2 with prerequisites signed off. N/A section 4.1.

- General References:
- OP-TM-541-921, EMERGENCY MAKEUP TO NS-T-1, Rev 2

Initiating Cue: The Inplant Supervisor has directed you to establish communications with the control room and lineup the condensate system for Emergency Makeup to NS-T-1, IAW OP-TM-541-921, EMERGENCY MAKEUP TO NS-T-1, Section 4.2.

Time Critical Task: No

Validation Time: 8 minutes

SIMULATOR SETUP

N/A

PERFORMANCE INFORMATION

(Denote Critical Steps with a check mark)

START TIME: _____

EVALUATORS CUE: Direct the examinee to:
"Lineup the condensate system for emergency makeup of
NS-T-1, IAW OP-TM-541-921, Section 4.2"

OP-TM-541-921, Section 4.2, Step 1

Performance Step: 1 **VERIFY** CLOSED SC-V-115 (355' TB NW side SC surge tank 4' above floor).

Standard: Examinee **VERIFIES** CLOSED SC-V-115.

Comment:

EVALUATOR NOTE: Examinee should locate a ladder but may simulate using it to Open CO-V-170.

OP-TM-541-921, Section 4.2, Step 2

√ **Performance Step: 2** **OPEN** CO-V-170. (305' TB 10' SE of CO-P-2C 12' above floor).

Standard: Examinee **OPENS** CO-V-170.

Comment:

OP-TM-541-921, Section 4.2, Step 3

√ **Performance Step: 3** Throttle **OPEN** NS-V-104 as needed to maintain NS-T-1 level between 3 and 6 feet. (322' TB on wall just S of elevator 2' W of DW-P-1)

Standard: Examinee Throttles **OPEN** NS-V-104 as needed to maintain NS-T-1 level between 3 and 6 feet.

Comment:

Terminating Cue: When Secondary AO demonstrates control of NS-V-104 the JPM may be terminated.

STOP TIME: _____

Job Performance Measure No.: ILT 16-01 NRC JPM J

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- Reactor power is 67%, after a loss of 1C 4160V bus
- NS-T-1 level is slowly lowering due to a small leak
- You are an Auxiliary Operator
- The examiner will be all control room operators

INITIATING CUE:

The Inplant Supervisor has directed you to establish communications with the control room and lineup the condensate system for Emergency Makeup to NS-T-1, IAW OP-TM-541-921, EMERGENCY MAKEUP TO NS-T-1, Section 4.2.

TIME CRITICAL:

No

Facility: THREE MILE ISLAND Task No.: 23104001

Task Title: Take Corrective Action for an
Unauthorized Waste Gas release -
Inplant JPM No.: ILT 16-01 NRC JPM K

K/A Reference: 071 G2.1.30 4.4/4.0 Bank JPM: TQ-TM-105-231-J100

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: X Actual Performance:

Classroom Simulator Plant X

READ CUE SHEET ON LAST PAGE 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.

Initial Conditions:

- 100% power
- An authorized release is in progress from Waste Gas Decay Tank "A"
- Three sets of readings have been completed on 1104-27, Waste Disposal-Gaseous, ENCLOSURE 2

Task Standard: Identify that Waste Gas Tank 'B' pressure is lowering and secure the release in accordance with 1104-27, section 3.17.

Required Materials:

- 1104-27, Rev 87 and three sets of readings on Enclosure 2.
- A 4th set of evaluator readings of Enclosure 2

General References:

- 1104-27

Initiating Cue: Perform the fourth set of 1104-27, ENCLOSURE 2 readings at the local panel

Time Critical Task: No

Validation Time: 11 minutes

SIMULATOR SETUP

N/A

Procedure Preparation

1. 1104-27, Enclosure 2, with three sets of prior readings
2. 1104-27, Rev 87, with section 3.7 filled out through and including 3.7.2.26 (N/A Method 2 in step 3.7.2.8)
3. 1104-27, section 3.17, not given to the examinee until requested.

PERFORMANCE INFORMATION

(Denote Critical Steps with a check mark)

START TIME: _____

EVALUATORS CUE: Perform the fourth set of 1104-27, ENCLOSURE 2 readings at the local panel

Provide Examine 1104-27 Section 3.7 and Enclosure 2

EVALUATORS CUE: As each instrument is located or the control room is contacted, provide the instrument reading cues as listed for the 4th set of readings on the attached EVALUATOR ENCLOSURE 2.

1104-27 Enclosure 2

Performance Step: 1 Using Enclosure 2, the examine takes the 4th set of readings

Standard: Examinee identifies each instrument used to take the appropriate reading.

Contacts the Control Room for RM-A-8 readings.

Examinee logs readings on Enclosure 2

Comment:

EVALUATORS CUE: When the examinee notifies Shift management and ask if the release should be terminated, respond: "Terminate the release IAW the procedure".

1104-27, Step 3.7.2.27

√ **Performance Step: 2** If at any time any gas tank has a pressure decrease other than the tank being released then perform the following:
(N/A this step if no pressure drop occurs)

- Inform Shift Management of the problem.

Go to section 3.17 to terminate the gas release.

Standard: Examinee recognizes WDG Tank 'B' pressure has lowered and

- Notifies Shift Management
- Goes to Section 3.17 to terminate Gas release

PERFORMANCE INFORMATION

Comment:

EXAMINER CUE: **Provide the examinee with Section 3.17**

1104-27, Section 3.17

Performance Step: 3

Prerequisites:

- A Waste Gas Decay Tank is being released to the atmosphere.
- Per Enclosure 2, a Waste Gas Decay Tank has lowering pressure and it is not being released to the atmosphere.

Standard:

Examinee verifies prerequisites

Comment:

EXAMINER CUE: **The WDG-V-47 bleed control valve is open and pressure is lowering to ZERO**

1104-27, Step 3.17.2.1

√ **Performance Step: 4**

Bleed off air from WDG-V-47 by adjusting the hand loader for WDG-V-47 to 0 psig.

Standard:

Examinee simulates bleeding off air from WDG-V-47 by turning the control valve (knob) on the panel in the counter-clockwise direction.

Comment:

PERFORMANCE INFORMATION

EXAMINER CUE: Indication for WDG-V-47 will go from red to green to indicate closed.

1104-27, Step 3.17.2.2

√ **Performance Step: 5** Close WDG-V-47 by depressing the Close PB.

Standard: Simulates depressing WDG-V-47 CLOSE PB and verifies closed indication

Comment:

EXAMINER CUE: WDG-FR-123 is located in the LWDS panel. When the examinee goes to the door, show the examinee the attached picture of WDG-FR-123 to perform the next step. Indicate WDG-FR-123 is set at "ZERO" after the examinee performs the next step.

1104-27, Step 3.17.2.3

√ **Performance Step: 6** Reset WDG-FR-123 setpoint to "0".

Standard: Examinee Adjusts WDG-FR-123 setpoint to "ZERO".

Comment:

PERFORMANCE INFORMATION

EXAMINER CUE: Provide valve closed and locking device status cues for any valve operated. Closing WDG-V-30 is the critical task.

1104-27, Step 3.17.2.4

√ **Performance Step: 7** Close and lock closed the applicable manual outlet valve on the tank being released. (N/A the valves not open)

- Close and lock closed WDG-V-30 for WDG-T-1A.
- Close and lock closed WDG-V-31 for WDG-T-1B.
- Close and lock closed WDG-V-32 for WDG-T-1C.

Standard: Examinee Locates and simulates closing WDG-V-30 by turning it in the clockwise direction.

WD-G-V-31 & 32 are N/A

Comment:

Terminating Cue: After WDG-V-30 is simulated closed, this JPM is complete

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: ILT 16-01 NRC JPM K

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- 100% power
- An authorized release is in progress from Waste Gas Decay Tank "A"
- Three sets of readings have been completed on 1104-27, Waste Disposal-Gaseous, ENCLOSURE 2

INITIATING CUE:

Perform the fourth set of 1104-27, ENCLOSURE 2 readings at the local panel

TIME CRITICAL:

No