Facility: VC SUMMER Scenario No: 1 Op Test No: NRC-ILO-13-01

Examiners: _____ Operators: CRS: _____

_____ RO: _____

_____ BOP: _____

Initial Conditions:
- The plant has completed a Mid-Cycle outage.
- The Reactor is Critical at 10^{-3} % power.
- Critical Data has been recorded.
- The National Weather Service has declared a Severe Weather Warning for Richland, Fairfield, and Kershaw counties for the next four (4) hours.
- The secondary has been warmed.
- "B1" Train Work Week.
- Alternate Seal Injection is OOS.

Turnover:
- Following turnover start RBCU 2B, then secure RBCU 1B per an Engineering Request to monitor the RBCU 2B.
- Following turnover raise Reactor Power to between 1% and 3%.

Critical Tasks:
- Maintain SG levels using EFW without causing a Reactor trip.
- Align at least one CHG/SI flowpath prior to completing EOP-1.0 Attachment 3.
- Isolate LOCA prior to exiting EOP-2.5.

Event No.	Malf No.	Event Type*	Event Description
1	NA	N-BOP	Start RBCU 2B, then secure RBCU 1B.
2	NA	R-RO, N-CRS	Raise power to between 1% and 3%.
3	EF002B EF002T	C-BOP, CRS TS-CRS	MD EFW "B" Pump Bearing Failure leading to trip of the pump.
4	EPS005C EPS006B	C-BOP, CRS TS-CRS	Loss of Emergency Auxiliary transformer (1DB). DG fails to AUTO start.
5	CRF004F8 CRF007	TS-CRS	Partially Dropped Rod (F8) – Rod slips to approximately 200 steps withdrawn.

6	CRF004F8 CRF004D4 CRF007	C-RO, CRS	Two Dropped Rods (F8 and D4) – Trip the reactor
7	CVC015A	I-RO, CRS	Letdown pressure control valve PCV-145 fails CLOSED (AUTO ONLY).
8	RHR013E RHR013B RHR011	M-ALL	LOCA Outside the Reactor Building.
	PCS005A		SI Train "A" Actuation Failure (Auto and Manual). Manually configure Pumps and Valves.
	CS004P CS006F		"A" CHG/SI pump trips (cannot be reset). "B" CHG/SI pump fails to Auto-Start. Manually Start. "C" CHG/SI pump breaker cannot be racked-up.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

The following notation is used in the ES-D-2 form "Time" column:

IOA	designates **Immediate Operator Action** steps.
*	designates **Continuous Action** steps.

The crew will assume the watch having been pre-briefed on the Initial Conditions, the plan for this shift and any related operating procedures.

The scenario involves a plant startup so GOP-3, Reactor Startup from Hot Standby to Startup (Mode 3 to Mode 2), is being implemented. Step 3.13, recording Critical Data, has been completed and the reactor is critical in Mode 2 at 10E-3% power. The secondary plant has been warmed with the turbine on turning gear.

The simulator will be frozen prior to the crew entering the simulator.

The Lead Evaluator may leave the simulator frozen or allow surrogates to maintain stable plant conditions until the crew assumes the watch.

The crew will be briefed to have the BOP start the 2B RBCU and then stop the 1B RBCU following turnover due to a request from Engineering. The crew will then increase to between 1% and 3% in accordance with GOP-3 beginning at step 3.14.

GTP-702 Attachment II G, Operational Mode Change Plant Startup - Entering Mode 1, has been completed.

Sections of GOP-4A, Power Operation (Mode 1 - Ascending) have been completed to perform initial lineups and to warm the secondary plant.

EVENT 1: Start RBCU 2B, then secure RBCU 1B.

Three Reactor Building Cooling Units (RBCUs) will be running in fast speed at turnover. After turnover is complete, the BOP will start the 2B RBCU in fast speed then secure the 1B RBCU in accordance with SOP-114, Reactor Building Ventilation System.

EVENT 2: Raise power to between 1% and 3%.

The RO will increase Reactor Power by withdrawing control rods. The RO will recognize the negative reactivity feedback as the Point of Adding Heat is achieved and stabilize power between 1-3%. The BOP will adjust Emergency Feedwater flow to the Steam Generators as steam flow increases.

The crew will transition to GOP-4A, Power Operation (Mode 1 - Ascending).

EVENT 3: MD EFW "B" Pump Bearing Failure leading to trip of the pump.

- TRIGGER 1
  - PMP-EF002B
    XPP0021B MOTOR DRIVEN EFW PMP B BRG FAILURE
    RAMP = 5 seconds
    FINAL = 10
  - PMP-EF002T
    XPP0021B MOTOR DRIVEN EFW PMP B TRIP ON COMMAND
    DELAY = 35 seconds

On cue from the Examiner at approximately 2-3% power the "B" MDEFW bearing will fail and the "B" EFW Pump will trip after a short delay if not stopped by the BOP.

In accordance with XCP-623 1-5, MD EFP B MOTOR OVRLD and XCP-623 1-3, MD EFP B Trip, EFW flow must be reduced to below 400 gpm. The EFW flow requirement is approximately 180 gpm/percent so power is limited to approximately 2% using the "A" MDEFW unless the crew decides to use the TDEFW Pump.

The BOP will throttle EFW flow to the SGs using the "A" MDEFW in accordance with SOP-211, Emergency Feedwater System. The CRS will evaluate the failure and determine that the "B" MDEFW Pump is inoperable.

The CRS will refer to Technical Specification 3.7.1.2, Emergency Feedwater System.

EVENT 4: Loss of Emergency Auxiliary Transformer (1DB), DG fails to AUTO Start

- TRIGGER 2
  - MAL-EPS006B
    DIESEL GENERATOR B FAILURE
    FAIL TO: No Auto Start
  - MAL-EPS005C
    LOSS OF ESF BUS 1DB (NORMAL FEED BREAKER)
    DELAY = 1 second

On cue from the Examiner, power will be lost to the 1DB bus due to a breaker failure and the Auto-Start failure of the "B" EDG. The BOP will start the "B" EDG. The "B" EDG will then load onto the 1DB Bus.

The CRS will refer to Technical Specification 3.8.1.1, AC Sources.

EVENT 5: Partially Dropped Rod (F8) – Rod slips to approximately 200 steps withdrawn.

- TRIGGER 3
  - MAL-CRF004F8
    DROPPED ROD F8
    FINAL = STATIONARY
    DELETE = 1 second
  - LOA-CRF007
    CONTROL ROD F8 STICKING POSITION
    FINAL VALUE = 200
    DELETE = 1 second

On cue from the Examiner, F8 will slip to the 200 steps withdrawn position. The RO will take immediate actions in accordance with AOP-403.6, Dropped Control Rod, by verifying that only one Control Rod has slipped and by placing the Rod Cntrl Bank Sel Switch in Manual.

The CRS will refer to Technical Specifications: 3.1.1.1 Shutdown Margin, 3.1.3.1 Group Height, Insertion and Power Distribution Limits, 3.1.3.6 Control Rod Insertion Limits, and 3.2.4 Quadrant Power Tilt Ratio.

EVENT 6: Two Dropped Rods (F8 and D4) – Trip the Reactor

- TRIGGER 4
  - LOA-CRF007
    CONTROL ROD F8 STICKING POSITION
    (NOTE: This LOA is inserted allow F8 to fall when dropped)
    FINAL VALUE = 0
  - MAL-CRF004F8
    DROPPED ROD F8
    FINAL = STATIONARY
  - MAL-CRF004D4
    DROPPED ROD D4
    FINAL =STATIONARY

After Technical Specifications have been addressed for a single dropped rod the examiner will cue the booth operator to drop a second rod. The RO will trip the Reactor and implement EOP-1.0 (E-0) Reactor Trip/Safety Injection Actuation in accordance with AOP-403.6, Dropped Control Rod.

EVENT 7: Letdown pressure control valve PCV-145 fails CLOSED (AUTO ONLY).

- TRIGGER 5
  - MAL-CVC015A
    LETDOWN PRESSURE CONTROL VALVE PCV-145 FAILURE (AUTO ONLY)
    RAMP = 5 seconds
    FINAL = 35

On cue from the Examiner, PCV-145 pressure controller will drift LOW in auto causing letdown pressure to increase to the alarm setpoint. The RO will respond to annunciators, XCP-613 2-4, LP LTDN FLO/PRESS HI and take manual control of PCV-145.

EVENT 8: LOCA Outside RB, SI Train "A" Actuation Failure (AUTO and MANUAL), "A" CHG/SI Pump TRIP and "B" CHG/SI Pump Fails to Auto-Start

- TRIGGER 6
  - MAL-PCS005A
    SAFETY INJECTION FAILURE TRAIN A
    FAIL TO: Total Failure
  - MAL-RHR013E
    RHR DISCH CHECK VALVE 8973C LEAKAGE (0.05=800 GPM)
    SEVERITY = 0.05
  - MAL-RHR013B
    RHR DISCH CHECK VALVE 8974B LEAKAGE (0.05=800 GPM)
    SEVERITY = 0.05
  - FLX-RHR011
    FLEX LEAK RLF VLV 8864B
    SEVERITY = 5000
- AUTO-TRIGGER 7
  LPPLSI ==1 SAFETY INJECTION ACTUATED
  - PMP-CS004T
    XPP0043A CHRG/SI PMP A TRIP ON COMMAND
  - PMP-CS006F
    XPP0043B CHRG/SI PMP B FAIL TO START
- TRIGGER 8
  LOA-CVC041
  CHARGING PUMP A SUPPLY BRKR
  POSITION TO: RACK OUT

Scenario Attributes		Events
Total Malfunctions (5-8)	9	· MD EFW "B" Pump Bearing Failure leading to Trip · Loss of Emergency Auxiliary transformer (1DB) · DG fails to auto-start · Rod F8 slips to approximately 200 steps withdrawn · 2 Dropped Rods (F8 and D4) · Letdown pressure control valve PCV-145 fails CLOSED · SI Train "A" Actuation Failure (Auto and Manual) · "A" Charging Pump Trip · "B" CHG/SI pump fails to Auto-Start
Malfunctions after EOP entry (1-2)	4	· SI Train "A" Actuation Failure (Auto and Manual). · "A" Charging Pump Trip · "B" CHG/SI pump fails to Auto-Start · "C" CHG/SI pump fails to Rack-Up
Abnormal Events (2-4)	5	· MD EFW "B" Pump Bearing Failure leading to Trip · Loss of Emergency Auxiliary transformer (1DB) with DG failing to auto-start · Rod F8 slips to approximately 200 steps withdrawn · 2 Dropped Rods (F8 and D4) · Control Card Output for Letdown PCV-145 Drifts LOW
Major Transient (1-2)	1	· LOCA Outside the Reactor Building.
EOPs Entered (1-2)	3	· EOP-2.5 (ECA-1.2), LOCA Outside Containment · EOP-2.0 (E-1), Loss Of Reactor Or Secondary Coolant · EOP-1.2 (ES-1.1), Safety Injection Termination
EOP Contingencies (0-2)	1	· EOP-2.5 (ECA-1.2), LOCA Outside Containment
Critical Tasks (2-3)	3	· Maintain SG levels using EFW without causing a Reactor trip. · Align at least one CHG/SI flowpath prior to completing EOP-1.0 Attachment 3. · Isolate LOCA prior to exiting EOP-2.5 (ECA-1.2).

On cue from the Examiner, a LOCA will be inserted in the RHR suction line outside the Reactor Building. This leak is in the discharge line from the B RHR Pump to the RCS.

The crew will implement AOP-101.1, Loss of Reactor Coolant Not Requiring SI, and determine that an SI is required.

The crew will implement EOP-1.0 (E-0) and determine that the RCS leak is outside of containment and transition to EOP-2.5 (ECA-1.2). The crew will isolate the leak by closing 8888B, RHR LP A to Cold Legs, and transition to EOP-2.0 (E-1).

"A" Train Safety Injection will fail to actuate automatically or manually. Individual components will be started/positioned to their required SI condition.

When Safety Injection actuation is attempted the running "A" Charging pump will trip and the "B" Charging pump will fail to auto-start resulting in the loss of all High Head Safety injection. It is a critical task to start one High Head Safety Injection Pump.

If the crew attempts to rack-up the "C" Charging/SI pump they will be informed that the breaker will not rack-up. Both the "A" and "C" Charging pumps are failed in this step to limit the flow rate from High Head Safety Injection. Too much flow would mask the leak as RCS pressure is lowered.

CRITICAL TASKS:

It is a critical task to:

- align at least one CHG/SI flowpath prior to completing EOP-1.0 Attachment 3.
- isolate the LOCA prior to exiting EOP-2.5 (ECA-1.2).
- maintain SG levels using EFW without causing a Reactor trip.

TERMINATION:

The scenario can be terminated after the crew has isolated the leak in EOP-2.5 (ECA-1.2), and transitions to EOP -2.0 then EOP-1.2 (ES-1.1) and terminates Safety Injection or at any time at the discretion of the Examiner.

SIMULATOR SCENARIO SETUP

INITIAL CONDITIONS:

- IC Set 290
- 10^{-3}% Power EOL
- Burnup = 20,000 MWD/MTU
- RCS Boron Concentration = 652 ppm
- FCV-113 Pot Setting = 2.80
- Rod Position: Group D = 94
- Tavg = 557.9
- Xe = - 0.0 pcm
- Prior to the scenario, crew should pre-brief on conditions and expectations for the Shift (maintain power, repairs estimated to be complete well before LCO action time expires.)

PRE-EXERCISE:

- Ensure simulator has been checked for hardware problems (DORT, burnt out light bulbs, switch malfunctions, chart recorders, etc.).
- VCS-TQP-0807 Attachment I-A, Unit 1 Booth Instructor Checklist, has been completed.
- Verify the Hard Card for Turbine Load changes is in its proper storage location.
- Verify the Hard Card for borating via MVT-8104 is in its proper storage location.
- Hang Red Tags for equipment out of service.
- Mark up procedures in use with "Circle and slash" as applicable:
  - GOP-3, Reactor Startup From Hot Standby To Startup (Mode 3 To Mode 2)
  - GOP-4A, Power Operation (Mode 1 - Ascending)
- Conduct two-minute drill.

PRE-LOAD:

STANDARD SIMULATOR SETUP:

- PMP-LD003P, XPP0138 Leak Detection Sump Pmp Loss of Power
- VLV-FW028W, XVG01676-FW FW Hdr Recirc Isol Vlv Loss of Power
- VLV-FW029W, XVG01679-FW FW HTR Recirc Iso Vlv Loss of Power
- VLV-CS052W, XVT08141A-CS RCP A Seal Leakoff Vlv Loss of Power
- VLV-CS054W, XVT08141C-CS RCP C Seal Leakoff Vlv Loss of Power
- VLV-CS053W, XVT08141B-CS RCP B Seal Leakoff Vlv Loss of Power

SCENARIO RELATED:

- ANN-TA030 , GEN AUX PNL TRBL — FAIL TO: OFF
- ANN-CS044, ALT SEAL INJ PUMP TRBL — FAIL TO: ON
- MAL-CVC027, ALT SEAL INJ D/G FAIL TO START
- MAL-CVC029, ALT SEAL INJ PUMP FAIL TO START

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Event Description: Start RBCU 2B, then secure RBCU 1B.

Time	Position	Applicant's Actions or Behavior	
BOOTH OPERATOR: No triggers for this event.			
	CRS	Direct BOP to start RBCU 2B, then secure RBCU 1B in accordance with SOP-114, Reactor Building Ventilation System, Section III.A.	
		NOTE 2.1 a. Due to eddy current brakes, RBCU control switches must be held in START position until the red breaker closed light is lit and starting current is indicated on appropriate meter. b. Normal and preferred lineup is three RBCUs running in NORM (fast speed). c. To increase stay times for teams entering containment, four RBCUs may be placed in service in NORM (fast speed).	SOP-114
	BOP	2.1 Place RBCUs in service by starting three or four RBCUs in SLOW or NORM as follows:	SOP-114
	BOP	b. For XFN0065B-AH, REACTOR BLDG COOLING UNIT 2B EMERG FAN, start one of the following: 1) XFN 0065B-AH, 2B NORM.	SOP-114
		NOTE 2.1.e Contact PSE to evaluate, if RBCU fan motor amps exceed the values given.	SOP-114
	BOP	e. Verify RBCU Fan motor amps return to normal operating range: 1) For fast speed operation, 275 amps to 300 amps.	SOP-114
		NOTE 2.1.f The RBCU TRAIN A (B) EMERG switch must be selected to an operable RBCU.	SOP-114
	BOP	f. Verify the following switches are in the desired position: 2) XFN-64B/XFN 65B - RBCU TRAIN B EMERG.	SOP-114
	BOP	2.2 Shut down RBCUs by placing appropriate switch(es) in STOP: c. XFN 0064B-AH, 1B NORM.	SOP-114
	BOP	Report that the 2B RBCU is running and the 1B RBCU has been secured.	SOP-114
EVALUATOR NOTE: The next event is a power change which does not require a trigger.			

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Event Description: Raise power to between 1% and 3%.

Time	Position	Applicant's Actions or Behavior	
BOOTH OPERATOR: No triggers for this event.			
EVALUATOR NOTE: The Unit is stable in Mode 3 at turnover with all surveillances completed for a Mode change to Mode 2. GOP-3 is complete to step 3.14. The RO will bring the Reactor to the POAH and transition to GOP-4A Power Operation (Mode 1 – Ascending). GOP-4A steps have been signed off to indicate that lineups have been completed and the secondary warmed.			
		NOTE 3.14 Ensure sufficient Emergency Feedwater Flow exists prior to raising power.	GOP-3
	RO	3.14 Increase Reactor Power to between 1% and 3%.	GOP-3
	RO	3.15 At the Point of Adding Heat, if NR-45, NIS RECORDER, had previously been selected to HI speed place the recorder in LO speed.	GOP-3
		CAUTION 3.16 a. Adjustment of Tavg with the Rod Control System must not be attempted with the ROD CNTRL BANK SEL Switch in any position other than MAN. b. Manual rod control is required to establish equilibrium conditions, since C-5 blocks automatic rod withdrawal.	GOP-3
	RO	3.16 Maintain Tavg between 555°F and 559°F.	GOP-3
	BOP	Adjust EFW flow to the Steam Generators (SG) as power is increased to maintain Narrow Range SG levels between 60% and 65%.	
EVALUATOR NOTE: Attachment II.G was completed prior to turnover			
	N/A	3.17 Complete Attachment II.G, Operational Mode Change Plant Startup - Entering Mode 1, of GTP-702.	GOP-3
	CRS	3.18 Proceed to GOP-4A, Power Operation (Mode 1 - Ascending).	GOP-3
EVALUATOR NOTE: GOP-4A POWER OPERATION (MODE 1 - ASCENDING) has several line-up verifications. GOP-4A lineups and secondary plant warming have been completed.			
		NOTE 3.1 through 3.11 Steps 3.1 through 3.11 raise Reactor Power from 1% to 25%.	GOP-4A
EVALUATOR NOTE: The next event may be initiated after GOP-4A is entered.			

Op Test No: NRC-ILO-13-01 Scenario # 1 Event # 3 Page: 12 of 49

Event Description: MD EFW "B" Pump Bearing Failure leading to trip of the pump.

Time	Position	Applicant's Actions or Behavior	
BOOTH OPERATOR: When directed - Initiate Event 3 (TRIGGER 1).			
EVALUATOR NOTE: • Event 3 should be initiated on entry into EOP-4A, Power Operation (Mode 1 - Ascending). • Power should be between 2 - 3% when this event is triggered.			
Indications Available: MD EFP B Amps > 60 amps XCP-623 1-5, MD EFP B MOTOR OVRLD			
	CRS	Enters ARP-001-XCP-623, 1-5	XCP-623 1-5
		CORRECTIVE ACTIONS:	XCP-623 1-5
	BOP	1. If possible, reduce demand to less than 400 gpm by throttling the flow control valves to the Steam Generators.	XCP-623 1-5
	BOP	2. Start Motor Driven Emergency Feedwater Pump A if necessary to maintain Steam Generator levels.	XCP-623 1-5
EVALUATOR NOTE: The guidance in SOP-211, Emergency Feedwater System, is not relevant for this failure because both pumps are running initially.			
	BOP	3. Refer to SOP-211.	XCP-623 1-5
	BOP	4. Determine if a single phasing event is in progress by diagnosis of any combination of the following symptoms: a. Vibration Alarms are received for other equipment. b. MCB Potential Lights are not lit. c. MCB Amber Overload lights are lit for running equipment or Motor Overload Alarms are received. d. MCB Undervoltage Alarms. e. Affected bus local 7.2 KV Bus ammeters	XCP-623 1-5
EVALUATOR NOTE: The CRS could direct the RO to Stop the "B" MD EFW Pump, reduce power to ensure MD EFW Pump "A" is sufficient and/or for the BOP to start the TD EFW Pump. The TD EFW Pump is not normally used for SG level control during heatup/cooldown.			
Indications Available: MD EFP B Amps > 60 amps XCP-623 1-5, MD EFP B MOTOR OVRLD XCP-623 1-3, MD EFP B TRIP			

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Event Description: MD EFW "B" Pump Bearing Failure leading to trip of the pump.

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: The crew will enter ARP-001-XCP-622, 1-5 first but since the "B" MD EFW Pump will trip within one minute only the actions associated with XCP-623 1-3, MD EFP B TRIP are included.			
	CRS	Enters ARP-001-XCP-622, 1-5	XCP-623 1-5
	CRS	Enters ARP-001-XCP-623, 1-3	XCP-623 1-3
EVALUATOR NOTE: The CRS could direct the RO to reduce power to ensure MD EFW Pump "A" is sufficient and/or for the BOP to start the TD EFW Pump. The TD EFW Pump is not normally used for SG level control during heatup/cooldown.			
		CORRECTIVE ACTIONS:	XCP-623 1-3
	BOP	1. Start Motor Driven Emergency Feedwater Pump A if necessary to maintain Steam Generator levels.	XCP-623 1-3
	RO	2. Reduce feedwater demand to less than 400 gpm.	XCP-623 1-3
	CRS	3. Refer to SOP-211.	XCP-623 1-3
		SUPPLEMENTAL ACTIONS:	XCP-623 1-3
	BOP	1. If Steam Generator levels cannot be maintained with one motor driven pump, start the Turbine Driven Emergency Feedwater Pump. 2. Place PUMP B control switch in NORMAL-AFTER-STOP to clear the alarm.	XCP-623 1-3
	CRS	3. Determine the cause of the trip and correct as soon as possible. 4. If the pump is inoperable, refer to Technical Specification 3.7.1.2.	XCP-623 1-3
EVALUATOR NOTE: Emergency Feedwater requirements are approximately 180 gpm per percent power.			

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Event Description: MD EFW "B" Pump Bearing Failure leading to trip of the pump.

Time	Position	Applicant's Actions or Behavior
CRITICAL TASK	RO/BOP	Maintain SG level without tripping the unit by reducing feedwater demand (Reactor Power) and/or controlling Emergency Feedwater flow.
BOOTH OPERATOR: If contacted to investigate the condition of the "B" MD EFW wait 3 minutes and report that the pump bearing are hot and the breaker is tripped with no flags.		
	CRS	Contacts Work Control and/or Maintenance for assistance.
EVALUATOR NOTE: Technical Specification 3.0.4 is applicable so entry into Mode 1 is prohibited.		
	CRS	Enters Technical Specification 3.7.1.2, Action a: With one emergency feedwater pump inoperable, restore the required emergency feedwater pumps to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.
EVALUATOR NOTE: The next event may be initiated after SG levels are under control and the Technical Specification determination is complete.		

TECH SPEC

Op Test No: NRC-ILO-13-01 Scenario # 1 Event # 4 Page: 15 of 49

Event Description: Loss of Emergency Auxiliary transformer (1DB). DG fails to AUTO start.

Time	Position	Applicant's Actions or Behavior	
BOOTH OPERATOR: When directed - Initiate Event 4 (TRIGGER 2).			
BOOTH OPERATOR: Silence the HVAC Alarms.			
INDICATIONS AVAILABLE: Multiple Alarms XCP-637 5-2 7KV ESF CHAN B BKR TRIP 1DB Volts = 0 1DB Feed Amps = 0			
		AUTOMATIC ACTIONS:	XCP-637 5-2
		1. If XSW1DB 07, TRANS 1DB1 & 1DB2, tripped, XSW1DB1 4B, MAIN INCOMING BREAKER, and XSW1DB2 4B, MAIN INCOMING BREAKER, will trip. 2. If XSW1DB 16, BUS 1DB NORMAL INCOMING BKR, tripped, Diesel Generator B will automatically start. 3. If XSW1EB 03, TRANSF 1EB1 FEEDER BREAKER, tripped, SW1EB1 4B, MAIN INCOMING BREAKER, will trip.	XCP-637 5-2
EVALUATOR NOTE: The "B" DB failed to start and load onto the 1DB bus. After determining that there are no lockout on the "B" DG or the 1DB Bus the operator should perform an emergency start of the "B" DG.			
	BOP	Perform an Emergency Start of the 1B Diesel Generator.	
		CORRECTIVE ACTIONS:	XCP-637 5-2
	BOP	1. Using MCB indication, determine which breaker tripped. 2. Verify appropriate automatic actions. 3. Dispatch an operator to investigate the cause of the breaker trip. 4. Request Electrical Maintenance to troubleshoot and correct the cause of the breaker trip.	XCP-637 5-2
		SUPPLEMENTAL ACTIONS:	XCP-637 5-2
		1. When the cause has been corrected, reclose the breaker.	XCP-637 5-2
	CRS	2. Refer to Technical Specifications 3.8.1 and 3.8.3 for LCO requirements.	XCP-637 5-2

Op Test No: NRC-ILO-13-01 Scenario # 1 Event # 4 Page: 16 of 49

Event Description: Loss of Emergency Auxiliary transformer (1DB). DG fails to AUTO start.

Time	Position	Applicant's Actions or Behavior	
	CRS	T.S. 3.8.1.1 AC SOURCES Actions c. With one offsite circuit and one EDG inoperable: 1. Demonstrate the OPERABILITY of the remaining offsite AC source by performing Surveillance Requirement 4.8.1.1.1 within one hour and at least once per 8 hours thereafter, and 2. *If the EDG became inoperable due to any cause other than preplanned preventative maintenance or testing: a) determine the OPERABLE EDG is not inoperable due to a common cause failure within 8 hours, or b) demonstrate the OPERABILITY of the remaining EDG by performing Surveillance Requirement 4.8.1.1.2.a.3 within 8 hours, and 3. Within 2 hours, verify that required systems, subsystems, trains, components and devices that depend on the remaining EDG as a source of emergency power are also OPERABLE and in MODE 1, 2, or 3, that the Turbine Driven Emergency Feed Pump is OPERABLE. If these conditions are not satisfied within 2 hours be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. 4. Restore one of the inoperable sources to OPERABLE status within 12 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours, and 5. Restore the other AC power source (offsite circuit or diesel generator) to OPERABLE status in accordance with the provisions of Section 3.8.1.1 Action Statement a. or b. as appropriate, with the time requirement of that Action Statement based on the time of initial loss of the remaining inoperable A.C. power source.	T.S. 3.8 1.1

EVALUATOR NOTE: The operators may have re-energized the 1DB bus using the 1B Diesel Generator.

Op Test No: NRC-ILO-13-01 Scenario # 1 Event # 4 Page: 17 of 49

Event Description: Loss of Emergency Auxiliary transformer (1DB). DG fails to AUTO start.

Time	Position	Applicant's Actions or Behavior	
	CRS	T.S. 3.8.3.1 Actions a. With one of the required trains of AC Emergency busses not fully energized, re-energize the division within 8 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.	T.S. 3.8 3.1
EVALUATOR NOTE: The next event may be initiated after the 1B Diesel Generator is powering the 1DB 7.2 KV Bus.			
	CRS	Implement SOP-306, Emergency Diesel Generator, B. Operation Of Diesel Generator B After An Automatic Start And Load.	
	BOP	2.1 Verify B TRN BLACKOUT SEQ COMPLETE Status Light is lit.	SOP-306
	RO	2.2 Ensure one Charging Pump is running.	SOP-306
	BOP	2.3 Ensure the following loads have started: a. RHR Pump B. b. One Train B Service Water Pump. c. One Train B HVAC Chilled Water Pump. d. One Train B CCW Pump. e. MD EFW Pump B. f. The Train B RBCU selected for emergency operation (slow speed). g. Train B FHB Exhaust Fan. h. Service Water Booster Pump B. i. The Train B HVAC Chiller associated with the running Train B HVAC Chilled Water Pump.	SOP-306
	BOP	2.4 Verify greater than or equal to 2000 gpm flow on FI-4496, SWBP B DISCH FLOW.	SOP-306

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Event Description: Loss of Emergency Auxiliary transformer (1DB). DG fails to AUTO start.

Time	Position	Applicant's Actions or Behavior	
	BOP	2.5 Perform the following per SOP-220: a. Ensure Instrument Air is supplied by one of the following: 1) Either Station Instrument Air Compressor A or B. 2) Diesel Driven Air Compressor.	SOP-306
	BOP	2.6 Supply Reactor Building Instrument Air from Station Instrument Air with Reactor Building Instrument Air Compressors secured per SOP-121, Section IV.	SOP-306
	BOP	2.7 Maintain RB temperature as follows: a. Monitor RB temperature and pressure for indications of insufficient cooling. b. If required, supply Service Water to the Train A RBCUs per SOP-117.	SOP-306
	BOP	2.8 With Shift Supervisor concurrence perform the following: a. Secure Emergency Feedwater Pumps. b. Realign the Emergency Feedwater System for standby operation per SOP-211.	SOP-30
NOTE 2.9 Spent Fuel Cooling Loop B is unavailable until NON-ESF LCKOUTS is reset.			SOP-306
	BOP	2.9 If required, startup Spent Fuel Cooling Loop A aligned to the Spent Fuel Pool per SOP-123.	SOP-306
CAUTION 2.10 De-energizing the following Atmospheric Gaseous Module rate meters when the appropriate Interlock Switch is in NORMAL/OFF will result in the generation of a High Radiation signal and component realignment: a. RMA0001-RM, ATM GASEOUS IODINE - CONT ROOM SUPP AIR. b. RMA0002-RM, ATM GASEOUS IODINE - RB SAMPLE LINE. c. RMA0010-RM, WASTE GAS DISCHARGE RADIATION MONITOR.			SOP-306

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Event Description: Loss of Emergency Auxiliary transformer (1DB). DG fails to AUTO start.

Time	Position	Applicant's Actions or Behavior	
	BOP	2.10 Perform either of the following for Train B radiation monitors: a. Restore Train B radiation monitors to normal operation per SOP-124. b. If Train B radiation monitors are unable to be restored to normal operation, contact Health Physics to perform compensatory actions per HPP-904 for loss of electrical power to Train B radiation monitors.	SOP-306

Op Test No: NRC-ILO-13-01 Scenario # 1 Event # 5 Page: 20 of 49

Event Description: Partially Dropped Rod (F8) – Rod slips to approximately 200 steps withdrawn.

Time	Position	Applicant's Actions or Behavior	
BOOTH OPERATOR: When directed - Initiate Event 5 (TRIGGER 3).			
Indication Available: XCP-620 2-5 CMPTR ROD DEV			
	RO	CORRECTIVE ACTIONS: 1 Observe the Digital Rod Position Indication display for proper rod positions. 2 Determine if the cause is a dropped or misaligned rod. 3 If DRPI ALARM URGENT is in refer to ARP-001-XCP-621, 2-1. SUPPLEMENTAL ACTIONS: 1 If a rod is misaligned, refer to AOP-403.5, Stuck or Misaligned Rod. 2 If a rod is dropped, refer to AOP-403.6, Dropped Control Rod. 3 Operate the Rod Control System in MAN as described in SOP-403 until proper automatic Rod Control in restored. 4 Refer to Technical Specification 3.1.3.1.	XCP-620 2-5
EVALUATOR NOTE: XCP-620 2-5 CMPTR ROD DEV is an Entry Condition for AOP-403.5 and AOP-403.6. The steps of both procedures are similar and would ensure a success path for the recovery of one partially dropped rod. Only the steps of AOP-403.6 are included here.			
	CRS	Implement AOP-403.6, Dropped Control Rod.	
IOA	RO	1 Verify only one Control Rod has dropped.	AOP-403.6
IOA	RO	2 Place ROD CNTRL BANK SEL Switch in MAN.	AOP-403.6
	RO	3 Stabilize the plant: a. Decrease Main Turbine load to maintain Tavg within 5°F of Tref. b. Verify PZR pressure is stable at OR trending to 2235 psig (2220 psig to 2250 psig). c. Verify PZR level is stable at OR trending to program level.	AOP-403.6
	RO	4 Check if Reactor power is LESS THAN 75%.	AOP-40

Op Test No: NRC-ILO-13-01 Scenario # 1 Event # 5 Page: 21 of 49

Event Description: Partially Dropped Rod (F8) – Rod slips to approximately 200 steps withdrawn.

Time	Position	Applicant's Actions or Behavior	
	CRS	5 Initiate GTP-702, Attachments IV.A, IV.B, and IV.C.	AOP-403.6
	CRS	6 Notify the following plant personnel prior to moving Control Rods: • Management Duty Supervisor. • Rod Control System Engineer. • Reactor Engineering	AOP-403.6
	CRS	7 Provide Reactor Engineering with the following information: Time rod dropped: _____. Dropped rod location: _____. Initial Reactor power level: _____. Current Reactor power level: _____. Current QPTR: _____.	AOP-403.6
BOOTH OPERATOR: As Reactor Engineering – after receiving the report of plant conditions, recommend that Reactor Power be maintained at the current level until a recovery plan is developed.			
	CRS	8 Determine and correct the cause of the failure.	AOP-403.6
NOTE - Step 9 This Step must be completed before continuing with Step 10.			AOP-403.6
	CRS	9 Obtain the following information from Reactor Engineering: Power level at which recovery is to be performed: _____. Rate of Control Rod movement during recovery: _____.	AOP-403.6

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Event Description: Partially Dropped Rod (F8) – Rod slips to approximately 200 steps withdrawn.

Time	Position	Applicant's Actions or Behavior	
	CRS	Enter Technical Specification 3.1.3.1.d.3 d. With one full length rod inoperable due to causes other than addressed by ACTION a., above, or misaligned from its group step counter demand height by more than ± 12 steps (indicated position), POWER OPERATION may continue provided that within one hour either: 3. The rod is declared inoperable and the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied. POWER OPERATION may then continue provided that: a) A reevaluation of each accident analysis of Table 3.1-1 is performed within 5 days… b) The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 - is determined at least once per 12 hours. c) A core power distribution measurement is obtained and F0(z) and Fj~5 are verified to be within their limits within 72 hours, and d) The THERMAL POWER level is reduced to less than or equal to 75% of RATED THERMAL POWER within the next hour and within the following 4 hours the high neutron flux tip setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER.	TECH SPEC

EVALUATOR NOTE: This scenario does NOT include Control Rod recovery. The next event may be inserted after Technical Specifications have been addressed. The Technical Specifications may be addressed in post-exam questioning if it is desired to expedite the scenario.

Op Test No: NRC-ILO-13-01	Scenario # 1	Event # 6	Page: 23 of 49

Event Description: Two Dropped Rods (F8 and D4) – Trip the reactor

Time	Position	Applicant's Actions or Behavior	
BOOTH OPERATOR: When directed - Initiate Event 6 (TRIGGER 4).			
EVALUATOR NOTE: The following steps occur after the 2nd rod drops.			
Indications Available: XCP-621, 3-2 RODS ON BOTTOM			
	RO	CORRECTIVE ACTIONS: 1 If two or more rods have dropped, manually trip the Reactor and implement EOP-1.0, Reactor Trip/Safety Injection Actuation. SUPPLEMENTAL ACTIONS: 1 Have I&C verify proper operation of the DRPI System and repair if necessary.	XCP-621 3-2
	CRS	Direct EOP-1.0 (E-0) Reactor Trip/Safety Injection Actuation, entry.	
IOA	Crew	1 Verify Reactor Trip: • Trip the Reactor using either Reactor Trip Switch. • Verify all Reactor Trip and Bypass Breakers are open. • Verify all Rod Bottom Lights are lit. • Verify Reactor Power level is decreasing.	EOP-1.0
IOA	BOP	2 Verify Turbine/Generator Trip: a. Verify all Turbine STM STOP VLVs are closed. b. Ensure Generator Trip (after 30 second delay): 1) Ensure the GEN BKR is open. 2) Ensure the GEN FIELD BKR is open. 3) Ensure the EXC FIELD CNTRL is tripped	EOP-1.0
IOA	BOP	3 Verify both ESF buses are energized.	EOP-1.0

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Event Description: Two Dropped Rods (F8 and D4) – Trip the reactor

Time	Position	Applicant's Actions or Behavior	
IOA	BOP	4 Check if SI is actuated: a. Check if either: **(NO)** • SI ACT status light is bright on XCP-6107 1-1. OR • Any red first-out SI annunciator is lit on XCP-626 top row. **ALTERNATIVE ACTION** a. GO TO Step 5.	EOP-1.0
IOA	CREW	5 Check if SI is required: a. Check if any of the following conditions exist: **(NO)** • PZR pressure LESS THAN 1850 psig. OR • RB pressure GREATER THAN 3.6 psig. OR • Steamline pressure LESS THAN 675 psig. OR • Steamline differential pressure GREATER THAN 97 psid. **ALTERNATIVE ACTION** a. GO TO EOP-1.1, REACTOR TRIP RECOVERY, Step 1.	EOP-1.0
	CRS	Direct EOP-1.1 entry.	

Op Test No: NRC-ILO-13-01 Scenario # 1 Event # 6 Page: 25 of 49

Event Description: Two Dropped Rods (F8 and D4) – Trip the reactor

Time	Position	Applicant's Actions or Behavior

EOP-1.1

REFERENCE PAGE FOR EOP-1.1

1 SI ACTUATION CRITERIA

IF either of the following conditions occurs, THEN actuate SI and GO TO EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION, Step 1:

- PZR level can NOT be maintained GREATER THAN 8%.
  OR
- RCS subcooling on TI-499A(B), A(B) TEMP °F, is LESS THAN the value listed in the table below:

RCS PRESSURE (psig)	RCS SUBCOOLING (°F)
1576-3075	42.5
876-1575	45
576-875	47.5
476-575	50
375-475	52.5

EOP-1.1

CAUTION

If SI actuation occurs during this procedure, EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION, should be performed to stabilize the plant.

EOP-1.1

NOTE

- Main Turbine vibration should be monitored during coastdown.
- The EOP REFERENCE PAGE should be monitored throughout the use of this procedure.

EOP-1.1

	CREW	1 Announce plant conditions over the page system.

EVALUATOR NOTE: At the discretion of the Lead Examiner after EOP-1.1 has been entered - Initiate Event 7 (TRIGGER 5). Remaining steps of EOP-1.1 will be run concurrently with Event 7 (next section) for PCV-145 failure.

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Event Description: Two Dropped Rods (F8 and D4) – Trip the reactor

Time	Position	Applicant's Actions or Behavior	
	BOP	2 Check FW status: a. Check if RCS Tavg is LESS THAN 564°F. b. Verify FW Isolation: • Ensure the FW Flow Control Valves, FCV-478(488)(498), are closed. • Ensure the Main FW Isolation Valves, PVG-1611A(B)(C), are closed. • Ensure the FW Flow Control Bypass Valves, FCV-3321 (3331)(3341), are closed.	EOP-1.1
EVALUATOR NOTE: "B" MDEFW Pump tripped during an earlier event.			
	BOP	c. Ensure EFW Pumps are running: 1) Ensure <u>both</u> MD EFW Pumps are running. **(NO)** 2) Verify the TD EFW Pump is running if necessary to maintain SG levels. d. Verify total EFW flow is GREATER THAN 450 gpm. e. Trip all Main FW Pumps.	EOP-1.1
*	RO	3 Check RCS temperature: • With any RCP running, RCS Tavg is stable at OR trending to 557°F. OR • With no RCP running, RCS Tcold is stable at OR trending to 557°F.	EOP-1.1
	BOP	4 IF EOP-1.0 was entered from AOP-112.2, THEN RETURN TO AOP-112.2, STEAM GENERATOR TUBE LEAK NOT REQUIRING SI, Step 7. **(NO)** **<u>ALTERNATIVE ACTION</u>** 4 GO TO Step 5.	EOP-1.1
	BOP	5 Verify all Control Rods are fully inserted.	EOP-1.1

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Event Description: Two Dropped Rods (F8 and D4) – Trip the reactor

Time	Position	Applicant's Actions or Behavior	
	BOP	6 Check DA level control: a. Open LCV-3235, DEAER START UP DRAIN CNTRL, as necessary to maintain DA level LESS THAN 10.5 ft as indicated on LI-3135, DEAER STOR TK WR LVL FEET. b. Locally adjust ITV-3062A(B)(C), BD COOLER A(B)(C) CDSTE OUT TEMP, to 90% (XPN-0029, NUCLEAR BLOWDOWN PROCESSING PANEL, AB-436).	EOP-1.1
	RO	7 Check PZR level control: a. Verify PZR level is GREATER THAN 17%. b. Verify Charging and Letdown are in service. c. Verify PZR level is trending to 25%.	EOP-1.1
	RO	8 Check PZR pressure control: a. Verify PZR pressure is GREATER THAN 1850 psig. b. Verify PZR pressure is stable at OR trending to 2230 psig (2220 psig to 2250 psig).	EOP-1.1
*	BOP	9 Check SG levels: a. Verify Narrow Range level in all SGs is GREATER THAN 26%. b. Control EFW flow to maintain Narrow Range SG level between 40% and 60%.	EOP-1.1
*	BOP	10 Verify all AC buses are energized by offsite power: • ESF AC buses. • BOP AC buses.	EOP-1.1

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Event Description: Two Dropped Rods (F8 and D4) – Trip the reactor

Time	Position	Applicant's Actions or Behavior	
	BOP	11 Transfer Condenser Steam Dumps to the Steam Pressure Mode: a. Verify PERMISV C-9 status light is bright on XCP-6114 1-3. b. WHEN RCS Tavg is LESS THAN P-12 (552"F), THEN place both STM DUMP INTERLOCK Switches to BYP INTLK. c. Perform the following: • Verify the MS Isolation Valves, PVM-2801A(B)(C), are open. OR • Open MS Isolation Bypass Valves: 1) Depress both MAIN STEAM ISOL VALVES RESET TRAIN A(B). 2) Open MS Isolation Bypass Valves, PVM-2869A(B)(C). d. Place the STM DUMP CNTRL Controller in MAN and closed. e. Ensure the STM DUMP CNTRL Controller is set to 8.4. f. Place the STM DUMP MODE SELECT Switch in STM PRESS. g. Place the STM DUMP CNTRL Controller in AUTO.	EOP-1.1
		NOTE - Step 12 • Priority should be given to running RCP A to supply Normal PZR Spray. • Since a time lag is expected after increasing steam flow before natural circulation parameters can be verified, this procedure should be continued concurrently with the establishment of natural circulation.	EOP-1.1
	RO	12 Verify RCP A is running.	EOP-1.1
	RO	13 Verify PERMISV C-9 status light is bright on XCP-6114 1-3.	EOP-1.1

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Event Description: Two Dropped Rods (F8 and D4) – Trip the reactor

Time	Position	Applicant's Actions or Behavior	
	RO	14 Check the position of NR-45, NIS RECORDER: a. Verify Intermediate Range Power is LESS THAN P-6 (7.5x10-6%). b. Transfer NR-45, NIS RECORDER, to both Source Range channels. c. Initiate GTP-702, Attachment VI.KK.	EOP-1.1
	BOP	15 Shut down and stabilize the Secondary Plant. REFER TO AOP-214.1, TURBINE TRIP.	EOP-1.1
	RO	16 Maintain stable plant conditions: a. Maintain PZR pressure at 2230 psig (2220 psig to 2250 psig). b. Maintain PZR level at 25%. c. Maintain Narrow Range SG levels between 40% and 60%. d. Maintain RCS temperature: • With any RCP running, Tavg at 557°F. OR • With no RCP running, Tcold at 557°F. e. REFER TO GOP-5, REACTOR SHUTDOWN FROM STARTUP TO HOT STANDBY (MODE 2 TO MODE 3).	EOP-1.1

Op Test No: NRC-ILO-13-01 Scenario # 1 Event # 7 Page: 30 of 49

Event Description: Letdown pressure control valve PCV-145 fails CLOSED (AUTO ONLY)

Time	Position	Applicant's Actions or Behavior	
BOOTH OPERATOR: When directed - Initiate Event 7 (TRIGGER 5).			
Indications Available: XCP-613 2-4 LP LTDN FLO/PRESS HI			
	CRS	Direct implementation of ARP-001-XCP-613	
		CORRECTIVE ACTIONS:	XCP-613 2-4
	RO	1. Verify proper operation of PCV-145, LO PRESS LTDN.	XCP-613 2-4
EVALUATOR NOTE: The Operator should identify the malfunction of PCV-145 automatic control and adjust letdown pressure with Manual control of PCV-145.			
	RO	2. If necessary, place PCV-145, LO PRESS LTDN, in MAN and adjust as necessary to reduce flow or pressure.	XCP-613 2-4
	RO	3. Close Letdown orifice isolation valves as necessary to reduce flow or pressure.	XCP-613 2-4
	RO	4. Isolate Charging flow if Letdown is isolated.	XCP-613 2-4
	CRS	Contacts Work Control/Maintenance for assistance.	
EVALUATOR NOTE: The next event may be initiated after letdown pressure control is established in manual.			

Op Test No: NRC-ILO-13-01 Scenario # 1 Event # 8 Page: 31 of 49

Event Description: LOCA Outside the Reactor Building, SI Train "A" Actuation Failure, "A" Chg Pp Trip, "B" CHG/SI Auto-Start Failure.

Time	Position	Applicant's Actions or Behavior	
BOOTH OPERATOR: When directed - Initiate Event 8 (TRIGGER 6).			
EVALUATOR NOTE: The CRS may, at his/her discretion, implement AOP-101.1 LOSS OF REACTOR COOLANT NOT REQUIRING SI to attempt leak isolation in parallel with EOP-1.1. The leak rate will quickly exceed the capability of available makeup to maintain Pressurizer level. EOP-1.1, REACTOR TRIP RECOVERY reference page will also direct actuation of Safety Injection if AOP-101.1 is not entered.			
Indications Available: XCP-614 5-1 CHG LINE FLO HI/LO XCP-616 1-5 PZR LCS DEV HI/LO XCP-616 2-3 PZR PRESS HI/LO XCP-616 3-6 PZR PCS LO BU HTRS ON XCP-607 3-4 LD TRBL AB SMP/FLDRN LVL HI XCP-644 3-2 PLANT VENT PARTIC RM-A3 TRBL XCP-645 2-2 AB VENT DUCTS RM-A11 TRBL • Decreasing Pressurizer level with increased Charging flow and normal Letdown flow. • Decreasing Pressurizer pressure. • Increased Heater output and Backup Heaters on. • Increased VCT makeup frequency.			
BOOTH OPERATOR: If an Operator is dispatched to investigate a local alarm in the Relay Room report: • XPN-6033 2-1, Leak Detection Drain 19 Level High AB-412 W. Pen South, is in alarm. • XPN-6033 2-2, Leak Detection Drain 21 Level High AB-412 W. Pen Middle, is in alarm.			
	CRS	Diagnose an RCS Leak.	
	CRS	Implement AOP-101.1, Loss of Reactor Coolant Not Requiring SI.	AOP-101.1
NOTE: • If a Reactor Trip occurs AND SI is NOT required, this procedure should be continued after the actions of EOP-1.1, REACTOR TRIP RECOVERY, are completed. • As valves are isolated, it may be necessary to monitor RCS pressure for a period of time to determine if the leak is isolated.			AOP-101.1
EVALUATOR NOTE: PCV-145 has previously been placed in manual due to a failure of the controller in auto. Letdown should be controlled in manual rather the placing the failed controller back in service.			

Op Test No: NRC-ILO-13-01 Scenario # 1 Event # 8 Page: 32 of 49

Event Description: LOCA Outside the Reactor Building, SI Train "A" Actuation Failure, "A" Chg Pp Trip, "B" CHG/SI Auto-Start Failure.

Time	Position	Applicant's Actions or Behavior	
*	RO	**1.** Verify PZR level is at or trending to program level. **(NO)** **ALTERNATIVE ACTION** **1.** IF PZR level is decreasing, THEN perform the following: a) Open FCV-122, CHG FLOW, as necessary to maintain PZR level. b) IF PZR level continues to decrease, THEN reduce Letdown to one 45 gpm orifice: 1) Set PCV-145, LO PRESS LTDN, to 70%. 2) Ensure PVT-8149A, LTDN ORIFICE A ISOL, is open. 3) Close both PVT-8149B(C), LTDN ORIFICE B(C) ISOL. 4) Adjust PCV-145, LO PRESS LTDN, to maintain PI-145, LO PRESS LTDN PRESS PSIG, between 300 psig and 400 psig. 5) Place PCV-145, LO PRESS LTDN, in AUTO.	AOP-101.1
*	CRS, RO	2 Check if SI is required: a. Check if any of the following criteria are met: • PZR level is decreasing with Charging maximized and Letdown minimized. **(YES)** OR • PZR level is approaching 8%. OR • PZR pressure is approaching 1870 psig. OR • VCT level is approaching 5%. b. Perform the following: 1) Trip the Reactor. 2) GO TO EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION. WHEN EOP-1.0 Immediate Actions are complete, THEN actuate SI.	AOP-101.1
	CRS	Implement EOP-1.0, Reactor Trip/Safety Injection Actuation.	

Op Test No: NRC-ILO-13-01 Scenario # 1 Event # 8 Page: 33 of 49

Event Description: LOCA Outside the Reactor Building, SI Train "A" Actuation Failure, "A" Chg Pp Trip, "B" CHG/SI Auto-Start Failure.

Time	Position	Applicant's Actions or Behavior	
		REFERENCE PAGE FOR EOP-1.0	EOP-1.0
		1 RCP TRIP CRITERIA a. IF Phase B Containment Isolation has actuated (XCP-612 4-2), THEN trip all RCPs. b. IF both of the following conditions occur, THEN trip all RCPs: • SI flow is indicated on FI-943, CHG LOOP B CLD/HOT LG FLOW GPM. AND • RCS Wide Range pressure is LESS THAN 1418 psig.	See step 11 note for RCP Trip Criteria
		2 REDUCING CONTROL ROOM EMERGENCY VENTILATION Reduce Control Room Emergency Ventilation to one train in operation within 30 minutes of actuation. REFER TO SOP-505, CONTROL BUILDING VENTILATION SYSTEM.	
		3 MONITOR SPENT FUEL COOLING Periodically check status of Spent Fuel Cooling by monitoring the following throughout event recovery: • Spent Fuel Pool level. • Spent Fuel Pool temperature.	
IOA	RO	1 Verify Reactor Trip: • Trip the Reactor using either Reactor Trip Switch. • Verify all Reactor Trip and Bypass Breakers are open. • Verify all Rod Bottom Lights are lit. • Verify Reactor Power level is decreasing.	EOP-1.0
IOA	BOP	2 Verify Turbine/Generator Trip: a. Verify all Turbine STM STOP VLVs are closed. b. Ensure Generator Trip (after 30 second delay): 1) Ensure the GEN BKR is open. 2) Ensure the GEN FIELD BKR is open. 3) Ensure the EXC FIELD CNTRL is tripped.	EOP-1.0
IOA	BOP	3 Verify both ESF buses are energized.	EOP-1.0

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Event Description: LOCA Outside the Reactor Building, SI Train "A" Actuation Failure, "A" Chg Pp Trip, "B" CHG/SI Auto-Start Failure.

Time	Position	Applicant's Actions or Behavior	
IOA	RO	4 Check if SI is actuated: a. Check if either: • SI ACT status light is bright on XCP-6107 1-1. OR • Any red first-out SI annunciator is lit on XCP-626 top row. b. Actuate SI using either SI ACTUATION Switch. c. GO TO Step 6.	EOP-1.0
EVALUATOR NOTE: The CRS may direct that SI be actuated during or after this step based on the instruction in AOP-101.1 to actuate SI following the EOP-1.0, Immediate Operator Actions.			
IOA	RO	**5** Check if SI is required: a. Check if any of the following conditions exist: • PZR pressure LESS THAN 1850 psig. OR • RB pressure GREATER THAN 3.6 psig. OR • Steamline pressure LESS THAN 675 psig. OR • Steamline differential pressure GREATER THAN 97 psid.	EOP-1.0
	RO	b. Actuate SI using either SI ACTUATION Switch.	EOP-1.0
EVALUATOR NOTE: • "A" Train Actuation is failed. The BOP will need to manually align the "A" Train Components to their SI condition in accordance with Attachment 3. • SI Actuation is a Trigger to trip the "A" Charging/SI pump. • The "B" Charging/SI pump will not Auto-Start on SI. • Attachment 3, SI Equipment Verification, is included as an attachment to this guide on page 47.			

Op Test No: NRC-ILO-13-01 Scenario # 1 Event # 8 Page: 35 of 49

Event Description: LOCA Outside the Reactor Building, SI Train "A" Actuation Failure, "A" Chg Pp Trip, "B" CHG/SI Auto-Start Failure.

Time	Position	Applicant's Actions or Behavior	
		BOOTH OPERATOR: If contacted about the "A" Charging Pump Trip wait 2 minutes and report that the breaker is tripped. If contacted to align the "C" CHG/SI wait 1 minute: • Use LOA-CVC041 to rack-down "A" CHG/SI. • Report the "C" CHG/SI breaker will not rack-up. • Acknowledge requests for support.	
	BOP	6 Initiate ATTACHMENT 3, SI EQUIPMENT VERIFICATION.	EOP-1.0
	Crew	7 Announce plant conditions over the page system.	EOP-1.0
*	RO	8 Verify RB pressure has remained LESS THAN 12 psig on PR-951, RB PSIG (P-951), red pen.	EOP-1.0
*	RO	9 Check RCS temperature: • With any RCP running, RCS Tavg is stable at OR trending to 557°F. OR • With no RCP running, RCS Tcold is stable at OR trending to 557°F.	EOP-1.0
	RO	10 Check PZR PORVs and Spray Valves: a. PZR PORVs are closed. b. PZR Spray Valves are closed. c. Verify power is available to at least one PZR PORV Block Valve: • MVG-8000A, RELIEF 445 A ISOL. • MVG-8000B, RELIEF 444 B ISOL. • MVG-8000C, RELIEF 445 B ISOL. d. Verify at least one PZR PORV Block Valve is open.	EOP-1.0
		NOTE - Step 11 Seal Injection flow should be maintained to all RCPs.	EOP-1.0

Op Test No: NRC-ILO-13-01 Scenario # 1 Event # 8 Page: 36 of 49

Event Description: LOCA Outside the Reactor Building, SI Train "A" Actuation Failure, "A" Chg Pp Trip, "B" CHG/SI Auto-Start Failure.

Time	Position	Applicant's Actions or Behavior	
	RO	11 Check if RCPs should be stopped: a. Check if either of the following criteria is met: • Annunciator XCP-612 4-2 is lit (PHASE B ISOL). OR • RCS pressure is LESS THAN 1418 psig AND SI flow is indicated on FI-943, CHG LOOP B CLD/HOT LG FLOW GPM.	EOP-1.0
EVALUATOR NOTE: In accordance with OAP-134.4, EOP/AOP User's Guide, RCP Trip Criteria for RCS pressure less than 1418 psig with SI flow do not apply in an event initiated from Mode 2.			
	RO	b. Stop all RCPs.	EOP-1.0
	RO	12 Verify no SG is FAULTED: • No SG pressure is decreasing in an uncontrolled manner. • No SG is completely depressurized.	EOP-1.0
	RO	13 Verify Secondary radiation levels indicate SG tubes are NOT RUPTURED: • RM-G19A(B)(C), STMLN HI RNG GAMMA. • RM-A9, CNDSR EXHAUST GAS ATMOS MONITOR. • RM-L3, STEAM GENERATOR BLOWDOWN LIQUID MONITOR. • RM-L10, SG BLOWDOWN CW DISCHARGE LIQUID MONITOR.	EOP-1.0
	RO	14 Check if the RCS is INTACT: a. RB radiation levels are normal on: • RM-G7, CNTMT HI RNG GAMMA. • RM-G18, CNTMT HI RNG GAMMA. b. RB Sump levels are normal. c. RB pressure is LESS THAN 1.5 psig. d. The following annunciators are NOT lit: • XCP-606 2-2 (RBCU 1A/2A DRN FLO HI). • XCP-607 2-2 (RBCU 1B/2B DRN FLO HI).	EOP-1.0

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Event Description: LOCA Outside the Reactor Building, SI Train "A" Actuation Failure, "A" Chg Pp Trip, "B" CHG/SI Auto-Start Failure.

Time	Position	Applicant's Actions or Behavior	
	RO	15 Reset both SI RESET TRAIN A(B) Switches.	EOP-1.0
	RO	16 Reset Containment Isolation: • RESET PHASE A - TRAIN A(B) CNTMT ISOL. • RESET PHASE B - TRAIN A(B) CNTMT ISOL.	EOP-1.0
	RO	17 Place both ESF LOADING SEQ A(B) RESETS to: a. NON-ESF LCKOUTS. b. AUTO-START BLOCKS.	EOP-1.0
	RO	18 Establish Instrument Air to the RB: a. Start one Instrument Air Compressor and place the other in Standby. b. Open PVA-2659, INST AIR TO RB AIR SERV. c. Open PVT-2660, AIR SPLY TO RB.	EOP-1.0
	RO	19 Check if SI flow should be reduced: a. RCS subcooling on TI-499A(B), A(B) TEMP °F, is GREATER THAN 52.5°F. b. Secondary Heat Sink is adequate: • Total EFW flow to the SGs is GREATER THAN 450 gpm. OR • Narrow Range level is GREATER THAN 26% in at least one SG. c. RCS pressure is stable OR increasing. **(NO)** **ALTERNATIVE ACTION** c. GO TO Step 20.	EOP-1.0
		NOTE - Step 20 Procedures referenced in EOP-12.0, MONITORING OF CRITICAL SAFETY FUNCTIONS, may now be implemented.	EOP-1.0

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Event Description: LOCA Outside the Reactor Building, SI Train "A" Actuation Failure, "A" Chg Pp Trip, "B" CHG/SI Auto-Start Failure.

Time	Position	Applicant's Actions or Behavior	
	CRS	20 Initiate monitoring of the Critical Safety Function Status Trees. REFER TO EOP-12.0, MONITORING OF CRITICAL SAFETY FUNCTIONS.	EOP-1.0
*	RO	21 Check SG levels: a. Verify Narrow Range level in all SGs is GREATER THAN 26%. b. Control EFW flow to maintain Narrow Range SG levels between 26% and 60%.	EOP-1.0
BOOTH OPERATOR: Acknowledge request to sample SGs.			
	RO	22 Check if Secondary activity is normal: a. Place SVX-9398A(B)(C), SG A(B)(C) SMPL ISOL, in AUTO. b. Notify Chemistry to sample all SG secondary sides for abnormal activity.	EOP-1.0
	CRS	23 Check for loss of Reactor Coolant outside Containment: a. Verify AB radiation levels are normal on: **(NO)** • RM-A3, MAIN PLANT VENT EXH ATMOS MONITOR: PARTICULATE, IODINE, GAS. • RM-A13, PLANT VENT HI RANGE. • RM-A11, AB VENT GAS ATMOS MONITOR. • Local area monitors. b. Verify annunciator XCP-631 6-1 is NOT lit (AB SMP LVL HI). c. Verify annunciators XCP-606 3-4 and XCP-607 3-4 are NOT lit (LD TRBL AB SMP/FLDRN LVL HI). **ALTERNATIVE ACTION** 23 Evaluate the cause of abnormal AB conditions. IF the cause is a loss of RCS inventory outside Containment, THEN GO TO EOP-2.5, LOCA OUTSIDE CONTAINMENT, Step 1.	EOP-
	CRS	Transition to EOP-2.5, LOCA OUTSIDE CONTAINMENT, Step 1.	

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Event Description: LOCA Outside the Reactor Building, SI Train "A" Actuation Failure, "A" Chg Pp Trip, "B" CHG/SI Auto-Start Failure.

Time	Position	Applicant's Actions or Behavior	
		NOTE • As valves are isolated, it may be necessary to monitor RCS pressure for a period of time to determine if the leak is isolated. • Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.	
	Crew	1 Announce plant conditions over the page system.	EOP-2.5
	RO	2 Ensure the following are closed: a. RHR Pump Suction Valves from the RCS: 1) MVG-8701A and MVG-8702A, RCS LP A TO PUMP A (Status Lights XCP-6106 1-11(2-11)), for Train A. 2) MVG-8701B and MVG-8702B, RCS LP C TO PUMP B (Status Lights XCP-6106 1-12(2-12)), for Train B. b. Other paths out of Containment: 1) Normal Letdown Isolation • PVT-8149A(B)(C), LTDN ORIFICE A(B)(C) ISOL. • PVT-8152, LTDN LINE ISOL. 2) RCP Seal Return Isolation: • MVT-8100, SEAL WTR RTN ISOL. • MVT-8112, SEAL WTR RTN ISOL. 3) PZR Sample Isolation: • SVX-9356A, PZR STM SMPL ISOL. • SVX-9356B, PZR LIQ SMPL ISOL. 4) RCS Loop B Sample Isolation: • SVX-9364B, RCS LP B SMPL ISOL. • SVX-9365B, RCS LP B SMPL ISOL. 5) RCS Loop C Sample Isolation: • SVX-9364C, RCS LP C SMPL ISOL. • SVX-9365C, RCS LP C SMPL ISOL.	EOP-2.5
	RO	3 Check if RCS pressure is continuing to decrease.	EOP-2.5

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Event Description: LOCA Outside the Reactor Building, SI Train "A" Actuation Failure, "A" Chg Pp Trip, "B" CHG/SI Auto-Start Failure.

Time	Position	Applicant's Actions or Behavior	
	RO	4 Try to identify and isolate the break: a. Close MVG-8888A, RHR LP A TO COLD LEGS. b. Check if RCS pressure is continuing to decrease. c. Open MVG-8888A, RHR LP A TO COLD LEGS.	EOP-2.5
EVALUATOR NOTE: The following step isolates the leak from the RCS.			
CRITICAL TASK	RO	d. Close MVG-8888B, RHR LP B TO COLD LEGS. e. Check if RCS pressure is continuing to decrease. **(NO)** **ALTERNATIVE ACTION** e. GO TO EOP-2.0, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.	EOP-2.5
	CRS	Direct the implementation of EOP-2.0, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.	

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Event Description: LOCA Outside the Reactor Building, SI Train "A" Actuation Failure, "A" Chg Pp Trip, "B" CHG/SI Auto-Start Failure.

Time	Position	Applicant's Actions or Behavior

REFERENCE PAGE FOR EOP-2.0 — EOP-2.0

1 SI REINITIATION CRITERIA
IF either of the following conditions occurs, THEN start Charging Pumps and operate valves as necessary:
- RCS subcooling on TI-499A(B), A(B) TEMP °F, is LESS THAN 52.5°F [67.5°F].
- PZR level can NOT be maintained GREATER THAN 10% [28%].

2 RCP TRIP CRITERIA
IF either of the following criteria is met, THEN trip all RCPs:
- Annunciator XCP-612 4-2 is lit (PHASE B ISOL).
- RCS pressure is LESS THAN 1418 psig AND SI flow is indicated on FI-943, CHG LOOP B CLD/HOT LG FLOW GPM.

See note on next page for RCP Trip Criteria

3 SECONDARY INTEGRITY TRANSITION CRITERIA
IF any unisolated SG pressure is decreasing in an uncontrolled manner OR is completely depressurized, THEN GO TO EOP-3.0, FAULTED STEAM GENERATOR ISOLATION, Step 1.

4 TUBE RUPTURE TRANSITION CRITERIA
IF any SG level increases in an uncontrolled manner OR if any SG has abnormal radiation, THEN start Charging Pumps and operate valves as necessary, and GO TO EOP-4.0, STEAM GENERATOR TUBE RUPTURE, Step 1.

5 COLD LEG RECIRCULATION TRANSITION CRITERION
IF RWST level decreases to LESS THAN 18%, THEN GO TO EOP-2.2, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

6 LOSS OF EMERGENCY COOLANT RECIRCULATION TRANSITION CRITERION
IF Emergency Coolant Recirculation is established and subsequently lost, THEN GO TO EOP-2.4, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.

7 REDUCING CONTROL ROOM EMERGENCY VENTILATION
Reduce Control Room Emergency Ventilation to one train in operation within 30 minutes of actuation. REFER TO SOP-505, CONTROL BUILDING VENTILATION SYSTEM.

NOTE — EOP-2.0
- The EOP REFERENCE PAGE should be monitored throughout the use of this procedure.
- Seal Injection flow should be maintained to all RCPs.
- Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.

EVALUATOR NOTE: If flow has been High Head Safety Injection flow has been established with RCS pressure < 1418 psig and the RCPs are running they should be stopped in the following step.

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Event Description: LOCA Outside the Reactor Building, SI Train "A" Actuation Failure, "A" Chg Pp Trip, "B" CHG/SI Auto-Start Failure.

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: In accordance with OAP-134.4, EOP/AOP User's Guide, RCP Trip Criteria for RCS pressure less than 1418 psig with SI flow do not apply in an event initiated from Mode 2.			
	RO	1 Check if RCPs should be stopped: a. Check if either of the following criteria is met: • Annunciator XCP-612 4-2 is lit (PHASE B ISOL). OR • RCS pressure is LESS THAN 1418 psig AND SI flow is indicated on FI-943, CHG LOOP B CLD/HOT LG FLOW GPM. b. Stop all RCPs.	EOP-2.0
	RO	2 Verify no SG is FAULTED: • No SG pressure is decreasing in an uncontrolled manner. • No SG is completely depressurized.	EOP-2.0
*	RO	3 Check INTACT SG levels: a. Verify Narrow Range level in INTACT SGs is GREATER THAN 26%. b. Control EFW flow to maintain Narrow Range level in each INTACT SG between 40% and 60%.	EOP-2.0
	RO	4 Reset both SI RESET TRAIN A(B) Switches.	EOP-2.0
	RO	5 Reset Containment Isolation: • RESET PHASE A - TRAIN A(B) CNTMT ISOL. • RESET PHASE B - TRAIN A(B) CNTMT ISOL.	EOP-2.0

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Event Description: LOCA Outside the Reactor Building, SI Train "A" Actuation Failure, "A" Chg Pp Trip, "B" CHG/SI Auto-Start Failure.

Time	Position	Applicant's Actions or Behavior	
	RO	6 Check if Secondary radiation levels are normal: a. Check radiation levels normal on: • RM-G19A(B)(C), STMLN HI RNG GAMMA. • RM-A9, CNDSR EXHAUST GAS ATMOS MONITOR. • RM-L3, STEAM GENERATOR BLOWDOWN LIQUID MONITOR. • RM-L10, SG BLOWDOWN CW DISCHARGE LIQUID MONITOR. b. Place SVX-9398A(B)(C), SG A(B)(C) SMPL ISOL, in AUTO. c. Notify Chemistry to sample all SG secondary sides, and screen samples for abnormal activity using a frisker.	EOP-2.0
*	RO	7 Check PZR PORVs and Block Valves: a. Verify power is available to the PZR PORV Block Valves: 1) MVG-8000A, RELIEF 445 A ISOL. 2) MVG-8000B, RELIEF 444 B ISOL. 3) MVG-8000C, RELIEF 445 B ISOL.	EOP-2.0
		CAUTION - Step 7.b If any PZR PORV opens because of high PZR pressure, Step 7.b should be repeated after pressure decreases to LESS THAN 2330 psig, to ensure the PORV recloses.	EOP-2.0
	RO	b. Verify all PZR PORVs are closed. c. Verify at least one PZR PORV Block Valve is open.	EOP-2.0
	RO	8 Place both ESF LOADING SEQ A(B) RESETS to: a. NON-ESF LCKOUTS. b. AUTO-START BLOCKS.	EOP-2.0
	RO	9 Establish Instrument Air to the RB: a. Start one Instrument Air Compressor and place the other in Standby. b. Open PVA-2659, INST AIR TO RB AIR SERV. c. Open PVT-2660, AIR SPLY TO RB.	EOP-2.0

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Event Description: LOCA Outside the Reactor Building, SI Train "A" Actuation Failure, "A" Chg Pp Trip, "B" CHG/SI Auto-Start Failure.

Time	Position	Applicant's Actions or Behavior	
*	RO	10 Check if SI flow should be reduced: a. RCS subcooling on TI-499A(B), A(B) TEMP °F, is GREATER THAN 52.5°F. b. Secondary Heat Sink is adequate: • Total EFW flow to INTACT SGs is GREATER THAN 450 gpm. OR • Narrow Range level is GREATER THAN 26% in at least one INTACT SG. c. RCS pressure is stable OR increasing.	EOP-2.0
		NOTE - Step 10.d If PZR level is LESS THAN 10% [28%], the PZR should refill from SI flow after pressure is stabilized.	EOP-2.0
	RO	d. PZR level is GREATER THAN 10%.	EOP-2.0
	RO	e. GO TO EOP-1.2, SAFETY INJECTION TERMINATION, Step 1.	EOP-2.0
		REFERENCE PAGE FOR EOP-1.2 1 SI REINITIATION CRITERIA Following SI termination, IF either of the following conditions occurs, THEN start Charging Pumps and operate valves as necessary, and GO TO EOP-2.0, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1: • RCS subcooling on TI-499A(B), A(B) TEMP °F, is LESS THAN 52.5°F [67.5°F]. OR • PZR level can NOT be maintained GREATER THAN 10% [28%]. 2 SECONDARY INTEGRITY TRANSITION CRITERIA IF any unisolated SG pressure is decreasing in an uncontrolled manner OR is completely depressurized, THEN GO TO EOP-3.0, FAULTED STEAM GENERATOR ISOLATION, Step 1. 3 REDUCING CONTROL ROOM EMERGENCY VENTILATION Reduce Control Room Emergency Ventilation to one train in operation within 30 minutes of actuation. REFER TO SOP-505, CONTROL BUILDING VENTILATION SYSTEM.	EOP-1.2
		NOTE The EOP REFERENCE PAGE should be monitored throughout the use of this procedure.	EOP-1.2

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Event Description: LOCA Outside the Reactor Building, SI Train "A" Actuation Failure, "A" Chg Pp Trip, "B" CHG/SI Auto-Start Failure.

Time	Position	Applicant's Actions or Behavior	
	RO	1 Stop all but one Charging Pump and place in Standby.	EOP-1.2
	RO	2 Verify RCS pressure is stable OR increasing.	EOP-1.2
	RO	3 Establish Normal Charging: a. Close FCV-122, CHG FLOW. b. Open both MVG-8107 and MVG-8108, CHG LINE ISOL. c. Adjust FCV-122, CHG FLOW, to obtain 70 gpm Charging flow. d. Close both MVG-8801A(B), HI HEAD TO COLD LEG INJ.	EOP-1.2
	RO	4 Control FCV-122, CHG FLOW, to maintain PZR level.	EOP-1.2
	RO	5 Check if RHR Pumps should be stopped: a. Check if any RHR Pump is running with suction aligned to the RWST. b. Stop any RHR Pump which is running with suction aligned to the RWST and place in Standby.	EOP-1.2
	RO	6 Verify SI flow is NOT required: a. RCS subcooling on TI-499A(B), A(B) TEMP °F, is GREATER THAN 52.5°F. b. PZR level is GREATER THAN 10%.	EOP-1.2

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Event Description: LOCA Outside the Reactor Building, SI Train "A" Actuation Failure, "A" Chg Pp Trip, "B" CHG/SI Auto-Start Failure.

Time	Position	Applicant's Actions or Behavior	
	RO	7 Check if Letdown can be established:	EOP-1.2
		a. Verify PZR level is GREATER THAN 22%.	
		b. Establish Normal Letdown:	
		1) Adjust FCV-122, CHG FLOW, to obtain 70 gpm Charging flow.	
		2) Set PCV-145, LO PRESS LTDN, to 70%.	
		3) Open TCV-144, CC TO LTDN HX.	
		4) Open PVT-8152, LTDN LINE ISOL.	
		5) Open both LCV-459 and LCV-460, LTDN LINE ISOL.	
		6) Open desired Orifice Isolation Valve(s) to obtain 60 gpm to 120 gpm: • PVT-8149A, LTDN ORIFICE A ISOL (45 gpm). • PVT-8149B, LTDN ORIFICE B ISOL (60 gpm). • PVT-8149C, LTDN ORIFICE C ISOL (60 gpm).	
		7) Adjust FCV-122, CHG FLOW, to maintain TI-140, REGEN HX OUT TEMP °F, between 250°F and 350°F while maintaining PZR level.	
		8) Adjust PCV-145, LO PRESS LTDN, to maintain PI-145, LO PRESS LTDN PRESS PSIG, between 300 psig and 400 psig.	
		9) Place PCV-145, LO PRESS LTDN, in AUTO.	
		10) Place TCV-144, CC TO LTDN HX, in AUTO.	

EVALUATOR NOTE: Terminate scenario after normal charging and letdown is established.

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Event Description: SI Equipment Verification (ATTACHMENT 3)

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: Due to the Failure of Safety Injection Train "A" Actuation, Train "A" Pumps and Valves will need to be manually positioned to their required condition.			
	BOP	1. Ensure EFW Pumps are running: a. Ensure both MD EFW Pumps are running. b. Verify the TD EFW Pump is running if necessary to maintain SG levels.	EOP-1.0 Attachment 3
	BOP	2 Ensure the following EFW valves are open: • FCV-3531(3541)(3551), MD EFP TO SG A(B)(C). • FCV-3536(3546)(3556), TD EFP TO SG A(B)(C). • MVG-2802A(B), MS LOOP B(C) TO TD EFP.	Attachment 3
	BOP	3 Verify total EFW flow is GREATER THAN 450 gpm.	Attachment 3
	BOP	4 Ensure FW Isolation: a. Ensure the following are closed: • FW Flow Control, FCV-478(488)(498). • FW Isolation, PVG-1611A(B)(C). • FW Flow Control Bypass, FCV-3321(3331)(3341). • SG Blowdown, PVG-503A(B)(C). • SG Sample, SVX-9398A(B)(C). b. Ensure all Main FW Pumps are tripped.	Attachment 3
EVALUATOR NOTE: It is a critical task to start the "B" Charging Pump, if it has not been previously started, to provide High Head Safety Injection.			
CRITICAL TASK	BOP	5 Ensure SI Pumps are running: • Two Charging Pumps are running. • Both RHR Pumps are running.	Attachment 3
	BOP	6 Ensure two RBCU Fans are running in slow speed (one per train).	Attachment 3

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Event Description: SI Equipment Verification (ATTACHMENT 3)

Time	Position	Applicant's Actions or Behavior	
	BOP	7 Verify Service Water to the RBCUs: a. Ensure two Service Water Pumps are running. b. Verify both Service Water Booster Pumps A(B) are running. c. Verify GREATER THAN 2000 gpm flow for each train on: • FI-4466, SWBP A DISCH FLOW GPM. • FI-4496, SWBP B DISCH FLOW GPM.	Attachment 3
	BOP	8 Verify two CCW Pumps are running.	Attachment 3
	BOP	9 Ensure two Chilled Water Pumps and Chillers are running.	Attachment 3
	BOP	10 Verify both trains of Control Room Ventilation are running in Emergency Mode.	Attachment 3
	BOP	11 Check if Main Steamlines should be isolated: a. Check if any of the following conditions are met: • RB pressure GREATER THAN 6.35 psig. OR • Steamline pressure LESS THAN 675 psig. OR • Steamline flow GREATER THAN 1.6 MPPH AND Tavg LESS THAN 552°F. b. Ensure all the following are closed: • MS Isolation Valves, PVM-2801A(B)(C). • MS Isolation Bypass Valves, PVM-2869A(B)(C).	Attachment 3
	BOP	12 Ensure Excess Letdown Isolation Valves are closed: • PVT-8153, XS LTDN ISOL. • PVT-8154, XS LTDN ISOL.	Attachment 3
	BOP	13 Verify ESF monitor lights indicate Phase A AND Containment Ventilation Isolation on XCP-6103, 6104, and 6106. REFER TO ATTACHMENT 4, CONTAINMENT ISOLATION VALVE MCB STATUS LIGHT LOCATIONS, as needed.	Attachment 3

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Event Description: SI Equipment Verification (ATTACHMENT 3)

Time	Position	Applicant's Actions or Behavior	
	BOP	14 Verify proper SI alignment: a. Verify SI valve alignment by verifying SAFETY INJECTION/PHASE A ISOL monitor lights are bright on XCP-6104.	Attachment 3
	BOP	b. Verify all SAFETY INJECTION monitor lights are dim on XCP-6106. c. Verify SI flow on FI-943, CHG LOOP B CLD/HOT LG FLOW GPM. d. Check if RCS pressure is LESS THAN 325 psig. **(NO)** **ALTERNATIVE ACTION** d. ATTACHMENT 3, SI EQUIPMENT VERIFICATION, is complete.	Attachment 3
	BOP	Report completion of Attachment 3.	

EVALUATOR NOTE: ATTACHMENT 3 is complete.

Facility: VC SUMMER Scenario No: 2 Op Test No: NRC-ILO-13-01

Examiners: _____ Operators: CRS: _____

_____ RO: _____

_____ BOP: _____

Initial Conditions:
- 60% Power MOL.
- "B1" Train Work Week.
- The National Weather Service has declared a Severe Weather Warning for Richland, Fairfield, and Kershaw counties for the next four (4) hours.
- Alternate Seal Injection is OOS.
- "C" MFW Pump is not running.
- Investigating small steam leak on "C" MFW Pump Casing.

Turnover:
- Maintain current power until Maintenance releases the "C" MFW Pump for operation.

Critical Tasks:
- Maintain SG Level without causing a Reactor/Turbine trip.
- Close "A" or "B" MSIV Prior to Orange path on Integrity or Containment.
- Isolate EFW to the faulted SG prior to Orange path reached on Integrity.

Event No.	Malf No.	Event Type*	Event Description
1	CVC008	C-RO, CRS TS-CRS	Isolable Letdown Line Leak Inside Reactor Building - 50 gpm.
2	MS005O	I-BOP, CRS TS-CRS	FT-494 ("C" Steam Flow Transmitter) fails LOW.
3	NA	N-BOP, CRS R-RO	Rapid downpower due to "B" MFW pump vibration.
4	CRF007H14	C-RO, CRS TS-CRS	Rod H14 stuck but trippable (blown fuse).
5	FW017O	I-BOP, CRS	PT-508 (MFW Pump Discharge Header Pressure) Fails LOW. (Manual control of MFW Pp speed)

6	MSS003A AUX009AA AUX009AB AUX009AC	M-ALL	"A" Main Steamline Break inside the RB due to a seismic event.
	EPS013		Main Generator and Voltage Regulator Breakers Fail to Trip.
	MSS006A MSS006B		SG "A" and "B" MSIV Fails to Close in AUTO.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

The following notation is used in the ES-D-2 form "Time" column:

IOA designates **Immediate Operator Action** steps.

***** designates **Continuous Action** steps.

The crew will assume the watch having been pre-briefed on the Initial Conditions, the plan for this shift and any related operating procedures.

GOP-4A, Power ascension was halted at 60% due to a mechanical problem with the "C" MFW Pump. The current power level has been maintained for 24 hours. Xenon is stable. The crew instructions are to maintain the current power until mechanical maintenance releases the "C" MFW Pump for operation.

EVENT 1: Isolable Letdown Line Leak Inside Reactor Building - 50 gpm.

- **TRIGGER 1**
  - MAL-CVC008
    LETDOWN LINE LEAK INSIDE CONTAINMENT
    FINAL=30%

On cue from the Examiner, a 50 gpm leak will be inserted on the letdown line inside the Reactor Building. The crew will identify that a leak exists and implement AOP-101.1, Loss of Reactor Coolant Not Requiring SI. The RO will isolate the leak by isolating letdown. The RO will then place excess letdown in service.

The CRS will refer to Technical Specification 3.4.6.2, Operational Leakage.

EVENT 2: FT-494 ("C" Steam Flow Transmitter) fails LOW.

- **TRIGGER 2**
  - XMT-MS005O
    IFT00494 SG C STEAM FLOW FAIL TO POSN
    FINAL=0

On cue from the Examiner, FT-494 will fail LOW. This is the selected "C" SG selected Steam Flow transmitter for SG level control. FCV-498 will stroke closed causing SG level to lower. The crew will implement AOP-401.3 Steam Flow - Feedwater Flow Protection Channel Failure and select the operable Steam Flow Transmitter for control. This is a Technical Specification transmitter.

The CRS will refer to Technical Specification 3.3.1, Reactor Trip System Instrumentation, Action 6 and 3.3.2, Engineered Safety Feature Actuation System Instrumentation, Action 24.

EVENT 3: Rapid downpower due to "B" MFW pump vibration.

The Shift Supervisor will call the CRS and report that the B Main Feedwater Pump vibration is in alert. He will instruct to crew to lower power to less than 45% at 3% per minute in accordance with GOP-4C Rapid Power Reduction and leave the pump running for engineering to evaluate. The RO will utilize boration and/or rod control to lower power while coordinating the downpower with the BOP who will be controlling turbine demand.

EVENT 4: Rod H14 stuck but trippable (blown fuse).

- **AUTO-TRIGGER 3**
  FNISPR(2) < 56 (N-42 indicates < 56% Power)
  - MAL-CRF007H14
    STUCK ROD H-14
    FAIL TO: TRIPPABLE
- **TRIGGER 4**
  - MAL-CRF007H14
    STUCK ROD H-14
    FAIL TO: TRIPPABLE
    DELETE=00:00:01
    Removes failure to allow rod recovery

This event will occur when power is reduced to less than 56% or earlier if directed by the Examiner. Control Rod H-14 in Control Bank D will stop moving. This event must be inserted early enough in the downpower so that the failure will be apparent as power is lowered. The RO will realign the control rods in accordance with AOP-403.5 Stuck or Misaligned Control Rod.

The CRS will refer to Technical Specification 3.1.3.1, Movable Control Assemblies.

EVENT 5: PT-508 (MFW Pump Discharge Header Pressure) Fails LOW. (Manual control of MFW Pp speed).

- **TRIGGER 5**
  - XMT-FW017O
    IPT00508 FW PP DSCHG HDR PRESS PI-508 FAIL TO POSN
    FINAL=200

On cue from the Examiner, a Main Feedwater Header Pressure transmitter will fail LOW causing the MFW Pump speed to increase and raise SG level. The operators will respond to annunciators and implement AOP-210.3, Feedwater Pump Malfunction.

The BOP will take manual control of the master Speed control and adjust speed to maintain Feedwater Pump discharge pressure 150 to 250 psi greater than Main Steam Header pressure and restore SG levels.

EVENT 6: "A" Main Steamline Break inside the RB due to a seismic event.

- **PRE-LOAD**
  - MAL-EPS013 GENERATOR BREAKER FAILS TO TRIP
- **TRIGGER 6**
  - MAL-AUX009AB SEISMIC EVENT EARTHQUAKE 2/3 O.B.E.(UP/DOWN VERTICAL)
    Final Value = 2.1
    Delay = 0
  - MAL-AUX009AA SEISMIC EVENT EARTHQUAKE 2/3 O.B.E.(NORTH/SOUTH HORIZONTAL)
    Final Value = 3.2
    Delay = 1 sec
  - MAL-AUX009AC SEISMIC EVENT EARTHQUAKE 2/3 O.B.E.(EAST/WEST HORIZONTAL)
    Final Value = 4.2
    Delay = 1 sec
  - MAL-MSS003A STEAMLINE S/G A BREAK INSIDE CONTAINMENT
    Final Value = 3E+6 lbm/hr
    Delay = 10 sec
  - MAL-EPS013 GENERATOR BREAKER FAILS TO TRIP
  - MAL-MSS006A MAIN STEAM ISOLATION VALVE (S/G A) FAILURE
    Fail to: FAILURE TO CLOSE
  - MAL-MSS006B MAIN STEAM ISOLATION VALVE (S/G B) FAILURE
    Fail to: FAILURE TO CLOSE
- **AUTO-TRIGGER 7** X10I041C == 1 (MSIV "A" Taken to CLOSE)
  - MAL-MSS006A MAIN STEAM ISOLATION VALVE (S/G A) FAILURE
    Delete = 00:00:01
- **AUTO-TRIGGER 8** X10I042C == 1 (MSIV "B" Taken to CLOSE)
  - MAL-MSS006B MAIN STEAM ISOLATION VALVE (S/G B) FAILURE
    Delete = 00:00:01

On cue from the Examiner, seismic monitors will indicate a seismic event has occurred. Ten (10) seconds later a steamline break inside the Reactor Building will be inserted. The Reactor will trip and the crew will implement EOP-1.0 (E-0) Reactor Trip/Safety Injection Actuation. The crew will identify that at least one Steam generator is faulted and transition to EOP-3.0 (E-2), Faulted Steam Generator Isolation. When the faulted SG is isolated the crew will transition to EOP-1.2 (ES-1.1), Safety Injection Termination.

The malfunction will be apparent after the Reactor Trip. The crew will identify that the Main Generator Output Breaker failed to automatically trip and the BOP will manually open the breaker from the control board.

The BOP must identify that the MSIVs are open and manually close them from the control board to isolate the faulted Steam Generator and prevent over-pressurization of the Reactor Building.

TERMINATION:

The scenario can be terminated after the crew has transitioned to EOP-1.2 (ES-1.1), Safety Injection Termination, and terminated Safety Injection or at the discretion of the Examiner.

Scenario Attributes		Events
Total Malfunctions (5-8)	7	· Letdown Line Leak Inside Reactor Building - 50 gpm. · FT-494 ("C" Steam Flow Transmitter) fails LOW · Rod H14 stuck but it can be tripped (blown fuse). · PT-508 (MFW Discharge Header Pressure) Fails LOW · "A" MSLB inside Reactor Building · Main Gen and Voltage Regulator Breakers Fail to Trip · SG "A" and "B" MSIV Fails to Close in AUTO.
Malfunctions after EOP entry (1-2)	2	· Main Generator and Voltage Regulator breakers fail to trip. · A and B MSIVs fail to close in auto.
Abnormal Events (2-4)	4	· Letdown Line Leak Inside Reactor Building - 50 gpm. · FT-494 ("C" Steam Flow Transmitter) fails LOW · Rod H14 stuck but it can be tripped (blown fuse). · PT-508 (MFW Discharge Header Pressure) Fails LOW
Major Transient (1-2)	1	· Faulted Steam Generator (MSLB inside RB)
EOPs Entered (1-2)	2	· EOP-3.0 (E-2), Faulted Steam Generator Isolation · EOP-1.2 (ES-1.1), Safety Injection Termination
EOP Contingencies (0-2)	0	
Critical Tasks (2-3)	3	· Maintain SG Level without a Reactor/Turbine trip. · Close "A" or "B" MSIV Prior to Orange path on Integrity or Containment. · Isolate EFW to the faulted SG prior to Orange path reached on Integrity.

SIMULATOR SCENARIO SETUP

INITIAL CONDITIONS:

- IC Set 291
- 60% Power
- Rod Position = 173
- FCV-113 Pot Setting = 4.81
- Boron = 1122 ppm
- Xe = - 2815 pcm
- Burnup = 10,000 MWD/MTU
- Prior to the scenario, crew should pre-brief on conditions and expectations for the Shift (maintain power, repairs estimated to be complete well before LCO action time expires.)

PRE-EXERCISE:

- Ensure simulator has been checked for hardware problems (DORT, burnt out light bulbs, switch malfunctions, chart recorders, etc.)
- VCS-TQP-0807 Attachment I-A, Unit 1 Booth Instructor Checklist, has been completed.
- Verify the Hard Card for Turbine Load changes is in its proper storage location.
- Verify the Hard Card for borating via MVT-8104 is in its proper storage location.
- Hang Tags for equipment out of service.
- Mark up procedures in use with "Circle and Slash" as applicable.
    - GOP-4A, POWER OPERATION (MODE 1 - ASCENDING) marked to step 3.16
- Prepare a turnover sheet for each position.
- Conduct two-minute drill.
- The simulator may be left running at turnover (stable plant conditions).
- Ensure SIPCS rod position is matched to DRPI indication.

PRELOAD:

STANDARD SIMULATOR SETUP:

- PMP-LD003P, LEAK DETECTION SUMP PMP LOSS OF POWER
- VLV-FW028W, FW HDR RECIRC ISOL VLV LOSS OF POWER
- VLV-FW029W, FW HTR RECIRC ISO VLV LOSS OF POWER
- VLV-CS052W, RCP A SEAL LEAKOFF VLV LOSS OF POWER
- VLV-CS053W, RCP B SEAL LEAKOFF VLV LOSS OF POWER
- VLV-CS054W, RCP C SEAL LEAKOFF VLV LOSS OF POWER

SCENARIO RELATED

- ALTERNATE SEAL INJECTION OUT-OF-SERVICE
  ANN-CS044, ALT SEAL INJ PUMP TRBL Fail to: ON
- ANN-CS046, ALT SEAL D/G TRBL Fail to: ON
- MAL-CVS027, ASI D/G FAIL TO START
- MAL-CVC029, ASI PUMP FAIL TO START

Op Test No: NRC-ILO-13-01	Scenario # 2	Event # 1	Page: 9 of 55

Event Description: Isolable Letdown Line Leak Inside Reactor Building - 50 gpm.

Time	Position	Applicant's Actions or Behavior

BOOTH OPERATOR: When directed, initiate Event 1 (TRIGGER 1).

EVALUATOR NOTE: On cue from the Examiner, a 50 gpm leak will be inserted on the letdown line inside the Reactor Building. The crew will identify that a leak exists and implement AOP-101.1, Loss of Reactor Coolant Not Requiring SI. The RO will isolate the leak by isolating letdown. The RO will then place excess letdown in service.

Indications Available:

Charging increasing with no change in Letdown
Changing RB environmental conditions
XCP-606/607-2-2, RBCU Drain Flow alarms
XCP-614-5-1, CHG LINE FLO HI/LO
XCP-615-3-6, RCS Leak Calculation alarm
RM-A2 HI RAD

Additional Alarms which may occur as time elapses:

XCP-606 3-2 LD TRBL RB/INCORE SUMP LVL HI
XCP-607 3-2 LD RB SMP LVL HI

EVALUATOR NOTE: If the BOP responds to the HVAC alarms the BOOTH OPERATOR will ENSURE that an INSTRUCTOR notifies the BOP that the Control Building Operator will handle all future HVAC alarms.

BOOTH OPERATOR:

If necessary direct an Instructor to relieve the BOP as the Control Building Operator. Inform the BOP that you will handle all future HVAC alarms.

When the HVAC panel annunciates – acknowledge the alarm.

Report as the Control Building Operator (Unit 4)

- High Temperature alarm in STEAM GENERATOR "A" COMPARTMENT and
- High Temperature alarm in REACTOR COMPARTMENT COOLING SYSTEM.

EVALUATOR NOTE: If Primary containment average air temperature exceeds 120°F then Technical Specification 3.6.1.5 Action applies:

With the containment average air temperature greater than 120"F, reduce the average air temperature to within the limit within 8 hours, or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

Op Test No: NRC-ILO-13-01 Scenario # 2 Event # 1 Page: 10 of 55

Event Description: Isolable Letdown Line Leak Inside Reactor Building - 50 gpm.

Time	Position	Applicant's Actions or Behavior	
	RO	**CORRECTIVE ACTIONS:** 3. Monitor LT-112A and LT-115, % LEVEL, to verify proper VCT level. 4. Monitor FI-122A, CHG FLOW GPM. **SUPPLEMENTAL ACTIONS:** 6. If RCS leakage is indicated, determine the leak rate and refer to Technical Specification 3.4.6.2.	XCP-614 5-1
	CRS	Determines than RCS leakage is indicated and implements AOP-101.1, LOSS OF REACTOR COOLANT NOT REQUIRING SI.	
		NOTE • If a Reactor Trip occurs AND SI is NOT required, this procedure should be continued after the actions of EOP-1.1, Reactor Trip Recovery, are completed. • As valves are isolated, it may be necessary to monitor RCS pressure for a period of time to determine if the leak is isolated.	AOP-101.1
*	RO	1 Verify PZR level is at or trending to program level.	AOP-101.1
*	RO	2 Check if SI is required: **(NO)** a. Check if any of the following criteria are met: • PZR level is decreasing with Charging maximized and Letdown minimized. OR • PZR level is approaching 8%. OR • PZR pressure is approaching 1870 psig. OR • VCT level is approaching 5%. **ALTERNATIVE ACTION** a. GO TO Step 3.	AOP-101.1

Op Test No: NRC-ILO-13-01 Scenario # 2 Event # 1 Page: 11 of 55

Event Description: Isolable Letdown Line Leak Inside Reactor Building - 50 gpm.

Time	Position	Applicant's Actions or Behavior	
		NOTE - Step 3 Conditions for implementing Emergency Plan Procedures should be evaluated using EPP.001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.	AOP-101.1
	CRS	3 Determine RCS leak rate: a. Estimate the RCS leak rate: • REFER TO IPCS CHGNET. • REFER TO IPCS 4RW1. b. Estimate the RCS leak rate using IPCS VCT level. (14 gal/percent) c. If necessary, calculate the RCS leak rate. REFER TO STP-114.002, OPERATIONAL LEAK TEST.	AOP-101.1
	CRS	4 Check if the RCS leak rate is GREATER THAN Technical Specification 3.4.6.2 limits.	AOP-101.1
	CRS	5 Comply with the applicable Technical Specification 3.4.6.2 action statement.	AOP-101.1
	CRS	TS 3.4.6.2 Reactor Coolant System operational leakage shall be limited to: b. 1 GPM UNIDENTIFIED LEAKAGE, ACTION b. With any operational Reactor Coolant System leakage greater than any one of the above limits, excluding PRESSURE BOUNDARY LEAKAGE, primary-to-secondary leakage, and leakage from Reactor Coolant System Pressure Isolation Valves, reduce the leakage rate to within limits within 4 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.	TS 3.4.6.2

Op Test No: NRC-ILO-13-01 Scenario # 2 Event # 1 Page: 12 of 55

Event Description: Isolable Letdown Line Leak Inside Reactor Building - 50 gpm.

Time	Position	Applicant's Actions or Behavior	
	RO	6 Verify RCS pressure is GREATER THAN 2210 psig.	AOP-101.1
EVALUATOR NOTE: Step 7 isolates the letdown leak.			
	RO	7 Close all Letdown Isolation Valves: a. PVT-8149A, LTDN ORIFICE A ISOL. b. PVT-8149B, LTDN ORIFICE B ISOL. c. PVT-8149C, LTDN ORIFICE C ISOL. d. LCV-459, LTDN LINE ISOL. e. LCV-460, LTDN LINE ISOL.	AOP-101.1
	RO	8 Check if the leak has been isolated: a. Evaluate the following: • IPCS CHGNET • IPCS 4RW1 • Pressurizer level • VCT Level • Reactor Building Conditions b. If necessary, calculate the RCS leak rate. REFER TO STP-114.002, OPERATIONAL LEAK TEST.	AOP-101.1

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Event Description: Isolable Letdown Line Leak Inside Reactor Building - 50 gpm.

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: • If the crew does not recognize that they have isolated the leak they will perform the Alternate actions for step 8 which isolates charging. • Alternative Actions will direct completion of steps 11 and 12 which duplicates steps 9 and 10.			
		ALTERNATIVE ACTION 8 Perform the following: a) Isolate Charging by closing either of the following: • MVG-8107, CHG LINE ISOL. • MVG-8108, CHG LINE ISOL. b) GO TO Step 11.	AOP-101.1
BOOTH OPERATOR: If directed to investigate Relay Room Alarms - report there are Reactor Building Sump "A" and "B" alarms for High Level and Leakage greater than 10 GPM.			
	RO	9 Place Excess Letdown in service using Attachment 1, Establishing Excess Letdown.	AOP-101.1

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Event Description: Isolable Letdown Line Leak Inside Reactor Building - 50 gpm.

Time	Position	Applicant's Actions or Behavior	
	RO	1 Place Excess Letdown in service:	AOP-101.1 ATTACH 1
		a. Close FCV-122, CHG FLOW.	
		b. Maintain Core Power LESS THAN 2898 MWt prior to and during Excess Letdown operation.	
		c. Close all Letdown Isolation Valves: 1) PVT-8149A(B)(C), LTDN ORIFICE A(B)(C) ISOL. 2) LCV-459, LTDN LINE ISOL. 3) LCV-460, LTDN LINE ISOL.	
		d. Isolate Charging by closing either of the following: • MVG-8107, CHG LINE ISOL. • MVG-8108, CHG LINE ISOL.	
		e. Reduce Seal Injection flow to 7 gpm per RCP as indicated on the following: • FI-130A, RCP A INJ FLO GPM. • FI-127A, RCP B INJ FLO GPM. • FI-124A, RCP C INJ FLO GPM.	
		f. Ensure HCV-137, XS LTDN HX, is closed.	

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Event Description: Isolable Letdown Line Leak Inside Reactor Building - 50 gpm.

Time	Position	Applicant's Actions or Behavior	
		g. Place PVM-8143, XS LTDN TO VCT OR RCDT, in VCT position.	AOP-101.1 ATTACH 1
		h. Ensure the following are open: • MVT-8100, SEAL WTR RTN ISOL. • MVT-8112, SEAL WTR RTN ISOL.	
		i. Ensure MVG-9583, FROM XS LTDN HX, is open.	
		j. Open the following: • PVT-8153, XS LTDN ISOL. • PVT-8154, XS LTDN ISOL.	
		k. Establish Excess Letdown flow: 1) Slowly throttle open HCV-137, XS LTDN HX. 2) Maintain temperature on TI-139, XS LETDOWN HX OUT TEMP °F, LESS THAN 165°F.	
		l. Monitor the following to ensure flow between 0.2 gpm and 5.0 gpm: • FR-154A, RCP SL LKOFF HI RANGE. • FR-154B, RCP SL LKOFF LO RANGE.	
		10 GO TO Step 42.	AOP-101.1
		42 Evaluate Plant status: a. Maintain stable plant conditions. b. Consult with the Shift Supervisor to determine further actions.	AOP-101.1
		43 RETURN TO Procedure and Step in effect.	AOP-101.1

Op Test No: NRC-ILO-13-01	Scenario # 2	Event # 1	Page: 16 of 55

Event Description: Isolable Letdown Line Leak Inside Reactor Building - 50 gpm.

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE: The next event may be inserted after excess letdown is placed in service.		

Op Test No: NRC-ILO-13-01 Scenario # 2 Event # 2 Page: 17 of 55

Event Description: FT-494 ("C" Steam Flow Transmitter) fails LOW.

Time	Position	Applicant's Actions or Behavior	
BOOTH OPERATOR: When directed, initiate Event 2 (TRIGGER 2).			
EVALUATOR NOTE: On cue from the Examiner, FT-494 will fail LOW. This is the selected "C" SG selected Steam Flow transmitter for SG level control. FCV-498 will stroke closed causing SG level to lower. The crew will implement AOP-401.3 Steam Flow - Feedwater Flow Protection Channel Failure and select the operable Steam Flow Transmitter for control. This is a Technical Specification transmitter. Technical Specifications 3.3.1, Reactor Trip System Instrumentation, Action 6 and 3.3.2, Engineered Safety Feature Actuation System Instrumentation, Action 24 requires that the inoperable channel is placed in the tripped condition within 72 hours.			
Indications Available: XCP-624 3-5, SG C LVL DEV XCP-624 6-4, SG C FWF>STF MISMATCH			
	CRS	Implements AOP-401.3, Steam Flow - Feedwater Flow Protection Channel Failure	
		NOTE Throughout this procedure, "AFFECTED" refers to any SG experiencing level control problems.	AOP-401.3
IOA	BOP	1 Verify the failed channel is the controlling channel.	AOP-401.3
		NOTE - Step 2 FW AND STEAM CONTROL CHANNEL SEL Switches for a SG should be selected to the same direction (both to the left or both to the right).	AOP-401.3
IOA	BOP	2 Select the operable flow channel: • Place FW CONTROL CHANNEL SEL Switch to the operable channel. • Place STEAM CONTROL CHANNEL SEL Switch to the operable channel.	AOP-401.3

Op Test No: NRC-ILO-13-01 Scenario # 2 Event # 2 Page: 18 of 55

Event Description: FT-494 ("C" Steam Flow Transmitter) fails LOW.

Time	Position	Applicant's Actions or Behavior	
		NOTE - Step 3 CTRL+ALT+S on either EHC HMI is equivalent to 50 MWe, and is the preferred method to accomplish a rapid load reduction.	AOP-401.3
IOA	BOP	3 Verify Turbine Load is LESS THAN 950 MWe.	AOP-401.3
IOA	BOP	4 Verify only one SG is AFFECTED.	AOP-401.3
IOA	BOP	5 Adjust the Feedwater Flow Control Valve as necessary to restore feed flow to the AFFECTED SG.	AOP-401.3
IOA	BOP	6 Check if Feedwater Pump speed control is operating properly: • Feedwater Header pressure is GREATER THAN Main Steam Header pressure. • Feed flow is normal for steam flow and power level. • All operating Feedwater Pump speeds and flows are balanced.	AOP-401.3
	BOP	7 Verify Narrow Range levels in all SGs are between 60% and 65%.	AOP-401.3
	BOP	8 Restore the AFFECTED SG control systems to normal: • Place the Feedwater Flow Control Valve in AUTO. • Place the Feedwater Pump Speed Control System in AUTO. REFER TO SOP-210, FEEDWATER SYSTEM.	AOP-401.3
		NOTE - Step 9 Steam flow transmitters FT-474, FT-484, FT-494, FT-475, FT-485, and FT-495 are density compensated by steam pressure transmitters PT-475, PT-485, PT-495, PT-476, PT-486, and PT-496.	AOP-401.3
	CRS	9 Within 72 hours, place the failed channel protection bistables in a tripped condition: a. Identify the associated bistables for the failed channel. REFER TO Attachment 1.	AOP-401.3

Op Test No: NRC-ILO-13-01 Scenario # 2 Event # 2 Page: 19 of 55

Event Description: FT-494 ("C" Steam Flow Transmitter) fails LOW.

Time	Position	Applicant's Actions or Behavior	

FT-494	FB-494A FB-498B	C3-748-BS-1 C3-749-BS-1	CHAN III LP C FB-494A CHAN III SG C FB-498B	TABLE 3.3-1 ITEM 14 TABLE 3.3-3 ITEM 4.d	302.030 395.006

AOP-401.3 Attachment 1

	CRS	Identifies FB-474A and FB-478B as the affected Bistables.	AOP-401.3 Attachment 1
	CRS	b. Record the following for each associated bistable on SOP-401, REACTOR PROTECTION AND CONTROL SYSTEM, Attachment I: • Instrument. • Associated Bistable. • Bistable Location. • STPs.	AOP-401.3
	CRS	Refers to Technical Specifications: Table 3.3-1 item 14 (Action 6 within 72 hrs) - The inoperable channel is placed in the tripped condition within 72 hours. Table 3.3-3 item 4.d (Action 24 within 72 hrs) - The inoperable channel is placed in the tripped condition within 72 hours.	Tech Specs
BOOTH OPERATOR: Acknowledge requests for support in troubleshooting and placing channel in trip.			
	CRS	c. Notify the I&C Department to place the identified bistables in trip.	AOP-401.3

EVALUATE NOTE: The next event may be initiated after the applicable Technical Specification Actions have been identified.

Op Test No: NRC-ILO-13-01 Scenario # 2 Event # 3 Page: 20 of 55

Event Description: Rapid downpower due to B MFW pump vibration.

Time	Position	Applicant's Actions or Behavior

BOOTH OPERATOR: When directed by the Evaluator

Call the Control Room as the Shift Supervisor

- The AO has reported to me that the "B" MFW Pump sounds unusual.
- I am at the "B" MFW Pump with Engineering and Mechanical Maintenance.
- Reduce power to less than 45% at 3% per minute IAW GOP-4C, Rapid Power Reduction.
- Leave the "B" MFW Pump running for Engineering to evaluate.

GOP-4C

GOP-4C REFERENCE PAGE

GENERAL NOTES

A. Procedure steps should normally be performed in sequence. However, it is acceptable to perform steps in advance after thorough evaluation of plant conditions and impact by the Shift Supervisor or Control Room Supervisor.

B. After any Thermal Power change of greater than 15% within any one hour, Attachment III.H. of GTP-702 must be completed.

C. If Reactor Power is stabilized during this procedure for the purpose of raising power per GOP-4A, a Power Range Heat Balance shall be performed.

D. Once a Rapid Power Reduction has begun, every effort should be made to prevent the Turbine from reaching "AT SET LOAD" unless it is desired to stabilize the plant.

REACTOR CONTROL

A. During operation with a positive Moderator Temperature Coefficient, power and temperature changes will require constant operator attention.

B. Rod Control should be maintained in Automatic if any Pressurizer PORV is isolated.

C02→ C. If at any time, power decreases unexpectedly below 0.1% on any Power Range NI (computer indication available) OR below 1.0% on any Power Range NI control board indication (computer not available):

1) No positive reactivity will be added by rods or dilution.

2) A complete reactor shutdown shall be performed per GOP-5.

3) A controlled reactor startup may be commenced per GOP-3 once the event has been reviewed by Reactor Engineering.

REACTOR TRIP CRITERIA DURING RAPID LOAD REDUCTION

A. If any of the following conditions occur, trip the Reactor and implement EOP-1.0:

1) RCS T_{avg} is less than 551°F for greater than 15 minutes.

2) T_{avg}/T_{ref} mismatch exceeds 10°F.

3) Pressurizer pressure approaches 1870 psig.

4) Power reduction at 5% per minute is not sufficient to mitigate the event.

Op Test No: NRC-ILO-13-01 Scenario # 2 Event # 3 Page: 21 of 55

Event Description: Rapid downpower due to B MFW pump vibration.

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: The crew will lower power from 60% in accordance with GOP-4C, Rapid Power Reduction. The RO will utilize boration and/or rod control to lower power while coordinating the downpower with the BOP who will be controlling turbine demand.			
		NOTE 3.0 If time allows, load reductions should be discussed with the Load Dispatcher.	GOP-4C
		CAUTION 3.1 through 3.12 a. Thermal Power changes of greater than 15% in any one-hour period requires completion of GTP-702 Attachment III.H. b. VCS PID Report, POWER CHANGE SEARCH, should be periodically performed to ensure a thermal power change of greater than 15% in any one-hour period is detected.	GOP-4C
	RO	3.1 Commence rapid Plant Shutdown as follows: a. Energize all Pressurizer Heaters.	GOP-4C
		NOTE 3.1.b Setting FCV-113A&B, BA FLOW SET PT to 8.3 will yield 33 gpm Boration flow rate.	GOP-4C
	RO	b. Maintain the following with rod motion or boron concentration changes: 1) Tavg within 10°F and trending to Tref. 2) ΔI within limits. 3) Control Rods above the rod insertion limit.	GOP-4C
	RO	c. Maintain Tavg within the control band by Control Rod motion or boron concentration changes.	GOP-4C

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Event Description: Rapid downpower due to B MFW pump vibration.

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: • SOP-106 III.F, Borate Operations, is attached (Page 48). • SOP-106 IV.D, Borating the RCS Using the Emergency Borate Valve, is attached (Page 50).			
	RO	3.1.d. Borate or dilute per SOP-106, Reactor Makeup Water System, to maintain the following parameters: 1) ΔI within limits. 2) Control Rods above the Rod Insertion Limit.	GOP-4C
NOTE 3.2 a. Step 3.2 lowers Reactor Power from 90% to 48%. b. While the plant is being maneuvered, total condensate flow through the Blowdown Heat Exchangers must be maintained greater than 450 gpm, which should maintain condensate outlet temperature at least 30°F below the DA temperature.			GOP-4C
	BOP	3.2 Reduce Reactor Power to 48% as follows:	GOP-4C
EVALUATOR NOTE: Applicable portions of SOP-214 are attached (Page 51).			
	BOP	a. Using the EHC HMI, Control/Load screen, reduce load per SOP-214 at a rate of 3% per minute or less.	GOP-4C
NOTE 3.2.b The System Controller should be notified prior to manually changing MVARs by more than 50 MVARs in a five minute period, unless the change is needed to prevent equipment damage.			GOP-4C
	BOP	b. As load decreases, adjust Megavars using GEN FIELD VOLT ADJ as requested by the System Controller and within the Estimated Generator Capability curve (Enclosure A).	GOP-4C

Op Test No: NRC-ILO-13-01 Scenario # 2 Event # 3 Page: 23 of 55

Event Description: Rapid downpower due to B MFW pump vibration.

Time	Position	Applicant's Actions or Behavior	
	BOP	c. When Reactor Power is between 60% and 80%, reduce to the following pumps in service per SOP-210, Feedwater System: 1) Two Main Feedwater Pumps. 2) Three Feedwater Booster Pumps.	GOP-4C
	BOP	d. When Reactor Power is between 60% and 75%, perform PTP-102.001, Main Turbine Tests (Power Operated Extraction System Check Valve portion only). NA – Power was never increased above 60%,	GOP-4C
EVALUATOR NOTE: Event 4 (Stuck Rod) will be auto-triggered at 56% power so that it is apparent that a rod is not moving.			

Op Test No: NRC-ILO-13-01	Scenario # 2	Event # 4	Page: 24 of 55

Event Description: Rod H14 stuck but trippable (blown fuse).

Time	Position	Applicant's Actions or Behavior	
		BOOTH OPERATOR: NO ACTION REQUIRED. Event 4 (TRIGGER 3) will auto-initiate when power is below 56%.	
		EVALUATOR NOTE: This event will auto-actuate when power is reduced below 56%. Control Rod H-14 in Control Bank D will stop moving. The RO will realign the control rods in accordance with AOP-403.5 Stuck or Misaligned Control Rod.	
		Indications available: IPCS alarm, XCP-620 2-5 CMPTR ROD DEV **Occurred at 51.8% during Work Week validation:** XCP-620 1-5 PR UP DET FLUX HI DEV AUTO DEFEAT	
	CRS	Refer to Alarm Response Procedure ARP-001-XCP-620 2-5	
		CORRECTIVE ACTIONS: 1. Observe the Digital Rod Position Indication display for proper rod positions. 2. Determine if the cause is a dropped or misaligned rod. 3. If DRPI ALARM URGENT is in refer to ARP-001-XCP-621, 2-1.	XCP-620 2-5
		SUPPLEMENTAL ACTIONS: 1. If a rod is misaligned, refer to AOP-403.5, Stuck or Misaligned Rod. 3. Operate the Rod Control System in MAN as described in SOP-403 until proper automatic Rod Control in restored. 4. Refer to Technical Specification 3.1.3.1.	XCP-620 2-5

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Event Description: Rod H14 stuck but trippable (blown fuse).

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: If the crew is having difficulty due to continuing with the power reduction while implementing AOP-403.5, consider having the Booth Operator direct stopping the downpower.			
BOOTH OPERATOR: If directed by the Lead Examiner: • Call the CRS as the SS. • Direct the CRS to hold power while implementing the AOP to realign rods.			
	CRS	Implement AOP-403.5, Stuck or Misaligned Rod.	
	CRS	Apply Technical Specification 3.1.3.1 Action d d. With one full length rod inoperable due to causes other than addressed by ACTION a., above, or misaligned from its group step counter demand height by more than12 steps (indicated position), POWER OPERATION may continue provided that within one hour either: 1. The rod is restored to OPERABLE status within the above alignment requirements, or ... 2. The remainder of the rods in the group with the inoperable rod are aligned to within 12 steps of the inoperable rod within one hour while maintaining the rod sequence and insertion limits specified in the CORE OPERATING LIMITS REPORT (COLR); the THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation, or ...	TS-3.1.3.1 Action d
IOA	RO	1 Place ROD CNTRL BANK SEL Switch in MAN.	AOP-403.5
IOA	RO	2 Check if Reactor Power is GREATER THAN OR EQUAL TO 5%.	AOP-403.5
IOA	BOP	3 Stabilize Main Turbine load/Steam Dumps demand.	AOP-403.5
*	CREW	4 Maintain Tavg within 5°F of Tref using the following: • Main Turbine load or Steam Dumps demand adjustment. • RCS Boration or Dilution. REFER TO SOP-106, REACTOR MAKEUP WATER SYSTEM.	AOP-403.5

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Event Description: Rod H14 stuck but trippable (blown fuse).

Time	Position	Applicant's Actions or Behavior	
		NOTE - Steps 5 through 16 Throughout the following steps, "AFFECTED" refers to any Rod Bank which contains a misaligned Control Rod.	AOP-403.5
	RO	5 Record the misaligned Control Rod and AFFECTED Bank: • Misaligned Rod: _____. • AFFECTED Bank: _____.	AOP-403.5
		NOTE - Step 6 Computer rod positions can be found at Group Display DRPIRODS.	AOP-403.5
	RO	6 Record the Control Rod positions and Group Step Counter demands: • Control Bank A DRPI: _____. Computer: _____. Demand Group 1: _____. Demand Group 2: _____. • Control Bank B DRPI: _____. Computer: _____. Demand Group 1: _____. Demand Group 2: _____. • Control Bank C DRPI: _____. Computer: _____. Demand Group 1: _____. Demand Group 2: _____. • Control Bank D DRPI: _____. Computer: _____. Demand Group 1: _____. Demand Group 2: _____. • Shutdown Bank A DRPI: _____. Computer: _____. Demand Group 1: _____. Demand Group 2: _____. • Shutdown Bank B DRPI: _____. Computer: _____. Demand Group 1: _____. Demand Group 2: _____.	AOP-403.5

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Event Description: Rod H14 stuck but trippable (blown fuse).

Time	Position	Applicant's Actions or Behavior	
	CRS	7 Notify the following plant personnel prior to moving Control Rods: • Management Duty Supervisor. • Rod Control System Engineer. • Reactor Engineering.	AOP-403.5
	CRS	8 Notify the I&C Department to investigate the cause of the Control Rod misalignment.	AOP-403.5
BOOTH OPERATOR: Acknowledge request for I&C support • Wait 3 minutes • Report as I&C "a blown lift coil fuse has been identified in Power Cabinet 1BD" • Request permission to replace blown fuse. • Insert TRIGGER 4 - Removes the blown fuse failure. • Report as I&C that the "blown lift coil fuse in Power Cabinet 1BD" was replaced			
CAUTION - Step 9 IF rod alignment could result in a mode change or a subcritical Reactor reaching criticality, then the plant shall be shut down to Mode 3.			AOP-403.5
	RO	9 Verify the misaligned Control Rod is NOT located on bottom of core.	AOP-403.5
	CRS	10 Provide Reactor Engineering with the following information: • Time Control Rod noticed to be AFFECTED: _____. • AFFECTED Control Rod location: _____. • Initial Reactor power level: _____. • Current Reactor power level: _____. • Current QPTR: _____.	AOP-403.5
Acknowledge request for Reactor Engineering support • Wait 2 minutes after being provided with the information from step 10. • Notify the CRS o Perform rod recovery at the current power level. o There is no restriction on rod withdrawal speed.			

Op Test No: NRC-ILO-13-01 Scenario # 2 Event # 4 Page: 28 of 55

Event Description: Rod H14 stuck but trippable (blown fuse).

Time	Position	Applicant's Actions or Behavior	
		NOTE - Step 11 This Step must be completed before continuing with Step 12.	AOP-403.5
	CRS	11 Obtain the following information from Reactor Engineering: • Power level at which recovery is to be performed: _____. • Rate of Control Rod movement during recovery: _____.	AOP-403.5
	RO	12 Rotate the ROD CNTRL BANK SEL Switch clockwise to the AFFECTED Bank position.	AOP-403.5
	RO	13 Check if the misaligned Control Rod can be moved: a. Monitor DRPI. b. Using the rate of Control Rod movement determined in Step 11, move the AFFECTED Bank six steps in the direction of the misaligned rod. c. Using the rate of Control Rod movement determined in Step 11, move the AFFECTED Bank six to eight steps in the direction of its original position.	AOP-403.5
		NOTE - Step 13.d Technical Specification 3.1.3.1 requires plant shutdown if a Control Rod can NOT be moved due to excessive friction or mechanical interference in Mode 1 or 2 OR is known to be untrippable.	AOP-403.5
	RO	d. Check if the misaligned Control Rod moved. e. Using the rate of Control Rod movement determined in Step 11, return the AFFECTED Bank to its original position.	AOP-403.5
	RO	14 If necessary, reduce Reactor power to the power level determined in Step 11. REFER TO GOP-4B, Power Operation (Mode 1 - Descending) or GOP-4C, Rapid Power Reduction.	AOP-403.5

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Event Description: Rod H14 stuck but trippable (blown fuse).

Time	Position	Applicant's Actions or Behavior	
	RO	15 Align the misaligned Control Rod with the AFFECTED Bank: a. At the CONTROL ROD DISCONNECT SWITCH BOX inside the MCB, place all Lift Coil Disconnect Switches for the AFFECTED Bank, except the switch for the misaligned Control Rod, to the ROD DISCONNECTED position. b. Dispatch an operator with the Rod Control Cabinets Key to the Rod Control Cabinet room (IB-463).	AOP-403.5
		NOTE - Step 15.c This step is only applicable for Control Banks.	AOP-403.5
		BOOTH OPERATOR: • Acknowledge request for a field operator. • Report you are located at the Rod Control Cabinet. • If directed to report to the Control Room for the key REPORT I&C is with you and they have a key. • Use INSIGHT ZCRFPA(6), REAL PA VALUE to PCSROD, for the P/A converter reading for the bank D.	
	NA	c. Locally at XCA4-CR, P/A CONVERTER CABINET (IB-463), record the P/A CONVERTER reading for the AFFECTED Bank: _____.	AOP-403.5
		NOTE - Step 15.d ROD CNTRL SYS FAIL URGENT (XCP-620 5-1), annunciator will alarm when a misaligned rod is moved in this step.	AOP-403.5
	RO	d. Using the rate of Control Rod movement determined in Step 11, move the misaligned Control Rod six steps in the direction of the AFFECTED Bank. e. Verify only the misaligned Control Rod moved. f. Using the rate of Control Rod movement determined in Step 11, continue moving the misaligned Control Rod until it is realigned with the AFFECTED Bank.	AOP-403.5

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Event Description: Rod H14 stuck but trippable (blown fuse).

Time	Position	Applicant's Actions or Behavior	
	RO	16 Reset the Group Step Counters and P/A CONVERTER: a. Reset the Bank Group Step Counters to indicate the Group Demands recorded in Step 6.	AOP-403.5
		NOTE - Step 16.b This step is only applicable for Control Banks.	AOP-403.5
		BOOTH OPERATOR: When directed - reset P/A converter using Remote Functions • Insert LOA-CRF005, P/A MAN HEIGHT VALUE (USE BEFORE SETTING LOA CRF1), to the value recorded in step 15. • Insert LOA-CRF001, P/A MAN BANK SELECT (USE AFTER SETTING LOA CRF5), to CB D.	
		b. Locally at XCA4-CR, P/A CONVERTER CABINET (IB-463), reset the P/A CONVERTER as follows: 1) Ensure the Bank Position Display Switch is in the AFFECTED Bank position. 2) Place MANUAL/AUTOMATIC Switch in MANUAL. 3) Depress the UP or DOWN Pushbutton to reset the P/A CONVERTER to the reading recorded in Step 15. 4) Place the MANUAL/AUTOMATIC Switch in AUTOMATIC. 5) Place the Bank Position Display Switch to DISPLAY OFF.	AOP-4
		NOTE - Step 17 If the Control Rods are near the All Rods Out position, SOP-403, ROD CONTROL AND POSITION INDICATING SYSTEM, should be used for final alignment.	AOP-403.5

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Event Description: Rod H14 stuck but trippable (blown fuse).

Time	Position	Applicant's Actions or Behavior	
	BOP	17 Restore the Rod Control System to normal alignment: a. Place all Lift Coil Disconnect Switches to the ROD CONNECTED position. b. Rotate the ROD CNTRL BANK SEL Switch counter-clockwise to MAN. c. Depress the ROD CNTRL ALARM RESET Pushbutton. d. Verify the ROD CNTRL SYS FAIL URGENT (XCP-620 5-1), annunciator clears.	AOP-403.5
EVALUATOR NOTE: Initiate the next event after rod alignment has been restored.			

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Event Description: PT-508 (MFW Pump Discharge Header Pressure) Fails LOW. (Manual control of MFW Pp speed)

Time	Position	Applicant's Actions or Behavior	
		BOOTH OPERATOR: When directed, insert Event 5 (TRIGGER 5)	
		EVALUATOR NOTE: On cue from the Examiner, a Main Feedwater Header Pressure transmitter will fail LOW causing the MFW Pump speed to increase and raise SG level. The operators will respond to annunciators and implement AOP-210.3, Feedwater Pump Malfunction. The BOP will take manual control of the master Speed control and adjust speed to maintain Feedwater Pump discharge pressure 150 to 250 psi greater than Main Steam Header pressure and restore SG levels.	
		Indications Available: XCP-624 1-5; 2-5; 3-5, SG LVL DEV XCP-624 4-4, 5-4, 6-4, FWF>STF MISMATCH	
	CREW	Responds to multiple SG LVL DEV alarms and/or change in feedwater flow.	
		EVALUATOR NOTE: The crew may first enter an ARP but could go directly to AOP-210.3, FEEDWATER PUMP MALFUNCTION, based on multiple alarms or early diagnosis.	
	CRS	Enters ARP-001-XCP-624 1-5 or 2-5 or 3-5	
	BOP	**CORRECTIVE ACTIONS:** 1. If required, restore Steam Generator A level to between 60% and 65% by performing either or both of the following: a. Manually control PVT-478, SG A FWF, as required. b. Manually control Feedwater Pump speed as follows: 1) Place the Feedwater Pump MASTER SPEED CNTRL in MAN. 2) Adjust the differential pressure between Feedwater Pump discharge header pressure and Main Steam header pressure, as required, to restore Steam Generator water level.	XCP-624 1-5

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Event Description: PT-508 (MFW Pump Discharge Header Pressure) Fails LOW. (Manual control of MFW Pp speed)

Time	Position	Applicant's Actions or Behavior	
	BOP	2. Evaluate SG A Narrow Range level indicators LI-474, LI-475, and LI-476: a. For increasing level: 1) At 70% Narrow Range level: (a) During startups (below 15% power) close the Feed Regulating valves with the B Train Switches. (b) When above 15% power take manual control of PVT-478, SG A FWF. (c) Ensure Feed Flow is 200 kbh to 400 kbh less than Steam Flow. 2) At 75% Narrow Range level: (a) Trip the Reactor if above 15% power. (b) Close the Feed Isolation valves. (c) Trip the Turbine. (d) Trip the Feed Pumps. (e) Close the Feedwater Regulating valves, if not closed earlier. (f) If the Reactor has NOT been tripped, reduce power to between 1% and 3% (g) Reestablish Emergency Feed.	XCP-624 1-5
	CRS	3. If FCV-478, A FCV, malfunctioned go to AOP-210.1, Feedwater Flow Control Valve Failure. **(NO)**	XCP-624 1-5
	CRS	4. If a Main Feedwater Pump has tripped or is malfunctioning go to AOP-210.3, Feedwater Pump Malfunction.	XCP-624 1-5
	CRS	Implements AOP-210.3, Feedwater Pump Malfunction.	

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Event Description: PT-508 (MFW Pump Discharge Header Pressure) Fails LOW. (Manual control of MFW Pp speed)

Time	Position	Applicant's Actions or Behavior	
		REFERENCE PAGE FOR AOP-210.3	AOP-210.3
		1 Manual Control of Main Feedwater Regulating Valves is permissible at any time as deemed necessary during the performance of this procedure. If a Main Feedwater Regulating Valve has been placed in Manual it should be returned to Automatic as soon as possible.	
		2 IF only one Main Feedwater Pump is operating and cannot be controlled THEN trip the Main Turbine and go to AOP-214.1, TURBINE TRIP.	
		3 IF Narrow Range SG level decreases to LESS THAN 40%, THEN Trip the reactor and enter EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION.	
		4 IF Reactor Power is GREATER THAN 15% and NR Steam Generator level exceeds 75%, THEN Trip the reactor and enter EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION.	
IOA	BOP	1 Verify at least one Feedwater Pump is running.	AOP-210.3
IOA	BOP	2 Check if a Feedwater Pump trip occurred. **(NO)** **ALTERNATIVE ACTION** 2 GO TO Step 4.	AOP-
IOA	BOP	4 Check Main Feedwater Pump operation. a. Verify all Main Feedwater Pumps are affected. b. Place the MCB MASTER SPEED CNTRL in MAN. and adjust the MCB MASTER SPEED CNTRL as necessary to match Steam Flow and Feedwater Flow.	AOP-210.3
	BOP	5 If necessary, place the Main Feed Regulating valves in Manual.	AOP-210.3
		NOTE - Step 6 Due to the slow operation of the Main Feedwater Pump Recirculation Valves, a constant Main Feedwater Pump speed should be maintained until the recirculation valves have become relatively stable while adjusting Feedwater Flow.	AOP-210.3

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Event Description: PT-508 (MFW Pump Discharge Header Pressure) Fails LOW. (Manual control of MFW Pp speed)

Time	Position	Applicant's Actions or Behavior	
*		6 Maintain Narrow Range Steam Generator Water level between 60% and 65%	AOP-210.3
EVALUATOR NOTE: Manual speed control will be maintained for the remainder of the scenario.			
EVALUATOR NOTE: The NEXT EVENT may be initiated after the Main Feedwater Pump Master speed controller is in manual.			
		7 WHEN conditions allow, Place Main Feed Regulating valves in AUTO.	AOP-210.3
		NOTE - Step 8 Main Feedwater Program ΔP should be established using the following as available: • PI-508, FW PP DISCH HDR PRESS PSIG. • Any operating Main Feedwater Pump Discharge Pressure. • PI-464C, MS HDR PRESS PSIG. • Any available MCB Main Steam Header Pressure. • IPCS (ZZMENU S/G SU Trend or FW Start)	AOP-210.3
		8 Restore Feedwater Pump D/P to program. a. Using the Feedwater Pump Speed Control method established in Step 4, slowly adjust Feedwater Pump discharge header pressure to within the limits of ATTACHMENT 1, FEEDWATER PUMP D/P LIMITS. b. Adjust PUMP A(B)(C) SPEED CNTRL (MCB M/A Stations) as necessary to balance all operating Feedwater Pumps speed to within 120 rpm of each other.	AOP-210.3

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Event Description: "A" Main Steamline Break inside the RB due to a seismic event. Generator breaker failure. "A" and "B" MSIVs fail to close.

Time	Position	Applicant's Actions or Behavior

BOOTH OPERATOR: When directed, initiate Event 6 (TRIGGER 6).

EVALUATOR NOTE (EVENT 6):
On cue from the Examiner, a steamline break inside the Reactor Building will be inserted. The Reactor will trip and the crew will implement EOP-1.0 (E-0) Reactor Trip/Safety Injection Actuation. The crew will identify that at least one Steam generator is faulted and transition to EOP-3.0 (E-2), Faulted Steam Generator Isolation. When the faulted SG is isolated the crew will transition to EOP-1.2 (ES-1.1), Safety Injection Termination.

The crew will identify that the Main Generator Output Breaker failed to automatically trip and the BOP will manually open the breaker from the control board.

The BOP must identify that the MSIVs are open and manually close them from the control board to isolate the faulted Steam Generator and prevent over-pressurization of the Reactor Building.

Indications Available:

XCP-621 3-2 RODS ON BOTTOM
XCP-624 2-4 STMLN PRESS LO
XCP-626 4-1 STM PRESS LO SI
XCP-626 6-1 RB PRESS HI-1 SII

Op Test No: NRC-ILO-13-01 Scenario # 2 Event # 6 Page: 37 of 55

Event Description: "A" Main Steamline Break inside the RB due to a seismic event. Generator breaker failure. "A" and "B" MSIVs fail to close.

Time	Position	Applicant's Actions or Behavior
		REFERENCE PAGE FOR EOP-1.0 EOP-1.0

1 RCP TRIP CRITERIA

a. IF Phase B Containment Isolation has actuated (XCP-612 4-2), THEN trip all RCPs.

b. IF both of the following conditions occur, THEN trip all RCPs:

- SI flow is indicated on FI-943, CHG LOOP B CLD/HOT LG FLOW GPM.

AND

- RCS Wide Range pressure is LESS THAN 1418 psig.

2 REDUCING CONTROL ROOM EMERGENCY VENTILATION

Reduce Control Room Emergency Ventilation to one train in operation within 30 minutes of actuation. REFER TO SOP-505, CONTROL BUILDING VENTILATION SYSTEM.

3 MONITOR SPENT FUEL COOLING

Periodically check status of Spent Fuel Cooling by monitoring the following throughout event recovery:

- Spent Fuel Pool level.
- Spent Fuel Pool temperature.

NOTE EOP-1.0

- Steps 1 through 5 are Immediate Operator Actions.
- The EOP REFERENCE PAGE should be monitored throughout the use of this procedure.
- Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.

IOA	RO	1 Verify Reactor Trip: • Trip the Reactor using either Reactor Trip Switch. • Verify all Reactor Trip and Bypass Breakers are open. • Verify all Rod Bottom Lights are lit. • Verify Reactor Power level is decreasing.	EOP-1.0

Op Test No: NRC-ILO-13-01 Scenario # 2 Event # 6 Page: 38 of 55

Event Description: "A" Main Steamline Break inside the RB due to a seismic event. Generator breaker failure. "A" and "B" MSIVs fail to close.

Time	Position	Applicant's Actions or Behavior	
IOA	BOP	2 Verify Turbine/Generator Trip: a. Verify all Turbine STM STOP VLVs are closed.	EOP-1.0
EVALUATOR NOTE: The GEN BKR and GEN FIELD BKR are failed and need to be manually opened.			
IOA	BOP	b. Ensure Generator Trip (after 30 second delay): 1) Ensure the GEN BKR is open. **(NO)** 2) Ensure the GEN FIELD BKR is open. **(NO)** 3) Ensure the EXC FIELD CNTRL is tripped.	EOP-1.0
IOA	BOP	3 Verify both ESF buses are energized.	EOP-1.0
IOA	RO	4 Check if SI is actuated: a. Check if either: • SI ACT status light is bright on XCP-6107 1-1. OR • Any red first-out SI annunciator is lit on XCP-626 top row. b. Actuate SI using either SI ACTUATION Switch. c. GO TO Step 6.	EOP-1.
EVALUATOR NOTE: Attachment 3, SI Equipment Verification, is attached (Page 51).			
	BOP	6 Initiate ATTACHMENT 3, SI EQUIPMENT VERIFICATION.	EOP-1.0
	CREW	7 Announce plant conditions over the page system.	EOP-1.0

Op Test No: NRC-ILO-13-01 Scenario # 2 Event # 6 Page: 39 of 55

Event Description: "A" Main Steamline Break inside the RB due to a seismic event. Generator breaker failure. "A" and "B" MSIVs fail to close.

Time	Position	Applicant's Actions or Behavior	
*	RO	8 Verify RB pressure has remained LESS THAN 12 psig on PR-951, RB PSIG (P-951), red pen. **(NO)**	EOP-1.0
		ALTERNATIVE ACTION	
		8 Perform the following:	
		a) Verify both the following annunciators are lit: • XCP-612 3-2 (RB SPR ACT). • XCP-612 4-2 (PHASE B ISOL). IF either annunciator is NOT lit, THEN actuate RB Spray by placing the following switches to ACTUATE: • Both CS-SGA1 and CS-SGA2. OR • Both CS-SGB1 and CS-SGB2.	
		b) Verify Phase B Isolation by ensuring RB SPRAY/PHASE B ISOL monitor lights are bright on XCP-6105.	
		c) Ensure the following are open: • MVG-3001A(B), RWST TO SPRAY PUMP A(B) SUCT. • MVG-3002A(B), NAOH TO SPRAY PUMP A(B) SUCT. • MVG-3003A(B), SPRAY HDR ISOL LOOP A(B).	
		d) Ensure both RB Spray Pumps are running.	
		e) Verify RB Spray flow is GREATER THAN 2500 gpm for each operating train on: • FI-7368, SPR PP A DISCH FLOW GPM. • FI-7378, SPR PP B DISCH FLOW GPM.	
		f) Stop all RCPs.	

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Event Description: "A" Main Steamline Break inside the RB due to a seismic event. Generator breaker failure. "A" and "B" MSIVs fail to close.

Time	Position	Applicant's Actions or Behavior	
*	RO	9 Check RCS temperature: • With any RCP running, RCS Tavg is stable at OR trending to 557°F. OR • With no RCP running, RCS Tcold is stable at OR trending to 557°F. **ALTERNATIVE ACTION** 9 IF RCS temperature is LESS THAN 557°F AND decreasing, THEN stabilize temperature by performing the following as required: a) Close IPV-2231, MS/PEGGING STM TO DEAERATOR. b) Perform one of the following: • IF Narrow Range SG level is LESS THAN 41% in all SGs, THEN reduce EFW flow as necessary to stop cooldown, while maintaining total EFW flow GREATER THAN 450 gpm. OR • WHEN Narrow Range SG level is GREATER THAN 41% in at least one SG, THEN control EFW flow as necessary to stabilize RCS temperature at 557°F.	EOP-1.0
EVALUATOR NOTE: Attachment 6, Steam Valve Isolation, is attached (Page 55).			
		c) Initiate ATTACHMENT 6, STEAM VALVE ISOLATION, while continuing with this procedure.	
EVALUATOR NOTE: Close "A" or "B" MSIV Prior to Orange path on Integrity or Containment.			

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Event Description: "A" Main Steamline Break inside the RB due to a seismic event. Generator breaker failure. "A" and "B" MSIVs fail to close.

Time	Position	Applicant's Actions or Behavior	
* Critical Task	RO	d) IF RCS cooldown continues, THEN close: • MS Isolation Valves, PVM-2801A(B)(C). • MS Isolation Bypass Valves, PVM-2869A(B)(C).	EOP-1.0
	RO	10 Check PZR PORVs and Spray Valves: a. PZR PORVs are closed. b. PZR Spray Valves are closed. c. Verify power is available to at least one PZR PORV Block Valve: • MVG-8000A, RELIEF 445 A ISOL. • MVG-8000B, RELIEF 444 B ISOL. • MVG-8000C, RELIEF 445 B ISOL. d. Verify at least one PZR PORV Block Valve is open.	EOP-1.0
		NOTE - Step 11 Seal Injection flow should be maintained to all RCPs.	EOP-1.0
	RO	11 Check if RCPs should be stopped: a. Check if either of the following criteria is met: • Annunciator XCP-612 4-2 is lit (PHASE B ISOL). OR • RCS pressure is LESS THAN 1418 psig AND SI flow is indicated on FI-943, CHG LOOP B CLD/HOT LG FLOW GPM. b. Stop all RCPs.	EOP-1.0

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Event Description: "A" Main Steamline Break inside the RB due to a seismic event. Generator breaker failure. "A" and "B" MSIVs fail to close.

Time	Position	Applicant's Actions or Behavior	
	RO	12 Verify no SG is FAULTED: • No SG pressure is decreasing in an uncontrolled manner. • No SG is completely depressurized. **ALTERNATIVE ACTION** 12 GO TO EOP-3.0, FAULTED STEAM GENERATOR ISOLATION, Step 1.	EOP-1.0
	CRS	Implement EOP-3.0, Faulted Steam Generator Isolation, Step 1.	
EVALUATOR NOTE: If EFW pump runout protection has occurred, the CRS may enter and exit EOP-15.0, Response To Loss Of Secondary Heat Sink.			
CAUTION • At least one SG must be maintained available for RCS cooldown. • Any FAULTED SG or secondary break should remain isolated during subsequent recovery actions unless needed for RCS cooldown, to prevent reinitiating the break.			EOP-3.0
NOTE Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.			EOP-3.0
	BOP	1 Ensure all the following are closed: • MS Isolation Valves, PVM-2801A(B)(C). • MS Isolation Bypass Valves, PVM-2869A(B)(C).	EOP-3.0
	BOP	2 Check if any SG is NON-FAULTED: • Pressure in any SG is stable OR increasing. • Any SG is NOT completely depressurized.	EOP-3.0

Op Test No: NRC-ILO-13-01 Scenario # 2 Event # 6 Page: 43 of 55

Event Description: "A" Main Steamline Break inside the RB due to a seismic event. Generator breaker failure. "A" and "B" MSIVs fail to close.

Time	Position	Applicant's Actions or Behavior	
	BOP	3 Identify any FAULTED SG(s): • Any SG pressure decreasing in an uncontrolled manner. OR • Any SG completely depressurized.	EOP-3.0
	BOP	4 Close the following for each FAULTED SG: • FW Flow Control, FCV-478. • FW Isolation, PVG-1611A. • SG Blowdown, PVG-503A. • FW Flow Control Bypass, FCV-3321.	EOP-3.0
	BOP	5 Complete the isolation of each FAULTED SG: a. Close SG Chemical Feed Isolation, MVK-1633A. b. Close MS Drain Isolation, PVT-2843A. c. Close MS Drain Isolation, PVT-2877A for SG A PVT-2877B for SG C. d. Place the Steamline PWR RELIEF A SETPT Controller(s) in MAN and closed. e. Place the Steamline Power Relief A Mode Switch(s) in PWR RLF.	EOP-3.0
CRITICAL TASK	BOP	f. Close FCV-3531, MD EFP TO SG A. g. Close FCV-3536, TD EFP TO SG A.	EOP-3.0
		CAUTION - Step 5.h If the TD EFW Pump is the only available source of feed flow, the steam supply to the TD EFW Pump must be maintained from at least one SG, to maintain a secondary heat sink.	EOP-3.0
	BOP	h. Close and locally deenergize the appropriate valve if SG B or SG C is FAULTED: **(NA)**	EOP-3.0

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Event Description: "A" Main Steamline Break inside the RB due to a seismic event. Generator breaker failure. "A" and "B" MSIVs fail to close.

Time	Position	Applicant's Actions or Behavior	
		NOTE - Step 6 Any high radiation level received on a radiation monitor that was unisolated at event initiation, may be considered a valid alarm.	EOP-3.0
	CRS	6 Check if Secondary radiation levels are normal: a. Check radiation levels normal on all unisolated radiation monitors: • RM-G19A(B)(C), STMLN HI RNG GAMMA. • RM-L3, STEAM GENERATOR BLOWDOWN LIQUID MONITOR. • RM-L10, SG BLOWDOWN CW DISCHARGE LIQUID MONITOR. • RM-A9, CNDSR EXHAUST GAS ATMOS MONITOR.	EOP-3.0
		BOOTH OPERATOR: Acknowledge request for Chemistry to sample and frisk samples for abnormal activity.	
		b. Notify Chemistry to sample all SG secondary sides, and screen samples for abnormal activity using a frisker.	EOP-3.0
	CRS	7 Check if SI flow should be reduced: a. RCS subcooling on TI-499A(B), A(B) TEMP °F, is GREATER THAN 52.5°F [67.5°F]. b. Secondary Heat Sink is adequate: • Total EFW flow to INTACT SGs is GREATER THAN 450 gpm. OR • Narrow Range level is GREATER THAN 41% in at least one INTACT SG. c. RCS pressure is stable OR increasing. d. PZR level is GREATER THAN 28%.	EOP-3.0

Op Test No: NRC-ILO-13-01 Scenario # 2 Event # 6 Page: 45 of 55

Event Description: "A" Main Steamline Break inside the RB due to a seismic event. Generator breaker failure. "A" and "B" MSIVs fail to close.

Time	Position	Applicant's Actions or Behavior	
	RO	8 Reset both SI RESET TRAIN A(B) Switches.	EOP-3.0
	RO	9 Reset Containment Isolation: • RESET PHASE A - TRAIN A(B) CNTMT ISOL. • RESET PHASE B - TRAIN A(B) CNTMT ISOL.	EOP-3.0
	BOP	10 Place both ESF LOADING SEQ A(B) RESETS to: a. NON-ESF LCKOUTS. b. AUTO-START BLOCKS.	EOP-3.0
	BOP	11 Establish Instrument Air to the RB: a. Start one Instrument Air Compressor and place the other in Standby. b. Open PVA-2659, INST AIR TO RB AIR SERV. c. Open PVT-2660, AIR SPLY TO RB.	EOP-3.0
	CRS	12 GO TO EOP-1.2, SAFETY INJECTION TERMINATION, Step 1.	EOP-3.0

Op Test No: NRC-ILO-13-01 Scenario # 2 Event # 6 Page: 46 of 55

Event Description: "A" Main Steamline Break inside the RB due to a seismic event. Generator breaker failure. "A" and "B" MSIVs fail to close.

Time	Position	Applicant's Actions or Behavior

EOP-1.2

REFERENCE PAGE FOR EOP-1.2

1 SI REINITIATION CRITERIA

Following SI termination, IF either of the following conditions occurs, THEN start Charging Pumps and operate valves as necessary, and **GO TO EOP-2.0, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:**

- RCS subcooling on TI-499A(B), A(B) TEMP °F, is LESS THAN 52.5°F [67.5°F].

OR

- PZR level can NOT be maintained GREATER THAN 10% [28%].

2 SECONDARY INTEGRITY TRANSITION CRITERIA

IF any unisolated SG pressure is decreasing in an uncontrolled manner OR is completely depressurized, THEN **GO TO EOP-3.0, FAULTED STEAM GENERATOR ISOLATION, Step 1.**

3 REDUCING CONTROL ROOM EMERGENCY VENTILATION

Reduce Control Room Emergency Ventilation to one train in operation within 30 minutes of actuation. **REFER TO SOP-505, CONTROL BUILDING VENTILATION SYSTEM.**

NOTE

The EOP REFERENCE PAGE should be monitored throughout the use of this procedure.

EOP-1.2

	RO	1 Stop all but one Charging Pump and place in Standby.	EOP-1.2
	RO	2 Verify RCS pressure is stable OR increasing.	EOP-1.2

Op Test No: NRC-ILO-13-01 Scenario # 2 Event # 6 Page: 47 of 55

Event Description: "A" Main Steamline Break inside the RB due to a seismic event. Generator breaker failure. "A" and "B" MSIVs fail to close.

Time	Position	Applicant's Actions or Behavior	
	RO	3 Establish Normal Charging: a. Close FCV-122, CHG FLOW. b. Open both MVG-8107 and MVG-8108, CHG LINE ISOL. c. Adjust FCV-122, CHG FLOW, to obtain 70 gpm Charging flow. d. Close both MVG-8801A(B), HI HEAD TO COLD LEG INJ.	EOP-1.2

EVALUATOR NOTE: The scenario may be terminated now the Safety Injection has been terminated (i.e. normal charging restored).

Op Test No: NRC-ILO-13-01 Scenario # 2 Event # NA Page: 48 of 55

Event Description: SOP-106 III.F. BORATE OPERATIONS

Time	Position	Applicant's Actions or Behavior	
		NOTE 2.0 1. Energizing additional Pressurizer Heaters will enhance mixing. 2. LCV-115A, LTDN DIVERT TO HU-TK, will begin to modulate to the HU-TK position at 70% level on LI-115, VCT LEVEL %.	SOP-106 III.F
	RO	2.1 Ensure at least one Reactor Coolant Pump is running.	SOP-106 III.F
	RO	2.2 Place RX COOL SYS MU switch to STOP.	SOP-106 III.F
	RO	2.3 Place RX COOL SYS MU MODE SELECT switch to BOR.	SOP-106 III.F
	RO	2.4 Set FIS-113, BA TO BLNDR FLOW, batch integrator to the desired volume.	SOP-106 III.F
	RO	2.5 Place RX COOL SYS MU switch to START.	SOP-106 III.F
		NOTE 2.6 Step 2.6 may be omitted when borating less than 10 gallons.	SOP-106 III.F
	RO	2.6 Place FCV-113 A&B, BA FLOW, controller in AUTO.	SOP-106 III.F
		NOTE 2.7 The AUTO setpoint dial for FCV-113A&B, BA FLOW, controller may be adjusted slowly to obtain the desired flow rate.	SOP-106 III.F
	RO	2.7 Verify the desired Boric Acid flow rate on FR-113, BA TO BLNDR GPM (F-113).	SOP-106 III.F
	RO	2.8 When the preset volume of boric acid has been reached, perform the following: a. Place FCV-113A&B, BA flow controller in MAN. b. Verify boration stops.	SOP-106 III.F
	RO	2.9 Place RX COOL SYS MU switch to STOP.	SOP-106 III.F
		NOTE 2.10 a. If plant conditions require repeated borations, Step 2.10 may be omitted. b. The volume in the piping between the blender and the VCT outlet is approximately 3.8 gallons.	SOP-106 III.F

Op Test No: NRC-ILO-13-01 Scenario # 2 Event # NA Page: 49 of 55

Event Description: SOP-106 III.F. BORATE OPERATIONS

Time	Position	Applicant's Actions or Behavior	
	RO	2.10 Alternate Dilute 4 to 6 gallons of Reactor Makeup Water to flush the line down stream of the blender by performing the following: a. Place RX COOL SYS MU MODE SELECT switch to ALT DIL. b. Adjust FCV-168, TOTAL MU FLOW SET PT, to desired flow rate. c. Set FIS-168, TOTAL MU FLOW, batch integrator to desired volume. d. Place RX COOL SYS MU switch to START. e. Verify desired flow rate on FR-113, TOTAL MU GPM (F-168). f. Verify alternate dilution stops when preset volume is reached on FIS-168, TOTAL MU FLOW, batch integrator. g. Place RX COOL SYS MU switch to STOP.	SOP-106 III.F
	RO	2.11 Place RX COOL SYS MU MODE SELECT switch to AUTO.	SOP-106 III.F
	RO	2.12 Adjust FCV-168, TOTAL MU FLOW SET PT, to 7.5 (120 gpm).	SOP-106 III.F
	RO	2.13 In MAN, adjust FCV-113 A&B, BA FLOW OUTPUT, to the required position which will ensure proper Boric Acid addition for subsequent Automatic Makeup operations.	SOP-106 III.F
	RO	2.14 Adjust FCV-113A&B, BA FLOW SET PT, to the desired position to ensure proper boric acid addition for subsequent Automatic Makeup operations.	SOP-106 III.F
	RO	2.15 Place RX COOL SYS MU switch to START.	SOP-106 III.F
	RO	2.16 Perform the following: a. Start XPP-13A(B), BA XFER PP A(B), for the in-service Boric Acid Tank. b. If necessary, start XPP-13A(B), BA XFER PP A(B), for the Boric Acid Tank on recirculation.	SOP-106 III.F
END OF SECTION			SOP-106 III.F

Op Test No: NRC-ILO-13-01	Scenario # 2	Event # NA	Page: 50 of 55

Event Description: SOP-106 IV.D. BORATING THE RCS USING THE EMERGENCY BORATE VALVE

Time	Position	Applicant's Actions or Behavior	
		CAUTION 2.0	SOP-106 IV.D
		AOP-106.1, Emergency Boration, should be used for any of the following: a. Failure of the Reactor Makeup Control System such that bypass is necessary to accomplish boration. b. Uncontrolled cooldown with Safety Injection NOT required. c. ANY questionable Shutdown Margin. d. Control Rod Insertion Limit is exceeded.	
	RO	2.1 Open MVT-8104, EMERG BORATE.	SOP-106 IV.D
	RO	2.2 Ensure XPP-13A(B), BA XFER PP A(B), is running.	SOP-106 IV.D
	RO	2.3 Verify greater than 30 gpm flow on FI-110, EMERG BORATE FLOW GPM.	SOP-106 IV.D
	RO	2.4 When boration is no longer required, perform the following: a. Close MVT-8104, EMERG BORATE. b. Verify no flow on FI-110, EMERG BORATE FLOW GPM.	SOP-106 IV.D
		END OF SECTION	SOP-106 IV.D

Op Test No: NRC-ILO-13-01 Scenario # 2 Event # NA Page: 51 of 55

Event Description: SOP-214 III.D. Turbine Load Reduction/Shutdown

Time	Position	Applicant's Actions or Behavior	
	BOP	2.1 Ensure the Control/Load screen is selected.	SOP-214
		NOTE 2.2 The turbine will come off the limiter and turbine load will lower once Load Set Reference is less than Load Limit Reference. Acknowledging dialog boxes is "skill of the Craft".	SOP-214
	BOP	2.2 To lower Turbine Load using Load Set, perform the following: a. If directed by Operations Management, disable the Turbine Vibration Trips per Section III. b. Select (or enter) the desired Rate %/min on Load Set. c. Select Load on Load Set (a dialog box will open). d. Enter the desired load and confirm. e. Verify proper system response. f. If during a load reduction, it is desired to stop the load reduction, perform the following: 1) Select Hold on Load Set. 2) Select the desired Rate %/min to resume load reduction. 3) If desired, place LOAD LIMIT in service per Section III.	SOP-214
	BOP	2.3 For rapid load shedding of 50 MWe, on an HMI keypad select Ctrl + Alt + S.	SOP-214
EVALUATOR NOTE: The remainder of this section deals with actions after Turbine Load is below 15%.			

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Event Description: EOP-1.0, Attachment 3

Time	Position	Applicant's Actions or Behavior	
	BOP	1 Ensure EFW Pumps are running: a. Ensure both MD EFW Pumps are running. b. Verify the TD EFW Pump is running if necessary to maintain SG levels.	EOP-1.0 Attachment 3
	BOP	2 Ensure the following EFW valves are open: • FCV-3531(3541)(3551), MD EFP TO SG A(B)(C). • FCV-3536(3546)(3556), TD EFP TO SG A(B)(C). • MVG-2802A(B), MS LOOP B(C) TO TD EFP.	Attachment 3
	BOP	3 Verify total EFW flow is GREATER THAN 450 gpm.	Attachment 3
	BOP	4 Ensure FW Isolation: a. Ensure the following are closed: • FW Flow Control, FCV-478(488)(498). • FW Isolation, PVG-1611A(B)(C). • FW Flow Control Bypass, FCV-3321(3331)(3341). • SG Blowdown, PVG-503A(B)(C). • SG Sample, SVX-9398A(B)(C). b. Ensure all Main FW Pumps are tripped.	Attachment 3
	BOP	5 Ensure SI Pumps are running: • Two Charging Pumps are running. • Both RHR Pumps are running.	Attachment 3
	BOP	6 Ensure two RBCU Fans are running in slow speed (one per train).	Attachment 3
	BOP	7 Verify Service Water to the RBCUs: a. Ensure two Service Water Pumps are running. b. Verify both Service Water Booster Pumps A(B) are running. c. Verify GREATER THAN 2000 gpm flow for each train on: • FI-4466, SWBP A DISCH FLOW GPM. • FI-4496, SWBP B DISCH FLOW GPM.	Attachment 3
	BOP	8 Verify two CCW Pumps are running.	Attachment 3

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Event Description: EOP-1.0, Attachment 3

Time	Position	Applicant's Actions or Behavior	
	BOP	9 Ensure two Chilled Water Pumps and Chillers are running.	Attachment 3
	BOP	10 Verify both trains of Control Room Ventilation are running in Emergency Mode.	Attachment 3
EVALUATOR NOTE: It is a critical task to close the "A" or "B" MSIV Prior to Orange path on Integrity or RB pressure.			
CRITICAL TASK	BOP	11 Check if Main Steamlines should be isolated: a. Check if any of the following conditions are met: • RB pressure GREATER THAN 6.35 psig. OR • Steamline pressure LESS THAN 675 psig. OR • Steamline flow GREATER THAN 1.6 MPPH AND Tavg LESS THAN 552°F. b. Ensure all the following are closed: • MS Isolation Valves, PVM-2801A(B)(C). • MS Isolation Bypass Valves, PVM-2869A(B)(C).	Attachment 3
	BOP	12 Ensure Excess Letdown Isolation Valves are closed: • PVT-8153, XS LTDN ISOL. • PVT-8154, XS LTDN ISOL.	Attachment 3
	BOP	13 Verify ESF monitor lights indicate Phase A AND Containment Ventilation Isolation on XCP-6103, 6104, and 6106. REFER TO ATTACHMENT 4, CONTAINMENT ISOLATION VALVE MCB STATUS LIGHT LOCATIONS, as needed.	Attachment 3

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Event Description: EOP-1.0, Attachment 3

Time	Position	Applicant's Actions or Behavior
	BOP	14 Verify proper SI alignment: a. Verify SI valve alignment by verifying SAFETY INJECTION/PHASE A ISOL monitor lights are bright on XCP-6104. b. Verify all SAFETY INJECTION monitor lights are dim on XCP-6106. c. Verify SI flow on FI-943, CHG LOOP B CLD/HOT LG FLOW GPM. d. Check if RCS pressure is LESS THAN 325 psig.
	BOP	Report completion of Attachment 3.
EVALUATOR NOTE: ATTACHMENT 3 is complete.		

Attachment 3

Op Test No: NRC-ILO-13-01 Scenario # 2 Event # NA Page: 55 of 55

Event Description: EOP-1.0, STEAM VALVE ISOLATION, Attachment 6

Time	Position	Applicant's Actions or Behavior	
	BOP	1 Close Feedwater Pump TURB DRN VLVs: • MOV-1-5A. • MOV-1-5B. • MOV-1-5C.	EOP-1.0 Attachment 6
	BOP	2 Close the following turbine drain valves: • MVG-2896A, SV-1 BSD. • MVG-2896B, SV-2 BSD. • MVG-2896C, SV-3 BSD. • MVG-2896D, SV-4 BSD.	EOP-1.0 Attachment 6
	BOP	3 Ensure the following drain valves are in AUTO: • PVT-2851A,B,C,D, MS LINES TO TURB DRN. • PVT-2713A,B,C,D, STM DUMP DRN BYP. • PVT-2870, TO MSR A & B DRN. • PVT-2875, TO MSR A & B DRN. • PVT-2845A,B,C, PVT-2824, PVT-2879A,B, LINE DRN. • PVT-2838A,B, HDR DRNS.	EOP-1.0 Attachment 6
	BOP	4 Place the STM DUMP CNTRL Controller in MAN and CLOSED.	EOP-1.0 Attachment 6
	BOP	5 Place the STM DUMP MODE SELECT Switch in STM PRESS.	EOP-1.0 Attachment 6
	BOP	6 Place the STM DUMP CNTRL Controller in AUTO.	EOP-1.0 Attachment 6
*	BOP	7 WHEN the Condenser is NOT available, THEN perform the following: a. Place the Steamline Power Relief A(B)(C) Mode Switches in PWR RLF. b. Adjust the PWR RELIEF A(B)(C) SETPT Controllers as necessary to control RCS temperature.	EOP-1.0 Attachment 6
	BOP	8 Verify proper response of all Steamline PORVs and Condenser Steam Dumps for existing plant conditions.	EOP-1.0 Attachment 6
	BOP	9 Ensure SG Blowdown Valves, PVG-503A(B)(C), are closed.	EOP-1.0 Attachment 6
	BOP	10 If desired, drain valves may be aligned per Shift Supervisor discretion based on current and expected plant status.	EOP-1.0 Attachment 6

Facility: VC SUMMER Scenario No: 3 Op Test No: NRC-ILO-13-01

Examiners: _____ Operators: CRS: _____

_____ RO: _____

_____ BOP: _____

Initial Conditions:
- 100% MOL.
- "B1" Train Work Week.
- Alternate Seal Injection is OOS.
- Thermography of transformer disconnects is in progress in the switchyard.

Turnover:
- Maintain 100% power.

Critical Tasks:
- Start Back-up EHC Pump prior to a Rx/Turbine Trip on Low EHC Pressure.
- Manually control "C" SG Feedwater without a Rx/Turbine Trip on SG Level.
- Manually trip the Reactor prior to completion of Immediate Actions of EOP-1.0 (E-0).
- Establish feed flow to at least one SG before RCS feed and bleed criteria is met.

Event No.	Malf No.	Event Type*	Event Description
1	TUR012A	I-RO, CRS TS-CRS	PT-446 (Turbine First Stage Pressure) fails LOW. (Rods Drive In)
2	NA	N-BOP, CRS R-RO	Rapid Power Reduction due to overheating of main generator disconnects.
3	EH001B EH002F	C-BOP	Running EHC Pump Trip. (Standby EHC must be manually started).
4	MS020O	I-BOP, CRS TS-CRS	LT-496 ("C" SG Level Instrument) fails HIGH. (Manually control feedwater to "C" SG)
5	CVC005C	C- CRS	Progressive failure of #2 Seal on "A" RCP.
6	RCS003A PCS008A PCS008B FW025P	C-RO, CRS	RCP Trip, ATWS, FW Isol Valve 1611A Fails Closed. (Manual Reactor trip)

7	MSS015 EF001S EF002T	M-ALL	Loss Of Heat Sink (EFW) After Reactor Trip.
	FWM001A FWM001B FWM001C		All Main Feedwater Pumps Trip. (Feed with Condensate)
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

The following notation is used in the ES-D-2 form "Time" column:

IOA designates **Immediate Operator Action** steps.

* designates **Continuous Action** steps.

The crew will assume the watch having been pre-briefed on the Initial Conditions, the plan for this shift and any related operating procedures.

EVENT 1: PT-446 (Turbine First Stage Pressure) fails LOW. (Rods Drive In)

- TRIGGER 1
  - MAL-TUR012A
    TURBINE IMPULSE PRESSURE TRANSMITTER PT-446 FAILURE
    FINAL=0
- TRIGGER 2
  - ANN-MI007
    AMSAC GENERAL WARNING
    Fail To: ON

On cue from the Examiner, the selected turbine first stage pressure transmitter (PT-446) will fail LOW. The failure causes a Tave -Tref mismatch resulting in rods inserting at the maximum speed. The crew will enter AOP-401.7, Turbine First Stage Pressure Channel Failure.

The RO will respond to the rod insertion by placing rod control in manual and restoring Tave to within 1 degree of Tref. The crew will then select the operable 1st stage pressure channel for control. The RO may restore automatic rod control after the operable channel is selected. The BOP will place the STM DUMP MODE SELECT in STM PRESS.

The CRS will refer to Technical Specification Table 3.3-1 Items 19.B, E and Table 3.3-3 Item 4.d.

EVENT 2: Rapid Power Reduction due to overheating of main generator disconnects.

On cue from the Examiner, the Booth Operator as the Shift Supervisor will direct the CRS to lower power 10% within the next 15 minutes in accordance with GOP-4C Rapid Power Reduction, due to a report that the transformer disconnects are overheating. The RO will lower Reactor power with boration and/or rod motion. The BOP will reduce turbine load using the Turbine controls.

EVENT 3: Running EHC Pump Trip. (Standby EHC must be manually started).

- TRIGGER 3
  - PMP-EH001B
    XPP0003-PP1 HFM PMP A BRG FAILURE
  - PMP-EH002F
    XPP0003-PP2 HFM PMP B FAIL TO START

On cue from the Examiner, the running EHC pump will trip and the backup pump will not start in auto. The BOP will respond to annunciator XCP-631 1-4, EHC PP A MOTOR OVRLD, determine the cause of the event, and take corrective action by starting the backup EHC pump to prevent turbine stop valves from closing. A Turbine trip will occur within 2 minutes if the event is not mitigated.

EVENT 4: LT-496 ("C" SG Level Instrument) fails HIGH. (Manually control feedwater to "C" SG)

- TRIGGER 4
  - XMT-MS020O
    ILT00496 SG C NR LVL LI-496 FAIL TO POSN
    FINAL VALUE = 100
    RAMP = 00:00:10

On cue from the Examiner, "C" SG level transmitter will fail HIGH. The BOP will identify the failure and take manual control of the "C" SG Feedwater Regulating Valve to maintain/restore SG level to between 60% and 65% and prevent a reactor trip.

The crew will enter AOP-401.11, Steam Generator Level Control and Protection Channel Failure, and remove the channel from service.

The CRS will refer to Technical Specifications 3.3-1, Item 13 (Action 6) and 3.3-3, Items 5, and 6c (Action 24).

EVENT 5: Progressive failure of #2 Seal on "A" RCP.

- TRIGGER 5
  - MAL-CVC005A, RCP 1 NUMBER 2 SEAL FAILURE
- TRIGGER 6
  - VLV-CS052W, XVT08141A-CS RCP A SEAL LEAKOFF VLV LOSS OF POWER
    DELETE: 1 second

On cue from the Examiner, RCP A Seal Number 2 will begin a ramped failure. The crew will respond to annunciator XCP-617 2-4, RCP A STNDPIP LVL HI/LO.

NOTE: The Annunciator will alarm within 4 minutes after the event is triggered and will not clear.

The RO will fill the standpipe for 2 minutes to determine that either the #1 or #2 seal is failing. The crew will implement AOP-101.2, Reactor Coolant Pump Seal Failure and determine that a reactor trip is not required. The RO will continue to monitor the RCP for further seal degradation.

EVENT 6: RCP Trip, ATWS, FW Isol Valve 1611A Fails Closed. (Manual Reactor trip)

- TRIGGER 7
  - MAL-PCS009AB
    REACTOR TRIP BREAKER A FAILURE (FAIL TO OPEN)
    FAIL TO: AUTO
  - MAL-PCS009BB
    REACTOR TRIP BREAKER B FAILURE (FAIL TO OPEN)
    FAIL TO: AUTO
  - PCS008B
    FAILURE OF MANUAL REACTOR TRIP SWITCH CS-CR01A
  - MAL-RCS003A
    REACTOR COOLANT PUMP 1 TRIP
    FAIL TO: TRIP
  - VLV-FW025P
    XVG01611A-FW FEEDWTR ISO VLV A FAIL POSITION
    Final = 0
    Delay = 00:00:02
- EVENT TRIGGER 8
  - VLV-FW025P
    XVG01611A-FW FEEDWTR ISO VLV A FAIL POSITION
    Delete = 00:00:01
    X07D033M < 26 NR "A" SG Level < 26%

On cue from the Examiner, RCP "A" will trip but the Reactor will not trip. The crew will enter EOP-1.0 (E-0), Reactor Trip/Safety Injection Actuation. The RO will manually trip the Reactor. Only the Manual Reactor trip switch the RO normally operates is functional.

The Feedwater Isolator Value to the "A" SG (PVG-1611A) spuriously fails closed to lower level in the "A" SG. Because the associated RCP has tripped, this SG level would otherwise remain above 26% required to force the crew to EOP-15 (FR-H.1), Response to Loss of Secondary Heat Sink. The PVG-1611A failure is auto-removed after NR "A" SG level is less than 26%.

EVENT 7: Loss Of Heat Sink (EFW) After Reactor Trip.

- EVENT TRIGGER 9
  L52RTAO == 1 RX TRIP BRKR RTA OPEN = TRUE OR
  L52RTBO == 1 RX TRIP BRKR RTB OPEN = TRUE
  - MAL-MSS015
    STEAM FAILURE TO EFW TURBINE
    PRELOAD
  - PMP-EF001S
    XPP0021A MOTOR DRIVEN EFW PMP A SHEARED SHAFT
    PRELOAD
  - PMP-EF002T
    XPP0021B MOTOR DRIVEN EFW PMP B TRIP ON COMMAND
  - MAL-FWM001A
    MAIN FEEDWATER PUMP A TRIP
  - MAL-FWM001B
    MAIN FEEDWATER PUMP B TRIP
  - MAL-FWM001C
    MAIN FEEDWATER PUMP C TRIP
- TRIGGER 10
  - LOA-FWM040
    SS-FW61A XVG01611A,B,C KEY SWITCH
    Position To: BYPASS
- TRIGGER 11
  - LOA-FWM041
    SS-FW81A1 IFV03321,3331,3341 TRAIN A KEY SWITCH
    Position To: BYPASS

- TRIGGER 12

  - LOA-FWM042
    SS-FW81B1 IFV03321,3331,3341 TRAIN B KEY SWITCH
    Position To: BYPASS

This event is automatically triggered when the Reactor Trip Breakers open. The crew will continue in EOP-1.0 (E-0) Reactor Trip/Safety Injection Actuation and identify that there is no Emergency Feedwater flow to the Steam Generators. The crew will then transition to EOP-15.0 (FR-H.1) Response to Loss of Secondary Heat Sink.

All Main Feedwater Pumps will trip when the Reactor Trip Breakers open.

The BOP will depressurize one Steam Generator, reset the Safety Injection actuation, and attempt to establish Main Feedwater flow to one SG. The Main Feedwater pumps cannot be reset so the success path is to continue in EOP-15 (FR-H.1) and utilize Condensate flow to restore SG level.

Trigger 10, 11, 12 places local key-switches in bypass so that Feedwater Valves can be opened to restore flow to one steam generator using Condensate and Feedwater Booster pumps.

CRITICAL TASKS:

It is a critical task to:

- Start Back-up EHC Pump prior to a Rx/Turbine Trip on Low EHC Pressure.
- Manually control "C" SG Feedwater without a Rx/Turbine Trip on SG Level.
- Insert a manual Reactor Trip prior to completion of Immediate Actions of EOP-1.0 (E-0).
- Establish feed flow to at least one SG before RCS Feed and Bleed criteria is met (WR level in any two SGs is less than 12% or PZR pressure is greater than 2330 psig due to the loss of secondary heat sink) is met.

TERMINATION:

The scenario can be terminated after the crew has established feedwater to one Steam Generator or at the Examiners discretion.

Scenario Attributes		Events
Total Malfunctions (5-8)	9	· PT-446 (Turbine First Stage Pressure) fails LOW. · Running EHC Pump Trip. · LT-498 ("C" SG Level Instrument) fails HIGH. · Progressive failure of #2 Seal on "A" RCP · RCP Trip. · RX trip breakers fail to open. · FW Isol Valve 1611A Fails Closed. · EFW pumps trip. · MFW pumps trip.
Malfunctions after EOP entry (1-2)	3	· Loss of MFW. · Loss of MD EFW. · Loss of TD EFW.
Abnormal Events (2-4)	4	· PT-446 (Turbine First Stage Pressure) fails LOW. · Running EHC Pump Trip. · LT-498 ("C" SG Level Instrument) fails HIGH. · Progressive failure of #2 Seal on "A" RCP
Major Transient (1-2)	1	· Loss of all Feedwater MFW, MD EFW and TD EFW.
EOPs Entered (1-2)	1	· EOP-15.0 (FR-H.1) Response to Loss of Secondary Heat Sink.
EOP Contingencies (0-2)	1	· EOP-15.0 (FR-H.1) Response to Loss of Secondary Heat Sink.
Critical Tasks (2-3)	4	· Start Back-up EHC Pump prior to a Rx/Turbine Trip on Low EHC Pressure. · Manually control "C" SG Feedwater without a Rx/Turbine Trip on SG Level. · Manual Trip prior to completion of Immediate Actions of EOP-1.0 (E-0). · Establish feed flow to at least one SG before RCS feed and bleed criteria is met.

SIMULATOR SCENARIO SETUP

INITIAL CONDITIONS:

- IC Set 292
- 100% Power MOL
- Rod Position = 230
- FCV-113 Pot Setting = 4.31
- Boron = 1005 ppm
- Xe = - 2700 pcm
- Burnup = 10001 MWD/MTU
- Prior to the scenario, crew should pre-brief on conditions and expectations for the Shift (maintain power, repairs estimated to be complete well before LCO action time expires.)

PRE-EXERCISE:

- Ensure simulator has been checked for hardware problems (DORT, burnt out light bulbs, switch malfunctions, chart recorders, etc.)
- VCS-TQP-0807 Attachment I-A, Unit 1 Booth Instructor Checklist, has been completed.
- Verify the Hard Card for Turbine Load changes is in its proper storage location.
- Verify the Hard Card for borating via MVT-8104 is in its proper storage location.
- Hang Tags for equipment out of service.
- Mark up procedures in use with "Circle and slash" as applicable.
- A turnover sheet has been prepared for each position.
- Conduct two-minute drill.

PRE-LOAD:

STANDARD SIMULATOR SETUP:

- PMP-LD003P, XPP0138 LEAK DETECTION SUMP PMP LOSS OF POWER
- VLV-FW028W, XVG01676-FW FW HDR RECIRC ISOL VLV LOSS OF POWER
- VLV-FW029W, XVG01679-FW FW HTR RECIRC ISO VLV LOSS OF POWER
- VLV-CS052W, XVT08141A-CS RCP A SEAL LEAKOFF VLV LOSS OF POWER
- VLV-CS054W, XVT08141C-CS RCP C SEAL LEAKOFF VLV LOSS OF POWER
- VLV-CS053W, XVT08141B-CS RCP B SEAL LEAKOFF VLV LOSS OF POWER
- ANN-TA030, GEN AUX PNL TRBL

SCENARIO RELATED:

- ANN-TA030 , GEN AUX PNL TRBL FAIL TO: OFF
- ANN-CS044, ALT SEAL INJ PUMP TRBL FAIL TO: ON
- MAL-CVC027, ALT SEAL INJ D/G FAIL TO START
- MAL-CVC029, ALT SEAL INJ PUMP FAIL TO START

Op Test No: NRC-ILO-13-01 Scenario # 3 Event # 1 Page: 10 of 47

Event Description: PT-446 (Turbine First Stage Pressure) fails LOW. (Rods Drive In)

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: On cue from the Examiner, the selected turbine first stage pressure transmitter (PT-446) will fail LOW. The failure causes a Tave -Tref mismatch resulting in rods inserting at the maximum speed. The crew will enter AOP-401.7, Turbine First Stage Pressure Channel Failure. The RO will respond to the rod insertion by placing rod control in manual and restoring Tave to within 1 degree of Tref. The crew will then select the operable 1st stage pressure channel for control. The RO may restore automatic rod control after the operable channel is selected. The BOP will place the STM DUMP MODE SELECT in STM PRESS. The Failed instrument is addressed in Technical Specification Table 3.3-1 Items 19.B, E and Table 3.3-3 Item 4.d. Within one hour verify the P7 and P13 permissives are dim, trip the affected bistables within 72 hours and place AMSAC in Bypass.			
BOOTH OPERATOR: When directed, insert Event 1 (TRIGGER 1)			
Indications available: Uncontrolled Rod Motion XCP-615, 2-5, RCS TAVG-TREF HI/LO; XCP-624-4-2, 5-2, 6-2; SG A, B, C STM FLO HI			
EVALUATOR NOTE: The crew could enter the ARP but it is likely that they will recognize the entry condition for AOP-401.7, Turbine First Stage Pressure Channel Failure.			
	CRS	Enters AOP-401.7, Turbine First Stage Pressure Channel Failure	AOP-401.7
EVALUATOR NOTE: If XCP-621 1-1 CRB INSERT LMT LO-LO is received the RO will immediately Emergency Borate per AOP-106.1, Emergency Boration until Shutdown Margin is restored.			
IOA	RO	1 Place Rod Control Bank Select Switch to MANUAL	AOP-401.7

Op Test No: NRC-ILO-13-01 Scenario # 3 Event # 1 Page: 11 of 47

Event Description: PT-446 (Turbine First Stage Pressure) fails LOW. (Rods Drive In)

Time	Position	Applicant's Actions or Behavior	
	RO	2 Ensure TREF 1ST STG PRESS switch is positioned to the operable channel: P446, CH III. **(FAILED)** OR PT-447, CH IV	AOP-401.7
	RO	3 Adjust Control Rods until Tavg is within 1.0° F of Tref.	AOP-401.7
	BOP	4 Check if Main Turbine load is greater than 10%	AOP-401.7
	CRS	5 Within one hour, verify the following permissives are dim: • P-13, 1st STG PRESS • P-7, REACTOR TRIP BLOCKED	AOP-401.7
EVALUATOR NOTE: • Due to the windup (integral) characteristic of the Rod Control function, the crew may not immediately place rods back in automatic. • The crew may elect to restore rods to their previous position.			
	RO	6 Restore automatic rod control. a. Check if automatic rod control is desired. b. Verify Reactor power is GREATER THAN 15% (C-5 status light dim). c. Verify Tavg is within 1.0°F of Tref. d. Place ROD CNTRL BANK SEL Switch in AUTO.	AOP-401.7
	BOP	7 Place Steam Dump Mode Select Switch in STM PRESS.	AOP-401.7

Op Test No: NRC-ILO-13-01 Scenario # 3 Event # 1 Page: 12 of 47

Event Description: PT-446 (Turbine First Stage Pressure) fails LOW. (Rods Drive In)

Time	Position	Applicant's Actions or Behavior	
		BOOTH OPERATOR: • Acknowledge requests for support. • Wait 3 minutes • Call for permission to proceed. • Use TRIGGER 2 to place AMSAC in BYPASS • Report that AMSAC is in Bypass	
	CRS	8 Notify I&C to place AMSAC in BYPASS.	AOP-401.7
	CRS	9 Within 72 hours, place the failed channel protection bistables in a tripped condition:	AOP-401.7
	CRS	a. Identify the associated bistables for the failed channel. REFER TO Attachment 1.	AOP-401.7
		TURBINE FIRST STAGE PRESSURE PROTECTION CHANNELS	AOP-401.7 Attachment 1

INSTRUMENT	ASSOCIATED BISTABLE	BISTABLE LOCATION	TRIP STATUS LIGHT	TECH SPECS	STPS
PT-446	FB-474A FB-484A FB-494A	C3-741-BS-1 C3-746-BS-1 C3-748-BS-1	CHAN III LPA FB-474A CHAN III LPB FB-484A CHAN III LPC FB-494A	TABLE 3.3-1 ITEMS 19.B, E TABLE 3.3-3 ITEM 4.d	302.052 345.034

	CRS	b. Record the following for each associated bistable on SOP-401, REACTOR PROTECTION AND CONTROL SYSTEM, Attachment I: • Instrument • Associated Bistable. • Bistable Location. • STPs.	AOP-401.7

Op Test No: NRC-ILO-13-01 Scenario # 3 Event # 1 Page: 13 of 47

Event Description: PT-446 (Turbine First Stage Pressure) fails LOW. (Rods Drive In)

Time	Position	Applicant's Actions or Behavior
	CRS	Table 3.3-1 Action 7 Refers to Technical Specification Table 3.3-1 and within one hour determines by observation of the associated permissive annunciator window(s) that the interlock is in its required state for the existing plant condition.

Tech Spec 3.3.1

TABLE 3.3-1 (Continued)
REACTOR TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT		TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
19. Reactor Trip System Interlocks						
B. Low Power Reactor Trips Block, P-7	P-10 Input	4	2	3	1	7
	P-13 Input	2	1	2	1	7
E. Turbine First Stage Pressure, P-13		2	1	2	1	7

ACTION 7 - With less than the Minimum Number of Channels OPERABLE, within one hour determine by observation of the associated permissive annunciator window(s) that the interlock is in its required state for the existing plant condition, or apply Specification 3.0.3.

CRS	Table 3.3-3 Action 24 Refers to Technical Specification Table 3.3-3 and determines that the inoperable channel must be placed in a tripped condition within 72 hours.	Tech Spec 3.3.2

TABLE 3.3-3 (Continued)
ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
4. STEAM LINE ISOLATION					
d. Steam Flow in Two Steam Lines--High	2/steam line	1/steam line any 2 steam lines	1/steam line	1, 2, 3###	24*
COINCIDENT WITH T_{avg}--Low-Low	1 T_{avg}/loop	1 T_{avg} any 2 loops	1 T_{avg} any 2 loops	1, 2, 3###	24*

* The provisions of Specification 3.0.4 are not applicable.

ACTION 24 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 72 hours.

b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels per Specification 4.3.2.1.

BOOTH OPERATOR:

Acknowledge requests for assistance and inform the crew that support personnel will be assigned.

Op Test No: NRC-ILO-13-01 Scenario # 3 Event # 1 Page: 14 of 47

Event Description: PT-446 (Turbine First Stage Pressure) fails LOW. (Rods Drive In)

Time	Position	Applicant's Actions or Behavior	
	CRS	c Notify I&C to place the failed channel protection bistables in a tripped condition within 72 hours: • FB-474A • FB-484A • FB-494A d Initiate a 30 day R&R for placing AMSAC in BYPASS.	AOP-401.7

EVALUATOR NOTE:
The next event may be initiated after I&C is called to trip the bistables and Technical Specifications have been addressed.

Op Test No: NRC-ILO-13-01 Scenario # 3 Event # 2 Page: 15 of 47

Event Description: Rapid Power Reduction due to overheating of main generator disconnects.

Time	Position	Applicant's Actions or Behavior

EVALUATOR NOTE: Direct the Booth Operator to call the Control Room as the Shift Supervisor. The RO will lower Reactor power with boration and/or rod motion. The BOP will reduce turbine load using the Turbine controls.

BOOTH OPERATOR:

- No triggers for this event.
- When directed, call the Control Room as the Shift Supervisor and notify the CRS:
  - Thermography in the switchyard indicates the transformer disconnects are overheating.
  - Lower power 10% within the next 15 minutes in accordance with GOP-4C, Rapid Power Reduction.

	CRS	Direct the crew to reduce power 10% in accordance with GOP-4C Rapid Power Reduction.

NOTE 2.0 through 3.0 GOP-4C

a. If this procedure must be initiated under conditions other than those in Section 2.0, INITIAL CONDITIONS, the Shift Supervisor or Control Room Supervisor will review Sections 2.0, INITIAL CONDITIONS, and 3.0, INSTRUCTIONS. Steps that are not applicable due to plant conditions will be marked N/A and initialed by the Shift Supervisor or Control Room Supervisor. All other items will require sign-off or check-off.

b. All personnel who sign off steps in this procedure must enter their names and initials on Attachment I.

c. Each step should be initialed and dated when all its substeps are either completed and checked-off or marked as N/A and initialed.

Op Test No: NRC-ILO-13-01 Scenario # 3 Event # 2 Page: 16 of 47

Event Description: Rapid Power Reduction due to overheating of main generator disconnects.

Time	Position	Applicant's Actions or Behavior

GOP- 4C REFERENCE PAGE GOP-4C

GENERAL NOTES

A. Procedure steps should normally be performed in sequence. However, it is acceptable to perform steps in advance after thorough evaluation of plant conditions and impact by the Shift Supervisor or Control Room Supervisor.

B. After any Thermal Power change of greater than 15% within any one hour, Attachment III.H. of GTP-702 must be completed.

C. If Reactor Power is stabilized during this procedure for the purpose of raising power per GOP-4A, a Power Range Heat Balance shall be performed.

D. Once a Rapid Power Reduction has begun, every effort should be made to prevent the Turbine from reaching "AT SET LOAD" unless it is desired to stabilize the plant.

REACTOR CONTROL

A. During operation with a positive Moderator Temperature Coefficient, power and temperature changes will require constant operator attention.

B. Rod Control should be maintained in Automatic if any Pressurizer PORV is isolated.

C. If at any time, power decreases unexpectedly below 0.1% on any Power Range NI (computer indication available) OR below 1.0% on any Power Range NI control board indication (computer not available):

1) No positive reactivity will be added by rods or dilution.
2) A complete reactor shutdown shall be performed per GOP-5.
3) A controlled reactor startup may be commenced per GOP-3 once the event has been reviewed by Reactor Engineering.

REACTOR TRIP CRITERIA DURING RAPID LOAD REDUCTION

A. If any of the following conditions occur, trip the Reactor and implement EOP-1.0:

1) RCS Tavg is less than 551°F for greater than 15 minutes.
2) Tavg/Tref mismatch exceeds 10°F.
3) Pressurizer pressure approaches 1870 psig.
4) Power reduction at 5% per minute is not sufficient to mitigate the event.

NOTE 3.0 GOP-4C

If time allows, load reductions should be discussed with the Load Dispatcher.

Op Test No: NRC-ILO-13-01 Scenario # 3 Event # 2 Page: 17 of 47

Event Description: Rapid Power Reduction due to overheating of main generator disconnects.

Time	Position	Applicant's Actions or Behavior	
		CAUTION 3.1 through 3.12 a. Thermal Power changes of greater than 15% in any one-hour period requires completion of GTP-702 Attachment III.H. b. VCS PID Report, POWER CHANGE SEARCH, should be periodically performed to ensure a thermal power change of greater than 15% in any one-hour period is detected.	GOP-4C
	RO	3.1 Commence rapid Plant Shutdown as follows: a. Energize all Pressurizer Heaters.	GOP-4C
		EVALUATOR NOTE: • SOP-106 III.F, Borate Operations, is attached (Page 41). • SOP-106 IV.D, Borating the RCS Using the Emergency Borate Valve, is attached (Page 43). • SOP-214 III. D. Turbine Load Reduction/Shutdown, is attached (Page 44).	
		NOTE 3.1.b Setting FCV-113A&B, BA FLOW SET PT to 8.3 will yield 33 gpm Boration flow rate.	GOP-4C
	RO	b. Maintain the following with rod motion or boron concentration changes: 1) Tavg within 10°F and trending to Tref. 2) ΔI within limits. 3) Control Rods above the rod insertion limit.	GOP-4C
	BOP	c. Using the Turbine HMI, Control/Load screen, reduce to the desired load, as low as 5% (50 MWe), as follows: 1) Under Rate %/min, select desired ramp rate up to 5% per minute. 2) Select Load (a dialog box opens). 3) Enter desired load. 4) Select OK. 5) Confirm setpoint. 6) Select OK. 7) Verify proper plant response.	GOP-4C

Op Test No: NRC-ILO-13-01 Scenario # 3 Event # 2 Page: 18 of 47

Event Description: Rapid Power Reduction due to overheating of main generator disconnects.

Time	Position	Applicant's Actions or Behavior
	CREW	Stabilize the unit at 10% reduced power.

EVALUATOR NOTE: The next event may be initiated after a significant power change has been observed.

Op Test No: NRC-ILO-13-01 Scenario # 3 Event # 3 Page: 19 of 47

Event Description: Running EHC Pump Trip. (Standby EHC must be manually started).

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: On cue from the Examiner, the running EHC pump will trip and the backup pump will not start in auto. The BOP will respond to annunciator XCP-631 1-4, EHC PP A MOTOR OVRLD, determine the cause of the event, and take corrective action by starting the backup EHC pump to prevent turbine stop valves from closing. A Turbine trip will occur within 2 minutes if the event is not mitigated.			
BOOTH OPERATOR: When directed, insert Event 3 (TRIGGER 3)			
Indications available: Control Switch Red and Green lights XCP-631, 1-4, EHC PP A MOTOR OVRLD XCP-631, 1-2, EHC FLUID PRESS LO			
	BOP	Enters ARP-001-XCP-631 1-4, EHC PP A MOTOR OVRLD	XCP-631 1-4
		CORRECTIVE ACTIONS:	XCP-631 1-4
	BOP	1. If EHC PUMP A is still running, verify high amps. **(NO)**	XCP-631 1-4
	BOP	2. Start EHC PUMP B and observe motor amps.	XCP-631 1-4
	BOP	3. If EHC PUMP A is still running with higher amps than EHC PUMP B, secure EHC PUMP A and continue to monitor EHC PUMP B. **(NO)**	XCP-631 1-4
BOOTH OPERATOR: • Acknowledge request to check for EHC Leaks. 3 minutes later report no leaks. • If called to investigate the pump and/or breaker, wait 3 minutes and report the breaker for the "A" EHC Pump is tripped. No problems are apparent with the pump.			
	BOP	4. Dispatch an operator to check for EHC System leaks.	XCP-631 1-4
	BOP	5. If EHC PUMP B is drawing high amps with EHC PUMP A tripped, attempt to restart EHC PUMP A and run both pumps until an external leak is located or a low level in the EHC fluid tank alarm is received. **(NO)**	XCP-631 1-4

Op Test No: NRC-ILO-13-01 Scenario # 3 Event # 3 Page: 20 of 47

Event Description: Running EHC Pump Trip. (Standby EHC must be manually started).

Time	Position	Applicant's Actions or Behavior	
	BOP	6. If EHC PUMP B overload annunciator is received after starting, commence a Turbine Runback at 5% per minute per GOP-4C. **(NO)**	XCP-631 1-4
EVALUATOR NOTE: The failure of the backup EHC pump to auto-start results in EHC pressure continuing to decrease. The Low Pressure alarm will alert operators to the failure – if not previously discovered – however this alarm provides no additional operator actions			
	BOP	Respond to alarm EHC FLUID PRESS LO (XCP-631, 1-2) EHC FLUID PRESS LO	
EVALUATOR NOTE: The next event may be initiated after the "B" EHC pump is started.			

Op Test No: NRC-ILO-13-01 Scenario # 3 Event # 4 Page: 21 of 47

Event Description: LT-496 ("C" SG Level Instrument) fails HIGH. (Manually control feedwater to "C" SG)

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: On cue from the Examiner, "C" SG level transmitter will fail HIGH. The BOP will identify the failure and take manual control of the "C" SG Feedwater Regulating Valve to maintain/restore SG level to between 60% and 65% and prevent a reactor trip. The crew will enter AOP-401.11, Steam Generator Level Control and Protection Channel Failure, and remove the channel from service. The CRS will refer to Technical Specifications 3.3-1, Item 13 (Action 6) and 3.3-3, Items 5, and 6c (Action 24) to determine that the protection bistables for the failed channels must be placed in the TRIPPED condition with 72 hours.			
BOOTH OPERATOR: When directed, insert Event 4 (TRIGGER 4)			
Indication Available: •XCP-624 3-4, SG C LVL DEV •XCP-624 6-4, SG C FWF>STF MISMATCH			
	BOP	Responds to alarms.	
	BOP	Diagnoses/reports LT-496 failed.	
	CRS	Enters AOP-401.11.	
IOA	BOP	1 Adjust the Feedwater Flow Control Valve as necessary to restore Narrow Range level in the AFFECTED SG to between 60% and 65%.	AOP-401.11
	CRS	2 Within 72 hours, place the failed channel protection bistables in a tripped condition: a. Identify the associated bistables for the failed channel. REFER TO Attachment 1.	AOP-401.11

Op Test No: NRC-ILO-13-01 Scenario # 3 Event # 4 Page: 22 of 47

Event Description: LT-496 ("C" SG Level Instrument) fails HIGH. (Manually control feedwater to "C" SG)

Time	Position	Applicant's Actions or Behavior	
		STEAM GENERATOR LEVEL PROTECTION CHANNELS	AOP-401.11 Excerpt from Attachment 1

INSTRUMENT	ASSOCIATED BISTABLE	BISTABLE LOCATION	TRIP STATUS LIGHT	TECH SPECS	STPS
LT-496	LB-496A LB-496C *LB-496	C3-731-BS-1 C3-731-BS-2 XPN-6010(AMSAC)	CHAN III SG C LB-496A CHAN III SG C LB-496C	TABLE 3.3-1 ITEM 13 TABLE 3.3-3 ITEMS 5, 6.c	302.025 345.029

* Bistable defeated by placing AMSAC in BYPASS

	BOP	b. Record the following for each associated bistable on SOP-401, REACTOR PROTECTION AND CONTROL SYSTEM, Attachment I: • Instrument. • Associated Bistable. • Bistable Location. • STPs.	AOP-401.11

EVALUATOR NOTE: The scenario does not allow time for any bistables to be put in trip or bypass.

BOOTH OPERATOR: Acknowledge request to troubleshoot failure and place bistables in trip.

	CRS	c. Notify the I&C Department to place the identified bistables in trip.	AOP-401.11
	CRS	d. For channels LT-474, LT-485, and LT-496, initiate a 30 day R&R for placing AMSAC in BYPASS.	AOP-401.11

Op Test No: NRC-ILO-13-01 Scenario # 3 Event # 4 Page: 23 of 47

Event Description: LT-496 ("C" SG Level Instrument) fails HIGH. (Manually control feedwater to "C" SG)

Time	Position	Applicant's Actions or Behavior

Excerpt from Tech Spec

TABLE 3.3-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
13. Steam Generator Water Level--Low-Low	3/loop	2/loop in any operating loops	2/loop in each operating loop	1, 2	6#

ACTION 6 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 72 hours; and

b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels per Specification 4.3.1.1.

Excerpt from Tech Spec

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
5. TURBINE TRIP & FEEDWATER ISOLATION					
a. Steam Generator Water Level--High-High	3/stn	2/loop in any operating loop	2/loop in each operating loop	1, 2	24*
6. EMERGENCY FEEDWATER					
c. Stn. Gen. Water Level-Low-Low					
i. Start Motor-Driven Pumps	3/stn. gen.	2/stn. gen. any stn gen.	2/stn. gen.	1, 2, 3	24*
ii. Start Turbine-Driven Pump	3/stn. gen.	2/stn. gen. any 2 stn. gen.	2/stn. gen	1, 2, 3	24*

ACTION 24 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 72 hours.

b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels per Specification 4.3.2.1.

	CRS	Refers to: T.S. 3.4.3.1 Reactor Trip System Instrumentation - Table 3.3-1 Action 6

Op Test No: NRC-ILO-13-01 Scenario # 3 Event # 4 Page: 24 of 47

Event Description: LT-496 ("C" SG Level Instrument) fails HIGH. (Manually control feedwater to "C" SG)

Time	Position	Applicant's Actions or Behavior
		T.S. 3.4 3.2 Engineered Safety Feature Actuation System Instrumentation - Table 3.3-3 Action 24

EVALUATOR NOTE: The next event may be initiated after Technical Specifications have been addressed.

Op Test No: NRC-ILO-13-01 Scenario # 3 Event # 5 Page: 25 of 47

Event Description: Progressive failure of #2 Seal on "A" RCP.

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: On cue from the Examiner, RCP A Seal Number 2 will begin a ramped failure. The crew will respond to annunciator XCP-617 2-4, RCP A STNDPIP LVL HI/LO. **NOTE:** The Annunciator will alarm within 4 minutes after the event is triggered and will not clear. The RO will fill the standpipe for 2 minutes to determine that either the #1 or #2 seal is failing. The crew will implement AOP-101.2, Reactor Coolant Pump Seal Failure and determine that a reactor trip is not required. The RO will continue to monitor the RCP for further seal degradation.			
BOOTH OPERATOR: When directed, insert Event 5 (TRIGGER 5)			
Indications Available: XCP-617 2-4, RCP A STNDPIP LVL HI/LO.			
	RO	1. Determine which seal failed as follows:	XCP-617 2-4
	RO	a. Attempt to fill the standpipe as follows: 1) Ensure Reactor Makeup Water System Non-Essentials are aligned. 2) Open PVD-8028, PRT RMWST MU. 3) Open PVD-8168A, RX MU WTR TO STNDPIPE A.	XCP-617 2-4
	RO	4) When one of the following occurs, close PVD-8168A, RX MU WTR TO STNDPIPE A: a) RCP A STNDPIP LVL HI/LO alarm clears and re-annunciates on a standpipe high level. b) RCP A STNDPIP LVL HI/LO alarm does not clear within two minutes. 5) Close PVD-8028, PRT RMWST MU. 6) Monitor radiation levels in the Reactor Building.	XCP-617 2-4
EVALUATOR NOTE: The alarm will NOT clear by filling the standpipe.			

Op Test No: NRC-ILO-13-01 Scenario # 3 Event # 5 Page: 26 of 47

Event Description: Progressive failure of #2 Seal on "A" RCP.

Time	Position	Applicant's Actions or Behavior	
	RO	b. If the standpipe alarm clears by filling, assume #2 or #3 Seal failure. c. If the standpipe alarm does not clear by filling, assume #1 or #2 Seal failure and go to AOP-101.2, Reactor Coolant Pump Seal Failure.	XCP-617 2-4
	CRS	Diagnose #1 or #2 Seal failure.	
	CRS	Implement AOP-101.2, Reactor Coolant Pump Seal Failure.	
		CAUTION • PVT-8141A(B)(C), A(B)(C) SEAL LKOFF, should be closed between three minutes and five minutes after the affected Reactor Coolant Pump is secured. • Reactor Coolant System Controlled Leakage should be limited to 33 gpm per Technical Specification 3.4.6.2 in Modes 1,2,3, and 4.	AOP-101.2
		BOOTH OPERATOR: • Wait 3 minutes after being directed to install the fuses • Use Trigger 6 to install XVT-8141A-FU-CS75 for RCP "A" • Report power has been restored to the Seal Leakoff Valve for RCP "A"	
	RO	1 While continuing with this procedure, have an operator install the pre-staged fuses for the AFFECTED RCP's Seal Leakoff Valve in Main Control Board Panel XCP-6109 Subpanel #5: • XVT-8141A-FU-CS75. • XVT-8141B-FU-CS76. • XVT-8141C-FU-CS77.	AOP-101.2
		NOTE - Step 2 IF Seal Injection flow has been throttled to optimize RCP Seal performance, THEN Step 2 does not need to be performed.	AOP-101.2

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Event Description: Progressive failure of #2 Seal on "A" RCP.

Time	Position	Applicant's Actions or Behavior	
	RO	2 Ensure seal injection flow is GREATER THAN 8 gpm for the affected Reactor Coolant Pump on FI-130A(127A)(124A), RCP A(B)(C) INJ FLO GPM.	AOP-101.2
	RO	3 Ensure Component Cooling Water flow to the affected Reactor Coolant Pump thermal barrier is between 35 gpm (50%) and 60 gpm (87.5%) on FM-7138(7158)(7178), RCP THERM BAR A(B)(C) (MODUFLASH M2 CC POINTS 19,18, and 20).	AOP-101.2
*	RO	4 Check the following conditions for the affected Reactor Coolant Pump on the IPCS: • Bearing water temperature (LOWER SEAL WTR BRG T) on T0417A (T0437A)(T0457A) is LESS THAN 225°F and NOT significantly increasing. AND • #1 seal leakoff temperature (SEAL WTR OUT TEMP) on T0181A (T0182A)(T0183A) is LESS THAN 235°F and NOT significantly increasing.	AOP-101.2
	RO	5 GO TO Step 11.	AOP-101.2
	RO	11 Check total #1 seal flow (#1 seal leakoff plus #2 seal leakoff) for the affected Reactor Coolant Pump from the following: a. Check if #1 seal leakoff flow is LESS THAN 6 gpm on FR-154A, RCP SL LKOFF HI RANGE.	AOP-101.2
	RO	b. Determine total #1 seal flow (#1 seal leakoff plus #2 seal leakoff) for the affected Reactor Coolant Pump from the following: 1) #1 seal leakoff flow by observing FR-154B, RCP SL LKOFF LO RANGE, and FR-154A, RCP SL LKOFF HI RANGE, or by having I&C install a temporary flow transmitter with readout on the IPCS per ICP-340.050, TEMPORARY INSTRUMENT INSTALLATION FOR RCP SEAL LEAKOFF MONITORING. 2) #2 seal leakoff flow by monitoring RCDT inleakage per the applicable portion of STP-114.002, OPERATIONAL LEAKAGE TEST, for any increase from the previous leak rate.	AOP-101.2

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Event Description: Progressive failure of #2 Seal on "A" RCP.

Time	Position	Applicant's Actions or Behavior	
	RO	12 IF total #1 seal flow is GREATER THAN 0.8 gpm AND LESS THAN 6 gpm, THEN perform the following: • Contact Plant Support Engineering for evaluation. • Continue to monitor for further seal degradation.	AOP-101.2
EVALUATOR NOTE: The next event may be initiated after #1 seal flow is identified as greater than 0.8 gpm.			
	CRS	13 Return to Procedure and Step in effect.	AOP-101.2
EVALUATOR NOTE: If this event is run for greater than 15 minutes XCP-617 2-1, RCP A #1 SL LKOFF FLO HI/LO, will alarm indicating that seal flow is less than 0.8 gpm. The Alternative Action for Step 12 would then require completion of steps 14-16.			
	CRS	14 Within eight hours, stop the affected Reactor Coolant Pump. REFER TO SOP-101, REACTOR COOLANT SYSTEM.	AOP-101.2
BOOTH OPERATOR: Acknowledge requests for support.			
	CRS	15 Contact Plant Support Engineering for evaluation.	AOP-101.2
	RO	16 Continue to monitor for further seal degradation.	AOP-101.2

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Event Description: RCP Trip, ATWS, FW Isol Valve 1611A Fails Closed. (Manual Reactor trip) Loss of Heat Sink (EFW), Trip of Main FW pumps.

Time	Position	Applicant's Actions or Behavior

EVALUATOR NOTE:

EVENT 6
On cue from the Examiner, RCP "A" will trip but the Reactor will not trip. The crew will enter EOP-1.0 (E-0) Reactor Trip/Safety Injection Actuation. The RO will manually trip the Reactor. Only the Manual Reactor trip switch the RO normally operates is functional.

EVENT 7
This event is automatically triggered when the Reactor Trip Breakers open. The crew will continue in EOP-1.0 (E-0) Reactor Trip/Safety Injection Actuation and identify that there is no Emergency Feedwater flow to the Steam Generators. The crew will then transition to EOP-15.0 (FR-H.1) Response to Loss of Secondary Heat Sink.

The BOP will depressurize one Steam Generator, reset the Safety Injection actuation, and attempt to establish Main Feedwater flow to one SG. The Main Feedwater pumps cannot be reset so the success path is to continue in EOP-15 (FR-H.1) and utilize Condensate flow to restore SG level.

BOOTH OPERATOR: When directed, insert Event 6 (TRIGGER 7)

Indications Available:
Indication of a Turbine trip w/o a reactor trip.

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Event Description: RCP Trip, ATWS, FW Isol Valve 1611A Fails Closed. (Manual Reactor trip) Loss of Heat Sink (EFW), Trip of Main FW pumps.

Time	Position	Applicant's Actions or Behavior

EOP-1.0

REFERENCE PAGE FOR EOP-1.0

1 RCP TRIP CRITERIA

a. IF Phase B Containment Isolation has actuated (XCP-612 4-2), THEN trip all RCPs.

b. IF both of the following conditions occur, THEN trip all RCPs:

- SI flow is indicated on FI-943, CHG LOOP B CLD/HOT LG FLOW GPM.

AND

- RCS Wide Range pressure is LESS THAN 1418 psig.

2 REDUCING CONTROL ROOM EMERGENCY VENTILATION

Reduce Control Room Emergency Ventilation to one train in operation within 30 minutes of actuation. **REFER TO SOP-505, CONTROL BUILDING VENTILATION SYSTEM.**

3 MONITOR SPENT FUEL COOLING

Periodically check status of Spent Fuel Cooling by monitoring the following throughout event recovery:

- Spent Fuel Pool level.
- Spent Fuel Pool temperature.

EOP-1.0

NOTE

- Steps 1 through 5 are Immediate Operator Actions.
- The EOP REFERENCE PAGE should be monitored throughout the use of this procedure.
- Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.

EVALUATOR NOTE: The Reactor will not automatically trip. The RO must manually trip the reactor. Only the Manual Reactor trip switch the RO normally operates is functional.

Op Test No: NRC-ILO-13-01 Scenario # 3 Event # 6, 7 Page: 31 of 47

Event Description: RCP Trip, ATWS, FW Isol Valve 1611A Fails Closed. (Manual Reactor trip) Loss of Heat Sink (EFW), Trip of Main FW pumps.

Time	Position	Applicant's Actions or Behavior	
IOA	RO	1 Verify Reactor Trip: **(NO)** • Trip the Reactor using either Reactor Trip Switch. • Verify all Reactor Trip and Bypass Breakers are open. • Verify all Rod Bottom Lights are lit. • Verify Reactor Power level is decreasing.	EOP-1.0
IOA CRITICAL TASK	BOP	**ALTERNATIVE ACTION** 1 Trip the Reactor using both Reactor Trip Switches. If the Reactor is NOT subcritical, THEN GO TO EOP-13.0, RESPONSE TO ABNORMAL NUCLEAR POWER GENERATION, Step 1.	EOP-1.0
IOA	BOP	2 Verify Turbine/Generator a. Verify all Turbine VLVs are closed. b. Ensure Generator Trip (after 30 second delay): 1) Ensure the GEN BKR is open. 2) Ensure the GEN FIELD BKR is open. 3) Ensure the EXC FIELD CNTRL is tripped.	EOP-1.0
IOA	BOP	3 Verify both ESF buses are energized.	EOP-1.0
IOA	RO	4 Check if SI is actuated: **(NO)** a. Check if either: • SI ACT status light is bright on XCP-6107 1-1. OR • Any red first-out SI annunciator is lit on XCP-626 top row. b. Actuate SI using either SI ACTUATION Switch. c. GO TO Step 6. **ALTERNATIVE ACTION** a. GO TO Step 5.	EOP-1.0

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Event Description: RCP Trip, ATWS, FW Isol Valve 1611A Fails Closed. (Manual Reactor trip) Loss of Heat Sink (EFW), Trip of Main FW pumps.

Time	Position	Applicant's Actions or Behavior	
	RO	5 Check if SI is required: **(NO)** a. Check if any of the following conditions exist: • PZR pressure LESS THAN 1850 psig. OR • RB pressure GREATER THAN 3.6 psig. OR • Steamline pressure LESS THAN 675 psig. OR • Steamline differential pressure GREATER THAN 97 psid. **ALTERNATIVE ACTION** a. GO TO EOP-1.1, REACTOR TRIP RECOVERY, Step 1.	EOP-1.0
EVALUATOR NOTE: • EOP-1.0 directs a transition to EOP-1.1 however a Red Path on Heat Sink requires implementation of EOP-15.0, Response to Loss of Secondary Heat Sink. • If Safety Injection occurs while EOP-15 is being implemented the crew may implement EOP-1.0 Attachment 3 (Page 45).			
	CRS	Implement EOP-15.0, Response to Loss of Secondary Heat Sink.	
CAUTION • If total EFW flow is LESS THAN 450 gpm due to operator action, this procedure should NOT be performed, since these actions are NOT appropriate if 450 gpm EFW flow is available. • If a NON-FAULTED SG is available, feed flow should NOT be reestablished to any FAULTED SG, to prevent thermal shock to SG tubes.			EOP-15.0
NOTE Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.			EOP-15.0

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Event Description: RCP Trip, ATWS, FW Isol Valve 1611A Fails Closed. (Manual Reactor trip) Loss of Heat Sink (EFW), Trip of Main FW pumps.

Time	Position	Applicant's Actions or Behavior	
	RO	1 Check if a secondary heat sink is required: a. Verify RCS pressure is GREATER THAN any NON-FAULTED SG pressure. b. Verify RCS Thot is GREATER THAN 350°F.	EOP-15.0
	RO	2 Verify power is available to all PZR PORV Block Valves: a. MVG-8000A, RELIEF 445 A ISOL. b. MVG-8000B, RELIEF 444 B ISOL. c. MVG-8000C, RELIEF 445 B ISOL.	EOP-15.0
	RO	3 Open the Block Valve for any PZR PORV that has been isolated due to excessive seat leakage: • MVG-8000A, RELIEF 445 A ISOL. • MVG-8000B, RELIEF 444 B ISOL. • MVG-8000C, RELIEF 445 B ISOL.	EOP-15.0
		CAUTION - Steps 4 through 16 If Wide Range level in any two SGs is LESS THAN 12% OR PZR pressure is GREATER THAN 2330 psig due to loss of secondary heat sink, Steps 17 through 24 should be immediately initiated for bleed and feed cooling.	EOP-15.0
	RO	4 Ensure the following valves are closed: • SG Blowdown, PVG-503A(B)(C). • SG Sample, SVX-9398A(B)(C).	EOP-15.0
		NOTE - Step 5 If EFW flow control can NOT be reestablished from the Control Room, this procedure should be continued while local operator action is in progress to restore EFW flow.	EOP-15.0

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Event Description: RCP Trip, ATWS, FW Isol Valve 1611A Fails Closed. (Manual Reactor trip) Loss of Heat Sink (EFW), Trip of Main FW pumps.

Time	Position	Applicant's Actions or Behavior	
	BOP	5 Try to establish EFW flow to at least one SG: a. Check Control Room indications for the cause of EFW failure: 1) Verify no EFW annunciators are lit: • XCP-621 3-5 (EFP SUCT HDR PRESS LO XFER TO SW). • Any alarm on XCP-622. • Any alarm on XCP-623. 2) Verify CST level is GREATER THAN 5 ft. 3) Ensure power is available to both MD EFW Pumps.	EOP-15.0
		CAUTION - Step 5.a.4) • EFW valves should NOT be opened to SGs with Wide Range level LESS THAN 12%. • If Wide Range level in all SGs is LESS THAN 12%, EFW valves should be open to only one SG, until RCS temperatures are decreasing, to limit any failure to one SG.	EOP-15.0
	BOP	4) Ensure all EFW valves are open: • FCV-3531(3541)(3551), MD EFP TO SG A(B)(C). • FCV-3536(3546)(3556), TD EFP TO SG A(B)(C). • MVG-2802A(B), MS LOOP B(C) TO TD EFP. • PVG-2030, STM SPLY TO TD EFP TRN A(B).	EOP-15.0
	BOP	b. Try to restore any EFW flow.	EOP-15.0

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Event Description: RCP Trip, ATWS, FW Isol Valve 1611A Fails Closed. (Manual Reactor trip) Loss of Heat Sink (EFW), Trip of Main FW pumps.

Time	Position	Applicant's Actions or Behavior	
BOOTH OPERATOR:			
		NOTE: Do Not Provide Information About Any Equipment Which Was Not Specifically Requested.	
		Acknowledge requests to investigate the EFW problems. The following conditions exist: • The "A" EFW Pp has a sheared shaft. • The "B" EFW Pp has tripped with no obvious cause. • The TD EFW Pp Steam Supply Valve, IFV-2030, has failed closed and cannot be opened. After 5 minutes report to the control room that attempts to correct the problems are unsuccessful.	
	BOP	c. Check total EFW flow to SGs GREATER THAN 450 gpm. **ALTERNATIVE ACTION** c. IF any feed flow to at least one SG verified, THEN perform the following: ... **(NO)** IF feed flow NOT verified, THEN perform the following: 1) Locally restore EFW flow. 2) GO TO Step 7.	EOP-15.0
	RO	7 Stop all RCPs.	EOP-15.0
		CAUTION - Step 8 Deaerator Storage Tank level should be monitored closely and maintained between 2.5 ft and 10.5 ft on LI-3135, DEAER STOR TK WR LVL FEET, to prevent tripping Condensate and Feedwater Booster Pumps.	EOP-15.0

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Event Description: RCP Trip, ATWS, FW Isol Valve 1611A Fails Closed. (Manual Reactor trip) Loss of Heat Sink (EFW), Trip of Main FW pumps.

Time	Position	Applicant's Actions or Behavior	
	BOP	8 Align the MCB for establishing feed flow: a. Ensure one Condensate Pump is running. b. Ensure two Feedwater Booster Pumps are running. c. Ensure Main FW Control Valves are closed: • FCV-478, A FCV. • FCV-488, B FCV. • FCV-498, C FCV. d. Place all Main FW Bypass Valve Controllers in MAN and closed: • FCV-3321,LOOP A MAIN FW BYP. • FCV-3331,LOOP B MAIN FW BYP. • FCV-3341,LOOP C MAIN FW BYP.	EOP-15.0
BOOTH OPERATOR: When called to place local key-operated switches in bypass: Acknowledge request. Wait 3 minutes. Insert TRIGGER 10, TRIGGER 11, and TRIGGER 12. Wait 1 minute. Report that all switches are in BYPASS.			
	BOP	e. Locally place the following key switches in BYPASS (CB-448): • XVG01611A,B,C (XPN 7114). • IFV03321,3331,3341 TRAIN A (XPN 7115). • IFV03321,3331,3341 TRAIN B (XPN 7121).	EOP-15.0
	BOP	f. Verify XCP-612 2-1 is NOT lit (RB PRESS HI-2 STM LINE ISOL).	EOP-15.0
NOTE - Step 8.g • SG B or C is preferred, so that a steam supply for the TD EFP will be restored as soon as possible. • Before the Low Steamline Pressure SI signal is blocked, Main Steam Isolation will occur if the Low Steam Pressure rate setpoint is exceeded.			EOP-15.0

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Event Description: RCP Trip, ATWS, FW Isol Valve 1611A Fails Closed. (Manual Reactor trip) Loss of Heat Sink (EFW), Trip of Main FW pumps.

Time	Position	Applicant's Actions or Behavior	
	BOP	g. Align the MS Isolation Valves to depressurize only one SG: 1) Verify the MS Isolation Valve, PVM-2801A(B)(C), is open for the SG to be depressurized. 2) Ensure the remaining two MS Isolation Valves, PVM-2801A(B)(C), are closed.	EOP-15.0
EVALUATOR NOTE: • The Alternative Actions are only required if the Low Steam Pressure rate setpoint is exceeded before the Low Steamline Pressure SI signal is blocked as stated in Step Note 8.g. • P-12 actuates on Tavg < 552°F to close all steam dumps unless the function is bypassed. P-12 coincident with high steamline flow causes main steamline isolation.			
	BOP	**ALTERNATIVE ACTION** g. Open the MS Isolation Bypass Valve for one SG: 1) IF RCS Tavg is LESS THAN P-12(552°F), THEN place STMLN SI TRAIN A(B) Switches to BLOCK. 2) Depress both MAIN STEAM ISOL VALVES RESET TRAIN A(B). 3) Open the MS Isolation Bypass Valve, PVM-2869A(B)(C), for only the SG to be depressurized. 4) Ensure the remaining two MS Isolation Bypass Valves, PVM-2869A(B)(C), are closed.	
		h. Place the following switches in AUTO: • PVG-1611A(B)(C), A(B)(C) ISOL. • FCV-3321,3331,3341, FW CNTRL BYP VLVS, Train A Switch. • FCV-3321,3331,3341, MAIN FW BYPASS VLVS, Train B Switch.	
	BOP	9 Reset both SI RESET TRAIN A(B) Switches.	EOP-15.0
EVALUATOR NOTE: The Main Feedwater Pumps will trip immediately if they are reset due to failure inserted in scenario.			

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Event Description: RCP Trip, ATWS, FW Isol Valve 1611A Fails Closed. (Manual Reactor trip) Loss of Heat Sink (EFW), Trip of Main FW pumps.

Time	Position	Applicant's Actions or Behavior	
	BOP	10 Establish Main Feedwater flow to the unisolated SG: a. Verify PERMISV C-9 status light is bright on XCP-6114 1-3. b. Open MOV-1-5A(B)(C), TURB DRN VLV. c. Ensure Feedwater Pump to be started is RESET (MCB or DCS (T ICON)). (**NO** – If any pump resets it will trip immediately) **ALTERNATIVE ACTION** 10 GO TO Step 11. Observe the NOTE prior to Step 11.	EOP-15.0
		NOTE - Step 11 • Step 11 should NOT be performed as long as the Main Feed Pump is supplying sufficient flow to increase SG level. • Before the Low Steamline Pressure SI signal is blocked, Main Steam Isolation will occur if the Low Steam Pressure rate setpoint is exceeded.	EOP-15.0
	BOP	11 WHEN the Main Feed Pump will NOT supply adequate flow to the SG, THEN depressurize one SG to establish Condensate flow: a. WHEN RCS Tavg is LESS THAN P-12 (552°F), THEN: • Place both STM DUMP INTERLOCK Switches to BYP INTLK. • Place STMLN SI TRAIN A(B) Switches to BLOCK.	EOP-15.0
		NOTE - Step 11.b SG B or C is preferred, so that a steam supply for the TD EFP will be restored as soon as possible.	EOP-15.0
	BOP	b. Open FCV-3321(3331)(3341), LOOP A(B)(C) MAIN FW BYP, to the SG to be depressurized.	EOP-15.0

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Event Description: RCP Trip, ATWS, FW Isol Valve 1611A Fails Closed. (Manual Reactor trip) Loss of Heat Sink (EFW), Trip of Main FW pumps.

Time	Position	Applicant's Actions or Behavior	
	BOP	c. Dump steam to the Condenser at the maximum rate: 1) Verify PERMISV C-9 status light is bright on XCP-6114 1-3. 2) Place the STM DUMP MODE SELECT Switch in STM PRESS. 3) Adjust the STM DUMP CNTRL Controller to fully open the Bank 1 Steam Dump Valves.	EOP-15.0
CRITICAL TASK	BOP	d. Adjust Condensate flow to restore SG Narrow Range level to between 26% and 60%.	EOP-15.0
EVALUATOR NOTE: The scenario may be terminated after Condensate flow is established to one Steam Generator and SG Level increases.			
	BOP	12 Reset Containment Isolation: • RESET PHASE A - TRAIN A(B) CNTMT ISOL. • RESET PHASE B - TRAIN A(B) CNTMT ISOL.	EOP-15.0
	BOP	13 Place both ESF LOADING SEQ A(B) RESETS to: a. NON-ESF LCKOUTS. b. AUTO-START BLOCKS.	EOP-15.0
	BOP	14 Establish Instrument Air to the RB: a. Start one Instrument Air Compressor and place the other in Standby. b. Open PVA-2659, INST AIR TO RB AIR SERV. c. Open PVT-2660, AIR SPLY TO RB.	EOP-15.0
		NOTE - Steps 15 and 16 The specified SG level range (Narrow Range OR Wide Range) must be used in the following Steps.	EOP-15.0

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Event Description: RCP Trip, ATWS, FW Isol Valve 1611A Fails Closed. (Manual Reactor trip) Loss of Heat Sink (EFW), Trip of Main FW pumps.

Time	Position	Applicant's Actions or Behavior	
		EVALUATOR NOTE: If this scenario is not terminated the crew may continue Step 15 until Narrow Range level is GREATER THAN 26%.	EOP-15.0
	BOP	15 Check SG levels: a. Verify Narrow Range level is GREATER THAN 26% in at least one SG. **(NO)** **ALTERNATIVE ACTION** a. IF feed flow to at least one SG is verified by: • Core exit TC temperatures decreasing, OR • Wide Range SG level increasing, THEN maintain flow to restore Narrow Range SG level to GREATER THAN 26%. RETURN TO Step 15.a. IF flow is NOT verified to any SG, THEN GO TO Step 16. (**NA**)	EOP-15.0
	CRS	b. RETURN TO the Procedure and Step in effect.	EOP-15.0
		EVALUATOR NOTE: If the scenario continues to this point the crew will exit EOP-15.0 and implement EOP-1.1, Reactor Trip Recovery.	

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Event Description: SOP-106 III.F. BORATE OPERATIONS

Time	Position	Applicant's Actions or Behavior	
		NOTE 2.0 1. Energizing additional Pressurizer Heaters will enhance mixing. 2. LCV-115A, LTDN DIVERT TO HU-TK, will begin to modulate to the HU-TK position at 70% level on LI-115, VCT LEVEL %.	SOP-106 III.F
	RO	2.1 Ensure at least one Reactor Coolant Pump is running.	SOP-106 III.F
	RO	2.2 Place RX COOL SYS MU switch to STOP.	SOP-106 III.F
	RO	2.3 Place RX COOL SYS MU MODE SELECT switch to BOR.	SOP-106 III.F
	RO	2.4 Set FIS-113, BA TO BLNDR FLOW, batch integrator to the desired volume.	SOP-106 III.F
	RO	2.5 Place RX COOL SYS MU switch to START.	SOP-106 III.F
		NOTE 2.6 Step 2.6 may be omitted when borating less than 10 gallons.	SOP-106 III.F
	RO	2.6 Place FCV-113 A&B, BA FLOW, controller in AUTO.	SOP-106 III.F
		NOTE 2.7 The AUTO setpoint dial for FCV-113A&B, BA FLOW, controller may be adjusted slowly to obtain the desired flow rate.	SOP-106 III.F
	RO	2.7 Verify the desired Boric Acid flow rate on FR-113, BA TO BLNDR GPM (F-113).	SOP-106 III.F
	RO	2.8 When the preset volume of boric acid has been reached, perform the following: a. Place FCV-113A&B, BA flow controller in MAN. b. Verify boration stops.	SOP-106 III.F
	RO	2.9 Place RX COOL SYS MU switch to STOP.	SOP-106 III.F
		NOTE 2.10 a. If plant conditions require repeated borations, Step 2.10 may be omitted. b. The volume in the piping between the blender and the VCT outlet is approximately 3.8 gallons.	SOP-106 III.F

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Event Description: SOP-106 III.F. BORATE OPERATIONS

Time	Position	Applicant's Actions or Behavior	
	RO	2.10 Alternate Dilute 4 to 6 gallons of Reactor Makeup Water to flush the line downstream of the blender by performing the following: a. Place RX COOL SYS MU MODE SELECT switch to ALT DIL. b. Adjust FCV-168, TOTAL MU FLOW SET PT, to desired flow rate. c. Set FIS-168, TOTAL MU FLOW, batch integrator to desired volume. d. Place RX COOL SYS MU switch to START. e. Verify desired flow rate on FR-113, TOTAL MU GPM (F-168). f. Verify alternate dilution stops when preset volume is reached on FIS-168, TOTAL MU FLOW, batch integrator. g. Place RX COOL SYS MU switch to STOP.	SOP-106 III.F
	RO	2.11 Place RX COOL SYS MU MODE SELECT switch to AUTO.	SOP-106 III.F
	RO	2.12 Adjust FCV-168, TOTAL MU FLOW SET PT, to 7.5 (120 gpm).	SOP-106 III.F
	RO	2.13 In MAN, adjust FCV-113 A&B, BA FLOW OUTPUT, to the required position which will ensure proper Boric Acid addition for subsequent Automatic Makeup operations.	SOP-106 III.F
	RO	2.14 Adjust FCV-113A&B, BA FLOW SET PT, to the desired position to ensure proper boric acid addition for subsequent Automatic Makeup operations.	SOP-106 III.F
	RO	2.15 Place RX COOL SYS MU switch to START.	SOP-106 III.F
	RO	2.16 Perform the following: a. Start XPP-13A(B), BA XFER PP A(B), for the in-service Boric Acid Tank. b. If necessary, start XPP-13A(B), BA XFER PP A(B), for the Boric Acid Tank on recirculation.	SOP-106 III.F
		END OF SECTION	SOP-106 III.F

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Event Description: SOP-106 IV.D. BORATING THE RCS USING THE EMERGENCY BORATE VALVE

Time	Position	Applicant's Actions or Behavior	
		CAUTION 2.0 AOP-106.1, Emergency Boration, should be used for any of the following: a. Failure of the Reactor Makeup Control System such that bypass is necessary to accomplish boration. b. Uncontrolled cooldown with Safety Injection NOT required. c. ANY questionable Shutdown Margin. d. Control Rod Insertion Limit is exceeded.	SOP-106 IV.D
		2.1 Open MVT-8104, EMERG BORATE.	SOP-106 IV.D
		2.2 Ensure XPP-13A(B), BA XFER PP A(B), is running.	SOP-106 IV.D
		2.3 Verify greater than 30 gpm flow on FI-110, EMERG BORATE FLOW GPM.	SOP-106 IV.D
		2.4 When boration is no longer required, perform the following: a. Close MVT-8104, EMERG BORATE. b. Verify no flow on FI-110, EMERG BORATE FLOW GPM.	SOP-106 IV.D
		END OF SECTION	SOP-106 IV.D

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Event Description: SOP-214 III.D. Turbine Load Reduction/Shutdown

Time	Position	Applicant's Actions or Behavior	
	BOP	2.1 Ensure the Control/Load screen is selected.	SOP-214
		NOTE 2.2 The turbine will come off the limiter and turbine load will lower once Load Set Reference is less than Load Limit Reference. Acknowledging dialog boxes is "skill of the Craft".	SOP-214
	BOP	2.2 To lower Turbine Load using Load Set, perform the following: a. If directed by Operations Management, disable the Turbine Vibration Trips per Section III. b. Select (or enter) the desired Rate %/min on Load Set. c. Select Load on Load Set (a dialog box will open). d. Enter the desired load and confirm. e. Verify proper system response. f. If during a load reduction, it is desired to stop the load reduction, perform the following: 1) Select Hold on Load Set. 2) Select the desired Rate %/min to resume load reduction. 3) If desired, place LOAD LIMIT in service per Section III.	SOP-214
	BOP	2.3 For rapid load shedding of 50 MWe, on an HMI keypad select Ctrl + Alt + S.	SOP-214
EVALUATOR NOTE: The remainder of this section deals with actions after Turbine Load is below 15%.			

Op Test No: NRC-ILO-13-01 Scenario # 3 Event # NA Page: 45 of 47

Event Description: EOP-1.0, Attachment 3

Time	Position	Applicant's Actions or Behavior	
	BOP	1 Ensure EFW Pumps are running: a. Ensure both MD EFW Pumps are running. b. Verify the TD EFW Pump is running if necessary to maintain SG levels.	EOP-1.0 Attachment 3
	BOP	2 Ensure the following EFW valves are open: FCV-3531(3541)(3551), MD EFP TO SG A(B)(C). FCV-3536(3546)(3556), TD EFP TO SG A(B)(C). MVG-2802A(B), MS LOOP B(C) TO TD EFP.	Attachment 3
	BOP	3 Verify total EFW flow is GREATER THAN 450 gpm.	Attachment 3
	BOP	4 Ensure FW Isolation: a. Ensure the following are closed: FW Flow Control, FCV-478(488)(498). FW Isolation, PVG-1611A(B)(C). FW Flow Control Bypass, FCV-3321(3331)(3341). SG Blowdown, PVG-503A(B)(C). SG Sample, SVX-9398A(B)(C). b. Ensure all Main FW Pumps are tripped.	Attachment 3
	BOP	5 Ensure SI Pumps are running: Two Charging Pumps are running. Both RHR Pumps are running.	Attachment 3
	BOP	6 Ensure two RBCU Fans are running in slow speed (one per train).	Attachment 3
	BOP	7 Verify Service Water to the RBCUs: a. Ensure two Service Water Pumps are running. b. Verify both Service Water Booster Pumps A(B) are running. c. Verify GREATER THAN 2000 gpm flow for each train on: FI-4466, SWBP A DISCH FLOW GPM. FI-4496, SWBP B DISCH FLOW GPM.	Attachment 3
	BOP	8 Verify two CCW Pumps are running.	Attachment 3

Op Test No: NRC-ILO-13-01 Scenario # 3 Event # NA Page: 46 of 47

Event Description: EOP-1.0, Attachment 3

Time	Position	Applicant's Actions or Behavior	
	BOP	9 Ensure two Chilled Water Pumps and Chillers are running.	Attachment 3
	BOP	10 Verify both trains of Control Room Ventilation are running in Emergency Mode.	Attachment 3
	BOP	11 Check if Main Steamlines should be isolated: a. Check if any of the following conditions are met: RB pressure GREATER THAN 6.35 psig. OR Steamline pressure LESS THAN 675 psig. OR Steamline flow GREATER THAN 1.6 MPPH AND Tavg LESS THAN 552°F. b. Ensure all the following are closed: MS Isolation Valves, PVM-2801A(B)(C). MS Isolation Bypass Valves, PVM-2869A(B)(C).	Attachment 3
	BOP	12 Ensure Excess Letdown Isolation Valves are closed: PVT-8153, XS LTDN ISOL. PVT-8154, XS LTDN ISOL.	Attachment 3
	BOP	13 Verify ESF monitor lights indicate Phase A AND Containment Ventilation Isolation on XCP-6103, 6104, and 6106. REFER TO ATTACHMENT 4, CONTAINMENT ISOLATION VALVE MCB STATUS LIGHT LOCATIONS, as needed.	Attachment 3
	BOP	14 Verify proper SI alignment: a. Verify SI valve alignment by verifying SAFETY INJECTION/PHASE A ISOL monitor lights are bright on XCP-6104. b. Verify all SAFETY INJECTION monitor lights are dim on XCP-6106. c. Verify SI flow on FI-943, CHG LOOP B CLD/HOT LG FLOW GPM. d. Check if RCS pressure is LESS THAN 325 psig.	Attachment 3

Op Test No: NRC-ILO-13-01 Scenario # 3 Event # NA Page: 47 of 47

Event Description: EOP-1.0, Attachment 3

Time	Position	Applicant's Actions or Behavior
	BOP	Report completion of Attachment 3.

EVALUATOR NOTE: ATTACHMENT 3 is complete.

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TURNOVER NOTES
(read at the start of the scenario)

Turnover Notes
Mode 1 // 100% Power // Work Week B1 // EOOS: Green // Grid Risk: Green // FEP Risk: Green // Switchyard thermography is in progress. Alternate Seal Injection is OOS for planned maintenance. It has been OOS for 2 hours and is expected back in 10 hours. A fire watch has been established IAW SOP-102. Xenon concentration is at equilibrium. Midnight RCS Boron Concentration is 1005 ppm.

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CONTROL ROOM SUPERVISOR RELIEF CHECKLIST

ATE/TIME: today

RELIEF SECTION

Turnover Notes
Mode 1 // 100% Power // Work Week B1 // EOOS: Green // Grid Risk: Green // FEP Risk: Green // Switchyard thermography is in progress. Alternate Seal Injection is OOS for planned maintenance. It has been OOS for 2 hours and is expected back in 10 hours. A fire watch has been established IAW SOP-102. Xenon concentration is at equilibrium. Midnight RCS Boron Concentration is 1005 ppm.

Offgoing Control Room Supervisor	
Operations in progress (GOPs, SOPs, load changes, etc.):	
Operations scheduled for oncoming shifts:	
ant safeguard systems in degraded status:	
	Initials
In the Control Room, all books are replaced, the desk and console tops are clear, and all trash is properly disposed of.	CRS
Station Log completed.	CRS

Oncoming Control Room Supervisor				**Initials**
Oncoming watch has reviewed the VCS Switchgear mailbox for switching orders.				
Plant Status (to be completed prior to turnover):				
	Plant ESF System Status:			
	Component Cooling System			
	Service water System			
	Reactor Building Cooling System			
	Reactor Building Spray System			
	Accumulator Tanks			
	RHR System			
	Charging/Safety Injection System Emergency Feedwater System			
	Accumulator Tanks			
	Diesel Generator			
	Chilled Water System			
	Control Room Ventilation System			
	Position indications, power availability, and annunciator alarms are normal for present plant conditions.			
		Plant Parameters	Limit	
		Reactor Power	0-100%	
		RCS Tavg	≤589.2°F per loop	
		RCS Pressure	<2385 psig	
		RCS Flow	>100% per loop	
		RCS Subcooling	Normal	
All parameters within allowable limits for plant conditions. If not, what actions are being taken to correct conditions:				
	Review of Logs:			
		Station Log		
		Removal and Restoration Log		
		Tagout Log		
		Special Orders		
Shift Turnover (to be completed during turnover):				
	Briefing on plant conditions by offgoing Control Room Supervisor.			
	Review of SPDS and BISI displays.			
	Discussion of Protected Equipment.			
	Identification of in-progress procedures including their present status and locations.			

C02→	To the best of my knowledge, I am fully qualified to assume this watch taking into consideration fitness for duty, requalification status, and minimum watchstanding qualification.		
Shift relief completed:		Oncoming Control Room Supervisor	
		Offgoing Control Room Supervisor	CR Supervisor
		Shift Supervisor review	

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REACTOR OPERATOR RELIEF CHECKLIST

DATE/TIME: today

LOG SECTION

Date	Entry

RELIEF SECTION

Turnover Notes

Mode 1 // 100% Power // Work Week B1 // EOOS: Green // Grid Risk: Green // FEP Risk: Green // Switchyard thermography is in progress.

Alternate Seal Injection is OOS for planned maintenance. It has been OOS for 2 hours and is expected back in 10 hours. A fire watch has been established IAW SOP-102.

Xenon concentration is at equilibrium.

Midnight RCS Boron Concentration is 1005 ppm.

Offgoing Reactor Operator	Initials
Main Control Board (Reactor Operator portion) properly aligned for the applicable mode.	RO
Housekeeping is satisfactory in the Reactor Operator area of responsibility.	RO
Discussion of Protected Equipment.	RO

Oncoming Reactor Operator	Initials
Review of HVAC Panel.	
Review of Station Log.	
Review of Removal & Restoration Log.	
Review of Main Control Board Panels.	

System Alignment	A	B	C	Train aligned to	Reasons for any inoperable equipment
Service Water Pumps	X	X		A	
Component Cooling Pumps	X			A	
Charging Pumps	X			A	
HVAC Chillers	X	X		A	
Reactor Building Spray Pumps					
RHR Pumps					
			TDEFP		
Emergency Feedwater Pumps					
Inoperable Radiation Monitors					

C02→	To the best of my knowledge, I am fully qualified to assume this watch taking into consideration fitness for duty, requalification status, and minimum watchstanding qualification.	
Shift relief completed:	Oncoming Reactor Operator	
	Offgoing Reactor Operator	Reactor Operator
	Shift Supervisor review	

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BALANCE OF PLANT RELIEF CHECKLIST

DATE/TIME: today

Date	Entry

RELIEF SECTION

Turnover Notes

Mode 1 // 100% Power // Work Week B1 // EOOS: Green // Grid Risk: Green // FEP Risk: Green // Switchyard thermography is in progress.

Alternate Seal Injection is OOS for planned maintenance. It has been OOS for 2 hours and is expected back in 10 hours. A fire watch has been established IAW SOP-102.

Xenon concentration is at equilibrium.

Midnight RCS Boron Concentration is 1005 ppm.

Offgoing Reactor Operator	Initials
Main Control Board (Reactor Operator portion) properly aligned for the applicable mode.	BOP
Housekeeping is satisfactory in the Reactor Operator area of responsibility.	BOP
Discussion of Protected Equipment.	BOP

Oncoming Reactor Operator	Initials
Review of Main Control Room Panels.	
Review of Station Log.	
Review of Removal & Restoration Log.	
Test annunciator lights (with Offgoing operator concurrence).	

C02→	To the best of my knowledge, I am fully qualified to assume this watch taking into consideration fitness for duty, requalification status, and minimum watchstanding qualification.	
Shift relief completed:	Oncoming Balance of Plant	
	Offgoing Balance of Plant	Balance of Plant
	Shift Supervisor review	

REACTIVITY CONTROL PARAMETERS

NOTE

This information should be recalculated every Sunday Dayshift (when the plant is in Mode 1) to be available for Reactor Engineering review Monday morning or following work day.

RCS Boron Concentration (**C**RCS) 1005 ppm Burnup 10000 MWD/MTU

(Check BAT in Service)

- ☐ **C**B "A" BAT 7350 ppm
- ☒ **C**B "B" BAT 7100 ppm

Moderator Temperature Coefficient (**MTC**) (Fig. II-3.7, HFP) -17.872 pcm/°F

Differential Boron Worth (**DBW**) (Fig. II-7.2, HFP) -6.953 pcm/ppm

Gallons of Boric Acid or Reactor Makeup Water required to change RCS average temperature by one (1) degree:

MTC/DBW = -17.872 / -6.953 = (Δ**B**) 2.57 ppm Boron Change/°F

gal. Acid/°F = 20.94 From Fig. III-2: gal. Acid/°F = $49640 \ln \left(\frac{(CB-CRCS)}{CB-(CRCS+\Delta B)}\right)$

gal. RMW/°F = 127.14 From Fig. III-3: gal. RMW/°F = $49640 \ln \left(\frac{CRCS}{(CRCS-\Delta B)}\right)$

Power Defect (PD) for 10% power change (100% to 90%) (Fig. II-2):

1766 PD @ 100% RTP - 1592.8 PD @ 90% RTP = 173.2 Δ Power Defect, pcm

Gallons of Boric Acid only to reduce reactor power from 100% to 90%:

Δ Power Defect/DBW = 173.2 / 6.953 = 24.91 ppm Boron

(Fig. III-2) 203.3 gal. Boric Acid/10% RTP

Final rod height using rods only to reduce reactor power from 100% to 90%:
(Assume ARO)

Δ Power Defect = Integrated Rod Worth (IRW) = 173.2 pcm

(Fig. II-10) 185 final rod height Bank D

REACTIVITY CONTROL PARAMETERS

NOTE

For a 10% reduction in load, ½ of the calculated boric acid should be used and ½ the calculated Control Rod motion.

For a 100% to 90% load reduction:

Use 102 **gallons boric acid** (½ the gallons calculated above), and expect the rods to be at approximately 200 **steps on bank D** (Fig. II-10 series, ½ the IRW, NOT ½ the steps).

To change T_{AVG} by 1° F: 20.9 **gallons Boric Acid/°F**

124.1 **gallons Reactor Makeup Water/°F**

For a 100% to 90% load reduction: **Use** 101.7 **gallons boric acid**

and expect 200 **steps on bank D**

NOTE:

This calculation is to provide a second check to the batch integrator setting to establish continuity between the setting and actual make-up results.

FCV 113 A&B, pot setting for current RCS boron concentration 4.81

Expected Boric Acid flowrate for VCT makeup 19

Expected Boric Acid total gallons on an Auto Makeup based on current BAT in service:

Current RCS **CB** / **CB** for BAT in service: 1122 / 7100 x 270 gallons* = 42.7

* Normal Auto Makeup is 267 to 275 gallons

Calculation and Auto Makeup pot settings by Reactor Operator 1 today
Signature / Date

Calculation and Auto Makeup pot settings verified by Reactor Operator 2 today
Signature / Date

Reactor Engineering Review Reactor Engineer Date today

REACTIVITY MANAGEMENT BRIEF MODES 1 - 3

NOTE

PART 1 REACTIVITY MANAGEMENT TURNOVER should be read at Shift Turnover Meeting.

PART 2 REACTOR STATUS should be discussed between the NROATC, BOP, and CRS.

PART 1 REACTIVITY MANAGEMENT TURNOVER:

- Date of last Automatic or Manual Make-Up: today
- Is Auto Makeup expected this shift (circle)? YES (NO)
- Expected Boric Acid total gallons on a normal Auto Makeup based on current BAT in service: 42.7 gallons
- FCV 113 A&B, pot setting for current RCS boron concentration: 4.81
- Expected Boric Acid flowrate for VCT makeup: 19
- Total gallons Diluted 227.3 Borated 42.7 (Last Shift)
- Last evolution (circle one): Borate / Dilute / (Blended)
- Expected Borations, Dilutions, or Blended changes to the RCS: _____
- List Reactivity Concerns in progress or planned and action(s) necessary (i.e. Steam or Feed Flow transmitter in test, Steam Generator Blowdown out of service, Calorimetric inputs in service, etc.).

"A" Steam Generator Feed Flow Spikes

REACTIVITY MANAGEMENT BRIEF MODES 1 – 3 (Cont'd)

PART 2 **REACTOR STATUS:** (circle one below)

- Delta I on Target (± 2%)? (YES) NO Not in Mode 1

  If NO is circled, identify plan to re-establish target band: _____

  _____

  _____

- Xenon Trend: (Stable) Building In Burning Out

- Demineralizers:

  Mixed Bed in service: A (B) PRC01 Y (N)

  Standby Demineralizer: (Filled) Borated Empty PRC01

  Cation Bed: Date last in service 1 month ago

  Boron Concentration when in service 1098

- ATTACHMENT IA reviewed and current: (YES) NO

- Midnight Boron Concentration and Date when CHG/SI pump was secured:

  C_B A _____ Date _____

  C_B B 1012 Date 3 days ago

  C_B C 1026 Date 1 week ago

SCHEDULED WORK APPROVAL/DENIAL

Scheduled Work/Activity Date today

Description of Work/Activity to be performed:
Scheduled maintenance on Alternate Seal Injection pump

I. This Moderate Risk, Elevated Risk, High Risk, or Cross Train activity is approved for work provided the required plant conditions are available on the scheduled due date.

OR

This specific activity has been reviewed for EOOS Risk Reassessment. Set EOOS Environmental Variance _____ Set Risk at Times _____

The following items were considered for making this approval:

Shift Supervisor Operations Supervisor (Moderate Risk or Cross Train)
In the absence of the Operations Supervisor:
Operations Scheduling, Shift Supervisor

_____ GMNPO/MDS (Elevated Risk)

_____ PSRC (High Risk)

II. This work activity/package cannot be performed on the scheduled date due to the following reason(s):

_____ SRO (WCC or On Shift)

_____ Operations Scheduling Supervisor

III. Recommended re-schedule date or plant conditions:

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **NJPSF-141A (R1)**

2015 NRC Sim a RO:

Continuous Rod Withdrawal

CANDIDATE: _____

EXAMINER: _____

TASK:

000-006-05-01 RESPOND TO CONTINUOUS ROD MOTION PER AOP-403.3/SOP-403

TASK STANDARD:

The reactor is tripped per AOP-403.3, CONTINUOUS CONTROL ROD MOTION, to terminate the transient prior to rods withdrawing to the point of adding heat (10e0 on Intermediate Range) and immediate actions of EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION, are completed.

TERMINATING CUE: Immediate actions of EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION are complete.

PREFERRED EVALUATION LOCATION *PREFERRED EVALUATION METHOD*

SIMULATOR PERFORM

REFERENCES:

Curve Book	Station Curve Book
REP-109.001	Calculation of Estimated Critical Conditions
REP-109.002	Inverse Count Rate Ratio Plot
GOP Appendix A	Generic Operating Precautions
EOP-1.0	E-0, REACTOR TRIP/SAFETY INJECTION ACTUATION
AOP-403.3	CONTINUOUS CONTROL ROD MOTION
GOP-3	REACTOR STARTUP FROM HOT STANDBY TO STARTUP (MODE 3 TO MODE 2)

INDEX NO.	*K/A NO.*		*RO*	*SRO*
0000012413	2.4.13	Knowledge of crew roles and responsibilities during EOP usage.	4.0	4.6
000001A105	AA1.05	Reactor trip switches	4.3	4.2

TOOLS: GOP Appendix A, Generic Operating Precautions
JPM a Handout 1; GOP-3, Reactor Startup from Hot Standby to Startup (MODE 3 TO MODE 2), marked up through step 3.12.k
JPM a Handout 2; REP-109.002, Enclosure 9.2, Recommended Rod Positions for ICRR marked through Bank C at 129 steps.
AOP-403.3, Continuous Control Rod Motion
EOP-1.0, E-0, Reactor Trip/Safety Injection Actuation
Copy of REP-190.002, Inverse Count Rate Ratio Plot

EVALUATION TIME 30 *TIME CRITICAL* No *10CFR55:* 45.a.3

TIME START: _____ TIME FINISH: _____ PERFORMANCE TIME: _____

PERFORMANCE RATING: SAT: ____ UNSAT: ____

CANDIDATE: _____

EXAMINER: _____ / _____

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS:

INITIAL CONDITION: A reactor start up is in progress after a short mini-outage.

GOP-3, REACTOR STARTUP FROM HOT STANDBY TO STARTUP (MODE 3 TO MODE 2), has been completed through step 3.12.k.

The Rod Insertion Limit at 0% power is 118 steps on Control Bank C.

The CRB INSERT LMT LO-LO (XCP-621 1-1) annunciator is NOT clear.

Control bank C is at 129 steps with Control Bank D at 1 step.

The estimated critical position is 100 steps on bank "D".

The Minimum rod height for criticality (-500 pcm equivalent) is 38 steps on Bank D.

The Maximum rod height for criticality (+500 pcm equivalent) is 185 steps on Bank D.

The source range counts have undergone one doubling at this point in the start up.

INITIATING CUES: A surrogate operator will fill the role of CRS for the purposes of this JPM.

Complete the Reactor Start up and increase reactor power to 10-3%per GOP-3 starting at Step 3.12.l.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

STEPS

CRITICAL: No ***SEQUENCED:*** Yes ***SAT*** ☐ ***UNSAT*** ☐

STEP: 1

Procedure Caution: Reactor startup should be stopped and I&C notified if the CRB INSERT LMT LO-LO (XCP-621 1-1) annunciator fails to clear between 118 steps and 134 steps on Bank C.

Step 3.12.l; Verify CRB INSERT LMT LO-LO (XCP-621 1-1) annunciator clears between 118 steps and 134 steps on Bank C..

Steps_____

STEP STANDARD:

Verifies LO-LO insertion Limit Annunciator clears (XCP-621 1-1)

CUES:

Evaluator note: Provide Examinee with copies of JPM a Handout 1 (GOP-3.0 markup) and JPM a Handout 2 (REP-109.002 Enclosure 9.2 mark up) following initial conditions brief.

Surrogate cue: Once Examinee is ready (on evaluator prompt) provide the following direction "Pull to 6 steps on Control Bank D or until the LO-LO Insertion Limit Alarm Clears whichever occurs first"

Evaluator note: Expect alarm to clear at 3 steps withdrawn on Control Bank D.

Surrogate cue: Once Examinee stops and verifies LO-LO insertion limit annunciator is clear, provide the following direction "Pull to 10 steps on Control Bank D."

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 2

Procedure Caution: 12 steps should NOT be exceeded until all Rod Bottom lights are off. If all Control Bank D Rod Bottom lights are NOT off at ten steps, AOP-403.5, Stuck Or Misaligned Control Rod, should be entered.

Step 3.12.m; At ten steps on Control Bank D, stop and verify Bank D RB lights clear.

STEP STANDARD:

Stops at 10 steps withdrawn on Control Bank D.

CUES:

Surrogate cue: After Examinee stops rod pull give the following direction "Inform me when counts are stable"

Surrogate cue: After Examinee announces counts are stable state "ICRR is 0.4 and criticality is predicted at 120 steps withdrawn on Control Bank D." Then give the following direction "Pull Control Bank D to 16 steps withdrawn or until LO Insertion Limit annunciator clears whichever comes first."

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 3

Step 3.12.n; Recommence withdrawing rods while observing that the groups sequence properly.

STEP STANDARD:

Continues to pull rods and stops at 16 steps withdrawn on Control Bank D or when the LO Insertion Limit Annunciator clears .

CUES:

Surrogate cue: Once Examinee stops and verifies LO insertion limit annunciator is clear, provide the following direction "Pull to 53 steps on Control Bank D."

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 4

Recommence withdrawing rods while observing that the groups sequence properly.

STEP STANDARD:

Continues rod withdrawal.

CUES:

Evaluator note: When rods are >51 steps on Bank D the continuous rod motion malfunction inserts. When examinee stops pull at 53 steps continuous rod motion occurs. This is the point that the JPM becomes alternate path.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 5

Enters AOP-403.3, CONTINUOUS CONTROL ROD MOTION.

STEP STANDARD:

Enters AOP-403.3, CONTINUOUS CONTROL ROD MOTION.

CUES:

Evaluator note: The examinee is not expected to pull out the procedure, but may perform the actions of this procedure from memory and trip the unit.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 6

Step 1; Verify rod motion is NOT required:

Tavg is within 1.5 °F of Tref.

AND

No load rejection has occurred (C7A OR C7B).

STEP STANDARD:

Notes Tavg and Tref matched and Status lights for C7A and C7B are dim: rod motion is not required.

CUES:

Evaluator note: This is an immediate operator action from AOP-403.3 and is expected to be performed from memory.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 7

Step 2; Place ROD CNTRL BANK SEL Switch in MAN.

STEP STANDARD:

Rods are already in manual no action required.

CUES:

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 8

Step 3; Verify rod motion is stopped.

STEP STANDARD:

Notes rods out light lit, step counters clicking and DRPI showing Bank D withdrawing, concludes that rod motion has NOT stopped.

CUES:

Evaluator note: This is an immediate operator action from AOP-403.3 and is expected to be performed from memory.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 9

Step 3 Alternative Action: Perform the following:

a) Trip the Reactor.

b) GO TO EOP-1.0. REACTOR TRIP/SAFETY INJECTION ACTUATION.

STEP STANDARD:

Turns one of the two reactor trip switches to trip prior to rods withdrawing to the Point of Adding Heat (10e0 on Intermediate Range instrumentation).

CUES:

Evaluator note: This is an immediate operator action from the Alternative Action of AOP-403.3 step 3. The Point of Adding Heat was noted at approximately 170 steps withdrawn on Control Bank D during development.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 10

Procedure Note:
-Steps 1 through 5 are Immediate Operator Actions.
-The EOP REFERENCE PAGE should be monitored throughout the use of this procedure.
- Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.

Step 1. Verify Reactor Trip:

- Trip the Reactor using either Reactor Trip Switch.

- Verify all Reactor Trip and Bypass Breakers are open.

- Verify all Rod Bottom Lights are lit.

- Verify Reactor Power level is decreasing.

STEP STANDARD:

Verifies:
-Reactor Trip and Bypass Breakers indicate Green light ON Red light OFF.
-Rod Bottom Lights are lit.
-Reactor Power level is decreasing.

CUES:

Evaluator note: This is an immediate operator action from EOP-1.0 and is expected to be performed from memory.

Evaluator cue: Direct Examinee to perform all Immediate actions from EOP-1.0 (both RO and BOP actions).

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 11

Step 2; Verify Turbine/Generator Trip:

a. Verify all Turbine STM STOP VLVs are closed.

b. Ensure Generator Trip (after 30 second delay):

1) Ensure the GEN BKR is open.

2) Ensure the GEN FIELD BKR is open.

3) Ensure the EXC FIELD CNTRL is tripped.

STEP STANDARD:

Verifies:
a. All Turbine STM STOP VLV indicate closed, status light for each valve is bright.

b. GEN BKR, GEN FIELD BKR, and EXC FIELD CNTRL indicate Green light ON and Red light OFF.

CUES:

Evaluator note: This is an immediate operator action from EOP-1.0 and is expected to be performed from memory.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 12

Step 3; Verify both ESF buses are energized.

STEP STANDARD:

Verifies potential lights on 1DA and 1DB are ON for all three phases on both buses.

CUES:

Evaluator note: This is an immediate operator action from EOP-1.0 and is expected to be performed from memory.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 13

Step 4; Check if SI is actuated:

a. Check if either:

SI ACT status light is bright on XCP-6107 1-1.

OR

Any red first-out SI annunciator is lit on XCP-626 top row.

Alternative Action go to Step 5.

STEP STANDARD:

Verifies: status light dim and no SI first out lit, goes to Step 5.

CUES:

Evaluator note: This is an immediate operator action from EOP-1.0 and is expected to be performed from memory.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 14

Step 5; Check if SI is required:

a. Check if any of the following conditions exist:

PZR pressure LESS THAN 1850 psig.

OR

RB pressure GREATER THAN 3.6 psig.

OR

Steamline pressure LESS THAN 675 psig.

OR

Steamline differential pressure GREATER THAN 97 psid.

Alternative action GO TO EOP-1.1, ES-0.1, REACTOR TRIP RECOVERY, Step 1.

STEP STANDARD:

Verifies:
PZR pressure is greater than 1850 psig
RB pressure less than 3.6 psig
All steam line pressures greater than 675 psig
All steam line pressures within 97 psi.

Transitions to EOP-1.1, ES-0.1, REACTOR TRIP RECOVERY.

CUES:

Evaluator note: This is an immediate operator action from EOP-1.0 and is expected to be performed from memory.

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: NJPSF-141A (R1)

DESCRIPTION: 2015 NRC Sim a RO: Continuous Rod Withdrawal

IC SET: 310

INSTRUCTIONS:

If IC 310 is designated for this JPM reset to IC 310.

1. RUN

2. Set up Audio Count Rate per GOP-3, step 3.4.e

3. Turn on Digital Reactivity Function of the IPCS per REP-109.002 step 7.6. set up display at ROATC SIPCS station using ZZREAC or RX STRT off the ZZ Menu.

4. Place HIGH FLUX AT SHUTDOWN in block per GOP-3, step 3.11.b.

5. Set SIPCS to MODE 2 per GOP-3, step 3.11.f

6. Set NR-45 to HI speed.

7. RUN until the Heat up or cooldown history clears on SIPCS. This may take 10-15 minutes on the initial reset.

8. FREEZE

9. When Examinee is ready (on Evaluator cue) go to RUN.

If IC 310 is not designated for this JPM then initial conditions may be established by resetting to IC 15 and following the below directions:

1. Go to RUN and withdraw Control Rods to 129 steps on Control bank C (1 step on Control Bank D).

2. Insert: MAL-PCS009AB REACTOR TRIP BREAKER A FAILURE (FAIL TO OPEN)
   Delay = 0, Fail To = AUTO (UV)

2. Insert MAL-PCS009BB REACTOR TRIP BREAKER B FAILURE (FAIL TO OPEN)
   Delay = 0, Fail To = AUTO (UV)

4. Set Event #1 as Mcrfpa(11) >51

5. Insert: MAL-CRF006B UNCONTROLLED MANUAL ROD MOTION, Delay=0, set to event #1

6. Set up Audio Count Rate per GOP-3, step 3.4.e

7. Place HIGH FLUX AT SHUTDOWN in block per GOP-3, step 3.11.b

8. Set SIPCS to MODE 2 per GOP-3, step 3.11.f

9. Turn on Digital Reactivity Function of the IPCS per REP-109.002 step 7.6.set up display at ROATC SIPCS station using ZZREAC or RX STRT off the ZZ Menu.

10. Set NR-45 to HI speed.

11. RUN until the Heat up or cooldown history clears on SIPCS. This may take 10-15 minutes on the initial reset.

12. FREEZE

13. When examinee is ready: RUN

COMMENTS:

Provide a surrogate in the role of CRS to simulate performing REP-109.002, Inverse Count Rate Ratio Plot and to provide cues for start up process.

During development, the Point of Adding Heat (10e0 on Intermediate Range) was observed at approximately 170 steps withdrawn on Control Bank D when the continuous rod withdrawal was allowed to proceed with auto trips failed malfunction in place. When the continuous rod motion malfunction was run without the auto trips blocked it took 2 minutes to reach the Source Range High Flux trip setpoint (10e5 CPS) and Control Bank D was at 147 steps withdrawn.

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS:

INITIAL CONDITION: A reactor start up is in progress after a short mini-outage.

GOP-3, REACTOR STARTUP FROM HOT STANDBY TO STARTUP (MODE 3 TO MODE 2), has been completed through step 3.12.k.

The Rod Insertion Limit at 0% power is 118 steps on Control Bank C. The

CRB INSERT LMT LO-LO (XCP-621 1-1) annunciator is NOT clear.

Control bank C is at 129 steps with Control Bank D at 1 step.

The estimated critical position is 100 steps on bank "D".

The Minimum rod height for criticality (-500 pcm equivalent) is 38 steps on Bank D.

The Maximum rod height for criticality (+500 pcm equivalent) is 185 steps on Bank D.

The source range counts have undergone one doubling at this point in the start up.

INITIATING CUES: A surrogate operator will fill the role of CRS for the purposes of this JPM.

Complete the Reactor Start up and increase reactor power to 10-3% per GOP-3 starting at Step 3.12.l.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

JPM a Handout 1

SOUTH CAROLINA ELECTRIC & GAS COMPANY

VIRGIL C. SUMMER NUCLEAR STATION

NUCLEAR OPERATIONS

NUCLEAR OPERATIONS
COPY NO._____

GENERAL OPERATING PROCEDURE

GOP-3

REACTOR STARTUP
FROM HOT STANDBY TO STARTUP
(MODE 3 TO MODE 2)

REVISION 13

SAFETY RELATED

RECORD OF CHANGES

CHANGE LETTER	TYPE CHANGE	APPROVAL DATE	CANCELLATION DATE	CHANGE LETTER	TYPE CHANGE	APPROVAL DATE	CANCELLATION DATE
A	P	01/25/10					
B	P	06/19/12					
C	P	07/02/12					
D	P	04/26/14					
E	P	06/30/14					
F	P	11/14/14					

CONTINUOUS USE

Continuous Use of Procedure Required.
Read Each Step Prior to Performing.

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TABLE OF CONTENTS

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1.0 PURPOSE/SCOPE

1.1 This procedure provides instructions for Reactor Startup, from Hot Standby to Startup.

1.2 The following governing regulations apply to this procedure:

a. 10CFR50.59.

b. 10CFR50, Appendix B.

c. SAP-630, Procedure/Commitment Accountability Program.

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NOTE 2.0 and 3.0

a. All personnel who sign off steps in this procedure must enter their names and initials on Attachment I.

b. Each step should be initialed and dated when all its substeps are either completed and checked-off or marked N/A and initialed.

NOTE 2.0

If this procedure must be initiated under conditions other than those in Section 2.0, INITIAL CONDITIONS, the Shift Supervisor or Control Room Supervisor will review Sections 2.0, INITIAL CONDITIONS, and 3.0, INSTRUCTIONS. Steps that are not applicable due to plant conditions will be marked N/A and initialed by the Shift Supervisor or Control Room Supervisor. All other items will require sign-off or check-off.

2.0 INITIAL CONDITIONS

		INITIALS/DATE
2.1	RCS status is as follows:	SRO / Today
	a. System temperature is being maintained between 555°F and 559°F using the Bank 1 Condenser Steam Dumps or Steamline PORVs.	☒
	b. System pressure is being maintained between 2230 psig and 2240 psig in AUTO control.	☒
	c. All Reactor Coolant Pumps are in operation.	☒
	d. Pressurizer level is being maintained at 25% in AUTO control.	☒
2.2	All Safety Injection Systems are aligned and operable.	SRO / Today
2.3	Excore NIs are aligned for critical operation per SOP-404, Excore Nuclear Instrumentation System.	SRO / Today
2.4	The Reactor is shutdown with all Control Bank Rods fully inserted.	SRO / Today

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INITIALS/DATE

2.5 Shutdown Margin is being maintained for Mode 3 conditions per STP-134.001, Shutdown Margin Verification. SRO / Today

2.6 Reactor Makeup Control is in AUTO and set for blended flow equal to the existing boron concentration. SRO / Today

2.7 Secondary Plant status is as follows: SRO / Today

a. The Main Turbine is on the Turning Gear per SOP-215, Main Turbine Lube Oil Supply System.

b. The Main Feedwater Pumps are on their Turning Gears per SOP-209, Feedwater Turbine Lube Oil System.

c. Narrow Range Steam Generator levels are being maintained between 60% and 65% with chemistry within specification using the following:

1) Blowdown per SOP-212, Steam Generator Blowdown.

2) Emergency Feedwater per SOP-211, Emergency Feedwater System.

d. Main Steam is being warmed per SOP-201, Main Steam System.

e. Feedwater is being warmed per SOP-210, Feedwater System.

f. Condensate is in operation per SOP-208, Condensate System.

g. Circulating Water is in operation per SOP-207, Circulating Water.

2.8 The Rod Control and Position Indicating Systems are in operation per SOP-403, Rod Control And Position Indicating System. SRO / Today

2.9 The Control Rod Drive Mechanism Ventilation System is in operation per SOP-114, Reactor Building Ventilation System. SRO / Today

2.10 GOP Appendix A review has been completed. SRO / Today

GOP 3 REFERENCE PAGE

1. GENERAL NOTES

   A. Procedure steps should normally be performed in sequence. However, it is acceptable to perform steps in advance after thorough evaluation of plant conditions and impact by the Shift Supervisor or Control Room Supervisor.

   B. At least two licensed operators, one of whom is SRO licensed, must be present in the Control Room during Reactor Startup.

2. REACTOR CONTROL

   A. Shutdown Bank Control:

      1) The Shutdown Banks must be fully withdrawn whenever reactivity additions are being made by dilution, Xenon, T_{avg}, or control rods unless one of the following conditions exists:

         a) The RCS is borated to Cold Shutdown concentration and verified by sample.

         b) T_{avg} is 557°F and the RCS is borated to the hot, Xenon-free concentration and verified by sample.

      2) If the count rate on any source range channel increases by more than a factor of two during any increment of Shutdown Bank withdrawal, rod withdrawal shall be stopped and the Shutdown Bank reinserted. Until Reactor Engineering has made a satisfactory evaluation of the situation, rod withdrawal shall not resume.

   B. Source Range Control:

      1) Source Range Counts and Digital Rod Position indication should be monitored during any Shutdown and Control Bank withdrawal or insertion.

      2) While in the Source Range, positive reactivity may be changed by only one controlled method.

   C. Anticipate criticality anytime:

      1) During rod motion.

      2) Boron dilution is in progress.

3.0 INSTRUCTIONS

INITIALS/DATE

3.1 Shut down and isolate BTRS as follows: SRO / Today

a. Place HCV-387, BTRS BYP FLOW, in BYP. ☒

b. Place BTRS SELECT Switch in OFF. ☒

3.2 Verify RCS Chemistry control for startup: SRO / Today

a. Contact Chemistry to ensure RCS Chemistry control is satisfactory for startup per CP-625, Chemistry Refueling Shutdown And Startup Plan. ☒

b. Record current Boron concentration: ☒

1658 ppm

CHG F

3.3 Perform the following if an RB entry is in progress or will occur during the reactor startup: NA / SRO / Today

a. Obtain the approval of the General Manager, Nuclear Plant Operations, for personnel to be in the RB during the reactor startup ☐

b. Notify Health Physics that a reactor startup is about to commence and dose rates in the RB could change rapidly. ☐

GOP 3 REFERENCE PAGE

1. GENERAL NOTES

   A. Procedure steps should normally be performed in sequence. However, it is acceptable to perform steps in advance after thorough evaluation of plant conditions and impact by the Shift Supervisor or Control Room Supervisor.

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      2) If the count rate on any source range channel increases by more than a factor of two during any increment of Shutdown Bank withdrawal, rod withdrawal shall be stopped and the Shutdown Bank reinserted. Until Reactor Engineering has made a satisfactory evaluation of the situation, rod withdrawal shall not resume.

   B. Source Range Control:

      1) Source Range Counts and Digital Rod Position indication should be monitored during any Shutdown and Control Bank withdrawal or insertion.

      2) While in the Source Range, positive reactivity may be changed by only one controlled method.

   C. Anticipate criticality anytime:

      1) During rod motion.

      2) Boron dilution is in progress.

INITIALS/DATE

3.4 Align Excore NIs for Reactor Startup as follows: SRO / Today

Z005→ a. Ensure INI00033-NI, REMOTE SOURCE RANGE MONITOR, is de-energized with fuses removed per SOP-404, Excore Nuclear Instrumentation System, Section IV.F.

CHG D

Z007→ b. Ensure the following Nuclear Instrumentation Channels are in operation per SOP-404, Excore Nuclear Instrumentation System, Section III.A and tested per the applicable STPs:

1) Two Source Range Channels.

2) Two Intermediate Range Channels.

3) At least three Power Range Channels.

c. Verify both Source Range Channels are indicating a minimum of two counts per second.

d. Perform either of the following to monitor Source and Intermediate Range Channels as follows:

1) Select the highest reading Source Range Channel and either Intermediate Range Channel on recorder NR-45, NIS RECORDER.

2) Monitor the highest reading Source Range Channel and either Intermediate Range Channel using computer display NR45 in FAST SPEED.

GOP 3 REFERENCE PAGE

1. GENERAL NOTES

   A. Procedure steps should normally be performed in sequence. However, it is acceptable to perform steps in advance after thorough evaluation of plant conditions and impact by the Shift Supervisor or Control Room Supervisor.

   B. At least two licensed operators, one of whom is SRO licensed, must be present in the Control Room during Reactor Startup.

2. REACTOR CONTROL

   A. Shutdown Bank Control:

      1) The Shutdown Banks must be fully withdrawn whenever reactivity additions are being made by dilution, Xenon, T_{avg}, or control rods unless one of the following conditions exists:

         a) The RCS is borated to Cold Shutdown concentration and verified by sample.

         b) T_{avg} is 557°F and the RCS is borated to the hot, Xenon-free concentration and verified by sample.

      2) If the count rate on any source range channel increases by more than a factor of two during any increment of Shutdown Bank withdrawal, rod withdrawal shall be stopped and the Shutdown Bank reinserted. Until Reactor Engineering has made a satisfactory evaluation of the situation, rod withdrawal shall not resume.

   B. Source Range Control:

      1) Source Range Counts and Digital Rod Position indication should be monitored during any Shutdown and Control Bank withdrawal or insertion.

      2) While in the Source Range, positive reactivity may be changed by only one controlled method.

   C. Anticipate criticality anytime:

      1) During rod motion.

      2) Boron dilution is in progress.

INITIALS/DATE

Step 3.4 continued

NOTE 3.4.e

Audio Count Rate is not required to be operable.

e. At the AUDIO COUNT RATE CHANNEL drawer, perform the following:

1) Select the highest reading Source Range Channel on the CHANNEL SELECTOR Switch.

2) Adjust the AUDIO MULTIPLIER Switch as necessary to maintain a distinguishable audio countrate.

3) Place the SR COUNTER/SCALER, POWER switch in the POWER position.

3.5 Complete Attachment III.A, Prior to Closing Reactor Trip Breakers in Modes 3, 4 & 5, of GTP-702. SRO / Today

C01→ N01→ 3.6 Ensure the P-4 trip actuating device operational test is performed and Reactor Trip breakers are closed per STP-345.039, Reactor Trip P-4 Trip Actuating Device Operational Test. SRO / Today

Z008→ 3.7 Ensure both Rod Control MG sets are supplying load to to Rod Control per SOP-403, Rod Control and Position Indicating System, Section III.A. SRO / Today CHG B CHG D

GOP 3 REFERENCE PAGE

1. GENERAL NOTES

   A. Procedure steps should normally be performed in sequence. However, it is acceptable to perform steps in advance after thorough evaluation of plant conditions and impact by the Shift Supervisor or Control Room Supervisor.

   B. At least two licensed operators, one of whom is SRO licensed, must be present in the Control Room during Reactor Startup.

2. REACTOR CONTROL

   A. Shutdown Bank Control:

      1) The Shutdown Banks must be fully withdrawn whenever reactivity additions are being made by dilution, Xenon, T_{avg}, or control rods unless one of the following conditions exists:

         a) The RCS is borated to Cold Shutdown concentration and verified by sample.

         b) T_{avg} is 557°F and the RCS is borated to the hot, Xenon-free concentration and verified by sample.

      2) If the count rate on any source range channel increases by more than a factor of two during any increment of Shutdown Bank withdrawal, rod withdrawal shall be stopped and the Shutdown Bank reinserted. Until Reactor Engineering has made a satisfactory evaluation of the situation, rod withdrawal shall not resume.

   B. Source Range Control:

      1) Source Range Counts and Digital Rod Position indication should be monitored during any Shutdown and Control Bank withdrawal or insertion.

      2) While in the Source Range, positive reactivity may be changed by only one controlled method.

   C. Anticipate criticality anytime:

      1) During rod motion.

      2) Boron dilution is in progress.

INITIALS/DATE

3.8 If necessary, withdraw the Shutdown Banks as follows: SRO / Today

a. Verify Shutdown Margin Boron Concentration is satisfactory by performing STP-134.001, Shutdown Margin Verification for Mode 3 with S/D Banks OUT

b. Place ROD CNTRL START UP RESET Switch in START UP.

CAUTION 3.8.c

To minimize the possibility of binding at the full in position, rods should not be driven below the 000 indication on the Group Demand Step Counters.

c. Ensure the Step Counters indicate zero (000) steps.

Z009→ d. Update Rod Bank positions on the IPCS, refer to OAP-107.1, Control of IPCS Functions, Step 6.2.b. CHG D

e. Ensure IZM01200, DRPI Main Control Board Display Monitor, and IZM01201, DRPI Main Control Board Display Monitor, indicate RB. CHG C

f. Momentarily depress the ROD CNTRL ALARM RESET Pushbutton. CHG F

g. Verify ROD CNTRL SYS FAIL URGENT (XCP-620 5-1) and ROD CNTRL SYS FAIL NON-URGENT (XCP-620 5-5) alarms cleared.

GOP 3 REFERENCE PAGE

1. GENERAL NOTES

   A. Procedure steps should normally be performed in sequence. However, it is acceptable to perform steps in advance after thorough evaluation of plant conditions and impact by the Shift Supervisor or Control Room Supervisor.

   B. At least two licensed operators, one of whom is SRO licensed, must be present in the Control Room during Reactor Startup.

2. REACTOR CONTROL

   A. Shutdown Bank Control:

      1) The Shutdown Banks must be fully withdrawn whenever reactivity additions are being made by dilution, Xenon, T_{avg}, or control rods unless one of the following conditions exists:

         a) The RCS is borated to Cold Shutdown concentration and verified by sample.

         b) T_{avg} is 557°F and the RCS is borated to the hot, Xenon-free concentration and verified by sample.

      2) If the count rate on any source range channel increases by more than a factor of two during any increment of Shutdown Bank withdrawal, rod withdrawal shall be stopped and the Shutdown Bank reinserted. Until Reactor Engineering has made a satisfactory evaluation of the situation, rod withdrawal shall not resume.

   B. Source Range Control:

      1) Source Range Counts and Digital Rod Position indication should be monitored during any Shutdown and Control Bank withdrawal or insertion.

      2) While in the Source Range, positive reactivity may be changed by only one controlled method.

   C. Anticipate criticality anytime:

      1) During rod motion.

      2) Boron dilution is in progress.

INITIALS/DATE

Step 3.8 continued

CAUTION 3.8.h

To prevent any inadvertent inward rod motion the ROD CNTRL BANK SEL Switch should not be placed in or pass through AUTO.

NOTE 3.8.h

Reactor Coolant System temperature is being maintained between 555°F and 559°F using the Bank 1 Condenser Steam Dumps or Steamline PORVs.

h. Place ROD CNTRL BANK SEL Switch in SBA. ☒

CAUTION 3.8.i

12 steps should **NOT** be exceeded until Rod Bottom lights are off. If all Shutdown Bank A Rod Bottom lights are **NOT** off at ten steps, AOP-403.5, Stuck Or Misaligned Control Rod, should be entered.

i. Using the ROD CONTROL ROD MOTION Lever, perform the following:

1) Withdraw Shutdown Bank A to ten Steps. ☒

2) Verify that all RB lights for Shutdown Bank A are off. ☒

3) Using the ROD CONTROL ROD MOTION Lever, withdraw SBA to 230 steps. ☒

GOP 3 REFERENCE PAGE

1. GENERAL NOTES

   A. Procedure steps should normally be performed in sequence. However, it is acceptable to perform steps in advance after thorough evaluation of plant conditions and impact by the Shift Supervisor or Control Room Supervisor.

   B. At least two licensed operators, one of whom is SRO licensed, must be present in the Control Room during Reactor Startup.

2. REACTOR CONTROL

   A. Shutdown Bank Control:

      1) The Shutdown Banks must be fully withdrawn whenever reactivity additions are being made by dilution, Xenon, T_{avg}, or control rods unless one of the following conditions exists:

         a) The RCS is borated to Cold Shutdown concentration and verified by sample.

         b) T_{avg} is 557°F and the RCS is borated to the hot, Xenon-free concentration and verified by sample.

      2) If the count rate on any source range channel increases by more than a factor of two during any increment of Shutdown Bank withdrawal, rod withdrawal shall be stopped and the Shutdown Bank reinserted. Until Reactor Engineering has made a satisfactory evaluation of the situation, rod withdrawal shall not resume.

   B. Source Range Control:

      1) Source Range Counts and Digital Rod Position indication should be monitored during any Shutdown and Control Bank withdrawal or insertion.

      2) While in the Source Range, positive reactivity may be changed by only one controlled method.

   C. Anticipate criticality anytime:

      1) During rod motion.

      2) Boron dilution is in progress.

INITIALS/DATE

Step 3.8 continued

CAUTION 3.8.j

To prevent any inadvertent inward rod motion the ROD CNTRL BANK SEL Switch should not be placed in or pass through AUTO.

j. Place ROD CNTRL BANK SEL Switch in SBB.

CAUTION 3.8.k

12 steps should **NOT** be exceeded until Rod Bottom lights are off. If all Shutdown Bank B Rod Bottom lights are **NOT** off at ten steps, AOP-403.5, Stuck Or Misaligned Control Rod, should be entered.

k. Using the ROD CONTROL ROD MOTION Lever, perform the following:

1) Withdraw Shutdown Bank B to ten steps.

2) Verify that all RB lights for Shutdown Bank B are off.

3) Using the ROD CONTROL ROD MOTION Lever, withdraw SBB to 230 steps.

GOP 3 REFERENCE PAGE

1. GENERAL NOTES

   A. Procedure steps should normally be performed in sequence. However, it is acceptable to perform steps in advance after thorough evaluation of plant conditions and impact by the Shift Supervisor or Control Room Supervisor.

   B. At least two licensed operators, one of whom is SRO licensed, must be present in the Control Room during Reactor Startup.

2. REACTOR CONTROL

   A. Shutdown Bank Control:

      1) The Shutdown Banks must be fully withdrawn whenever reactivity additions are being made by dilution, Xenon, T_{avg}, or control rods unless one of the following conditions exists:

         a) The RCS is borated to Cold Shutdown concentration and verified by sample.

         b) T_{avg} is 557°F and the RCS is borated to the hot, Xenon-free concentration and verified by sample.

      2) If the count rate on any source range channel increases by more than a factor of two during any increment of Shutdown Bank withdrawal, rod withdrawal shall be stopped and the Shutdown Bank reinserted. Until Reactor Engineering has made a satisfactory evaluation of the situation, rod withdrawal shall not resume.

   B. Source Range Control:

      1) Source Range Counts and Digital Rod Position indication should be monitored during any Shutdown and Control Bank withdrawal or insertion.

      2) While in the Source Range, positive reactivity may be changed by only one controlled method.

   C. Anticipate criticality anytime:

      1) During rod motion.

      2) Boron dilution is in progress.

INITIALS/DATE

3.9 Contact Reactor Engineering for recommended rod heights and Estimated Critical Condition information. SRO / Today

NOTE 3.10

Reactor Coolant System temperature is being maintained between 555°F and 559°F using the Bank 1 Condenser Steam Dumps or Steamline PORVs.

3.10 Perform a Shutdown Margin verification per STP-134.001, Shutdown Margin Verification, using Estimated Critical Condition boron, desired RCS temperature, and expected xenon. SRO / Today

STTS # 15-012345

NOTE 3.11 through 3.13

For initial criticality following refueling, REP-107.001, Controlling Procedure For Refueling Startup And Power Ascension Testing, is the controlling document for Reactor Startup. Appropriate steps of GOP-3 should be initialed as they are performed.

3.11 Prepare for Reactor Startup as follows: SRO / Today

a. Adjust Boron concentration as required by Estimated Critical Condition calculation as follows:

Z003→ Z010→ Z017→ 1) Borate or dilute per SOP-106, Reactor Makeup Water System, Sections III.D, III.E, or III.F. ☒

2) When complete, direct Chemistry to sample the RCS and the Pressurizer for boron. ☒

CHG D

GOP 3 REFERENCE PAGE

1. GENERAL NOTES

   A. Procedure steps should normally be performed in sequence. However, it is acceptable to perform steps in advance after thorough evaluation of plant conditions and impact by the Shift Supervisor or Control Room Supervisor.

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2. REACTOR CONTROL

   A. Shutdown Bank Control:

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      2) If the count rate on any source range channel increases by more than a factor of two during any increment of Shutdown Bank withdrawal, rod withdrawal shall be stopped and the Shutdown Bank reinserted. Until Reactor Engineering has made a satisfactory evaluation of the situation, rod withdrawal shall not resume.

   B. Source Range Control:

      1) Source Range Counts and Digital Rod Position indication should be monitored during any Shutdown and Control Bank withdrawal or insertion.

      2) While in the Source Range, positive reactivity may be changed by only one controlled method.

   C. Anticipate criticality anytime:

      1) During rod motion.

      2) Boron dilution is in progress.

INITIALS/DATE

Step 3.11 continued

b. Block HIGH FLUX AT SHUTDOWN as follows:

1) Disable the IPCS High Flux At Shutdown alarm function as follows:

a) Type the Turn-On-Code HFAS.

b) Verify OPERATOR DISABLED is indicated above the ENABLE CALCS box.

c) If OPERATOR ENABLED is indicated, select DISABLE CALCS.

2) Place HIGH FLUX AT SHUTDOWN Switch for SOURCE RANGE N-31 in BLOCK.

3) Place HIGH FLUX AT SHUTDOWN Switch for SOURCE RANGE N-32 in BLOCK.

4) Verify SR HI FLUX AT SHUTDN BLOCK (XCP-620 4-4) annunciator alarms.

c. Review Estimated Critical Condition calculation within four hours prior to criticality, verifying predicted rod height is above the Rod Insertion Limit per Tech Spec 4.1.1.1.1.c.

Time 3 Hours ago

CHG D

GOP 3 REFERENCE PAGE

1. GENERAL NOTES

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      1) Source Range Counts and Digital Rod Position indication should be monitored during any Shutdown and Control Bank withdrawal or insertion.

      2) While in the Source Range, positive reactivity may be changed by only one controlled method.

   C. Anticipate criticality anytime:

      1) During rod motion.

      2) Boron dilution is in progress.

INITIALS/DATE

Step 3.11 continued

d. Review the following for current status and limitations for Mode escalation:

1) Removal and Restoration Log.

2) Danger Tag Log.

3) 31 Day Surveillance Book.

4) Ensure completion of Attachment II.F, Operational Mode Change Plant Startup - Entering Mode 2, of GTP-702.

5) Ensure SAP-116, PLANT TRIP/SAFETY INJECTION PLANT RECOVERY, is completed, if necessary.

Z011→ e. Perform OAP-100.4, Communication, Attachment I, Mode Change Brief Checklist. CHG D

f. Update the IPCS Plant Mode indicator to indicate Mode 2 as the current Plant Mode as follows:

1) Type the Turn-On-Code MODE to display the PLANT MODE CHANGE DISPLAY window

2) Select the SET MODE 2 Pushbutton.

3) Verify the selected Mode is displayed on the left end of the top toolbar.

g. Verify all Shutdown Bank Rods fully withdrawn within 15 minutes of commencing Control Bank Rod withdrawal.

Time 10 Minutes prior to control bank withdrawal

GOP 3 REFERENCE PAGE

1. GENERAL NOTES

   A. Procedure steps should normally be performed in sequence. However, it is acceptable to perform steps in advance after thorough evaluation of plant conditions and impact by the Shift Supervisor or Control Room Supervisor.

   B. At least two licensed operators, one of whom is SRO licensed, must be present in the Control Room during Reactor Startup.

2. REACTOR CONTROL

   A. Shutdown Bank Control:

      1) The Shutdown Banks must be fully withdrawn whenever reactivity additions are being made by dilution, Xenon, T_{avg}, or control rods unless one of the following conditions exists:

         a) The RCS is borated to Cold Shutdown concentration and verified by sample.

         b) T_{avg} is 557°F and the RCS is borated to the hot, Xenon-free concentration and verified by sample.

      2) If the count rate on any source range channel increases by more than a factor of two during any increment of Shutdown Bank withdrawal, rod withdrawal shall be stopped and the Shutdown Bank reinserted. Until Reactor Engineering has made a satisfactory evaluation of the situation, rod withdrawal shall not resume.

   B. Source Range Control:

      1) Source Range Counts and Digital Rod Position indication should be monitored during any Shutdown and Control Bank withdrawal or insertion.

      2) While in the Source Range, positive reactivity may be changed by only one controlled method.

   C. Anticipate criticality anytime:

      1) During rod motion.

      2) Boron dilution is in progress.

INITIALS/DATE

Step 3.11 continued

NOTE 3.11.h

Reactor Coolant System temperature is being maintained between 555°F and 559°F using the Bank 1 Condenser Steam Dumps or Steamline PORVs.

h. Obtain the Shift Supervisor's permission to commence a Reactor Startup. ☒

i. Announce Reactor Startup over the page system. ☒

j. If used, place NR-45 CHART in HI speed. ☒

k. Initiate REP-109.002, Inverse Count Rate Ratio Plot. ☒

Time 5 minutes prior to Control Banks withdrawal

l. If performing an initial cycle startup, refer to REP-107.001, Controlling Procedure For Refueling Startup And Power Ascension Testing, for additional actions. ☒

GOP 3 REFERENCE PAGE

1. GENERAL NOTES

   A. Procedure steps should normally be performed in sequence. However, it is acceptable to perform steps in advance after thorough evaluation of plant conditions and impact by the Shift Supervisor or Control Room Supervisor.

   B. At least two licensed operators, one of whom is SRO licensed, must be present in the Control Room during Reactor Startup.

2. REACTOR CONTROL

   A. Shutdown Bank Control:

      1) The Shutdown Banks must be fully withdrawn whenever reactivity additions are being made by dilution, Xenon, T_{avg}, or control rods unless one of the following conditions exists:

         a) The RCS is borated to Cold Shutdown concentration and verified by sample.

         b) T_{avg} is 557°F and the RCS is borated to the hot, Xenon-free concentration and verified by sample.

      2) If the count rate on any source range channel increases by more than a factor of two during any increment of Shutdown Bank withdrawal, rod withdrawal shall be stopped and the Shutdown Bank reinserted. Until Reactor Engineering has made a satisfactory evaluation of the situation, rod withdrawal shall not resume.

   B. Source Range Control:

      1) Source Range Counts and Digital Rod Position indication should be monitored during any Shutdown and Control Bank withdrawal or insertion.

      2) While in the Source Range, positive reactivity may be changed by only one controlled method.

   C. Anticipate criticality anytime:

      1) During rod motion.

      2) Boron dilution is in progress.

INITIALS/DATE

3.12 Achieve Reactor criticality as follows: _____/_____

a. Review GOP Appendix A, Generic Operating Precautions, for Reactor Startup.

CAUTION 3.12.b

To prevent any inadvertent inward rod motion the ROD CNTRL BANK SEL Switch should not be placed in or pass through AUTO.

b. Place the ROD CNTRL BANK SEL Switch in MAN.

NOTE 3.12.c

A stable Startup Rate of one decade per minute should **NOT** be exceeded.

c. Using ROD CONTROL ROD MOTION lever, commence Control Bank Rod withdrawal to ten steps on Bank A.

Time *2 hours ago*

CAUTION 3.12.d

12 steps should **NOT** be exceeded until all Rod Bottom lights are off. If all Control Bank A Rod Bottom lights are **NOT** off at ten steps, AOP-403.5, Stuck Or Misaligned Control Rod, should be entered.

d. At ten steps on Control Bank A, stop and verify:

1) Bank A RB lights clear.

2) ONE ROD ON BOTTOM (XCP-621 3-1) annunciator clears.

3) RODS ON BOTTOM (XCP-621 3-2) annunciator clears.

e. Recommence withdrawing rods while observing that the groups sequence properly.

GOP 3 REFERENCE PAGE

1. GENERAL NOTES

   A. Procedure steps should normally be performed in sequence. However, it is acceptable to perform steps in advance after thorough evaluation of plant conditions and impact by the Shift Supervisor or Control Room Supervisor.

   B. At least two licensed operators, one of whom is SRO licensed, must be present in the Control Room during Reactor Startup.

2. REACTOR CONTROL

   A. Shutdown Bank Control:

      1) The Shutdown Banks must be fully withdrawn whenever reactivity additions are being made by dilution, Xenon, T_{avg}, or control rods unless one of the following conditions exists:

         a) The RCS is borated to Cold Shutdown concentration and verified by sample.

         b) T_{avg} is 557°F and the RCS is borated to the hot, Xenon-free concentration and verified by sample.

      2) If the count rate on any source range channel increases by more than a factor of two during any increment of Shutdown Bank withdrawal, rod withdrawal shall be stopped and the Shutdown Bank reinserted. Until Reactor Engineering has made a satisfactory evaluation of the situation, rod withdrawal shall not resume.

   B. Source Range Control:

      1) Source Range Counts and Digital Rod Position indication should be monitored during any Shutdown and Control Bank withdrawal or insertion.

      2) While in the Source Range, positive reactivity may be changed by only one controlled method.

   C. Anticipate criticality anytime:

      1) During rod motion.

      2) Boron dilution is in progress.

INITIALS/DATE

Step 3.12 continued

CAUTION 3.12.f

12 steps should **NOT** be exceeded until all Rod Bottom lights are off. If all Control Bank B Rod Bottom lights are **NOT** off at ten steps, AOP-403.5, Stuck Or Misaligned Control Rod, should be entered.

f. At ten steps on Control Bank B, stop and verify Bank B RB lights clear. ☒

g. Recommence withdrawing rods while observing that the groups sequence properly. ☒

h. Verify 102 step Bank Overlap between Control Bank A and Control Bank B. ☒

CAUTION 3.12.i

12 steps should **NOT** be exceeded until all Rod Bottom lights are off. If all Control Bank C Rod Bottom lights are **NOT** off at ten steps, AOP-403.5, Stuck Or Misaligned Control Rod, should be entered.

i. At ten steps on Control Bank C, stop and verify Bank C RB lights clear. ☒

j. Recommence withdrawing rods while observing that the groups sequence properly. ☒

k. Verify 102 step Bank Overlap between Control Bank B and Control Bank C. ☒

GOP 3 REFERENCE PAGE

1. GENERAL NOTES

   A. Procedure steps should normally be performed in sequence. However, it is acceptable to perform steps in advance after thorough evaluation of plant conditions and impact by the Shift Supervisor or Control Room Supervisor.

   B. At least two licensed operators, one of whom is SRO licensed, must be present in the Control Room during Reactor Startup.

2. REACTOR CONTROL

   A. Shutdown Bank Control:

      1) The Shutdown Banks must be fully withdrawn whenever reactivity additions are being made by dilution, Xenon, T_{avg}, or control rods unless one of the following conditions exists:

         a) The RCS is borated to Cold Shutdown concentration and verified by sample.

         b) T_{avg} is 557°F and the RCS is borated to the hot, Xenon-free concentration and verified by sample.

      2) If the count rate on any source range channel increases by more than a factor of two during any increment of Shutdown Bank withdrawal, rod withdrawal shall be stopped and the Shutdown Bank reinserted. Until Reactor Engineering has made a satisfactory evaluation of the situation, rod withdrawal shall not resume.

   B. Source Range Control:

      1) Source Range Counts and Digital Rod Position indication should be monitored during any Shutdown and Control Bank withdrawal or insertion.

      2) While in the Source Range, positive reactivity may be changed by only one controlled method.

   C. Anticipate criticality anytime:

      1) During rod motion.

      2) Boron dilution is in progress.

INITIALS/DATE

Step 3.12 continued

CAUTION Step 3.12.l

Reactor startup should be stopped and I&C notified if the CRB INSERT LMT LO-LO (XCP-621 1-1) annunciator fails to clear between 118 steps and 134 steps on Bank C.

l. Verify CRB INSERT LMT LO-LO (XCP-621 1-1) annunciator clears between 118 steps and 134 steps on Bank C. ☐

Steps _____

CAUTION 3.12.m

12 steps should **NOT** be exceeded until all Rod Bottom lights are off. If all Control Bank D Rod Bottom lights are **NOT** off at ten steps, AOP-403.5, Stuck Or Misaligned Control Rod, should be entered.

NOTE 3.12.m

Reactor Coolant System temperature is being maintained between 555°F and 559°F using the Bank 1 Condenser Steam Dumps or Steamline PORVs.

m. At ten steps on Control Bank D, stop and verify Bank D RB lights clear ☐

n. Recommence withdrawing rods while observing that the groups sequence properly. ☐

o. Verify the CRB INSERT LMT LO (XCP-621 1-2) annunciator clears between 138 steps and 144 steps on Bank C. ☐

CHG A

Steps _____

p. Verify 102 step Bank Overlap between Control Bank C and Control Bank D. ☐

GOP 3 REFERENCE PAGE

1. GENERAL NOTES

   A. Procedure steps should normally be performed in sequence. However, it is acceptable to perform steps in advance after thorough evaluation of plant conditions and impact by the Shift Supervisor or Control Room Supervisor.

   B. At least two licensed operators, one of whom is SRO licensed, must be present in the Control Room during Reactor Startup.

2. REACTOR CONTROL

   A. Shutdown Bank Control:

      1) The Shutdown Banks must be fully withdrawn whenever reactivity additions are being made by dilution, Xenon, T_{avg}, or control rods unless one of the following conditions exists:

         a) The RCS is borated to Cold Shutdown concentration and verified by sample.

         b) T_{avg} is 557°F and the RCS is borated to the hot, Xenon-free concentration and verified by sample.

      2) If the count rate on any source range channel increases by more than a factor of two during any increment of Shutdown Bank withdrawal, rod withdrawal shall be stopped and the Shutdown Bank reinserted. Until Reactor Engineering has made a satisfactory evaluation of the situation, rod withdrawal shall not resume.

   B. Source Range Control:

      1) Source Range Counts and Digital Rod Position indication should be monitored during any Shutdown and Control Bank withdrawal or insertion.

      2) While in the Source Range, positive reactivity may be changed by only one controlled method.

   C. Anticipate criticality anytime:

      1) During rod motion.

      2) Boron dilution is in progress.

INITIALS/DATE

Step 3.12 continued

q. Within 15 minutes before achieving criticality, verify T_{avg} greater than or equal to 551°F. ☐

Time _____ Tave _____

r. Announce criticality over the page system. ☐

Time _____

s. Verify critical rod position is above the Rod Insertion Limit per Tech Spec 3.1.3.6. ☐

t. Maintain as close to 0 SUR as reasonably achievable. ☐

u. At the AUDIO COUNT RATE CHANNEL drawer, place the following switches in OFF:

1) AUDIO MULTIPLIER. ☐

2) CHANNEL SELECTOR. ☐

3) SR COUNTER/SCALER, POWER switch. (Toggle down) ☐

GOP 3 REFERENCE PAGE

1. GENERAL NOTES

   A. Procedure steps should normally be performed in sequence. However, it is acceptable to perform steps in advance after thorough evaluation of plant conditions and impact by the Shift Supervisor or Control Room Supervisor.

   B. At least two licensed operators, one of whom is SRO licensed, must be present in the Control Room during Reactor Startup.

2. REACTOR CONTROL

   A. Shutdown Bank Control:

      1) The Shutdown Banks must be fully withdrawn whenever reactivity additions are being made by dilution, Xenon, T_{avg}, or control rods unless one of the following conditions exists:

         a) The RCS is borated to Cold Shutdown concentration and verified by sample.

         b) T_{avg} is 557°F and the RCS is borated to the hot, Xenon-free concentration and verified by sample.

      2) If the count rate on any source range channel increases by more than a factor of two during any increment of Shutdown Bank withdrawal, rod withdrawal shall be stopped and the Shutdown Bank reinserted. Until Reactor Engineering has made a satisfactory evaluation of the situation, rod withdrawal shall not resume.

   B. Source Range Control:

      1) Source Range Counts and Digital Rod Position indication should be monitored during any Shutdown and Control Bank withdrawal or insertion.

      2) While in the Source Range, positive reactivity may be changed by only one controlled method.

   C. Anticipate criticality anytime:

      1) During rod motion.

      2) Boron dilution is in progress.

INITIALS/DATE

3.13 Increase Reactor Power to 10^{-3}% as follows: _____/_____

a. Establish a stable Startup Rate of less than one decade per minute. ☐

b. At $7.5x10^{-6}$%, perform the following:

1) Verify P6 Permissive energizes to bright. ☐

2) Verify a minimum of one decade overlap between Source Range Channels and Intermediate Range Channels. ☐

c. Prior to 10^5 CPS, perform the following:

1) Momentarily place SR TRAIN A Switch in BLOCK. ☐

2) Verify SR A TRIP BLCK Permissive energizes to bright. ☐

3) Momentarily place SR TRAIN B Switch in BLOCK. ☐

4) Verify SR B TRIP BLCK Permissive energizes to bright. ☐

d. Perform one of the following for continued monitoring of Intermediate and Power Range instrument:

1) If available for use, select one Intermediate Range Channel and one Power Range Channel on NR-45, NIS RECORDER. ☐

2) Ensure at least one Intermediate Range and at least one Power Range instrument are selected for continuous monitoring using computer display NR45. ☐

e. Stabilize Reactor Power at 10^{-3}%. ☐

GOP 3 REFERENCE PAGE

1. GENERAL NOTES

   A. Procedure steps should normally be performed in sequence. However, it is acceptable to perform steps in advance after thorough evaluation of plant conditions and impact by the Shift Supervisor or Control Room Supervisor.

   B. At least two licensed operators, one of whom is SRO licensed, must be present in the Control Room during Reactor Startup.

2. REACTOR CONTROL

   A. Shutdown Bank Control:

      1) The Shutdown Banks must be fully withdrawn whenever reactivity additions are being made by dilution, Xenon, T_{avg}, or control rods unless one of the following conditions exists:

         a) The RCS is borated to Cold Shutdown concentration and verified by sample.

         b) T_{avg} is 557°F and the RCS is borated to the hot, Xenon-free concentration and verified by sample.

      2) If the count rate on any source range channel increases by more than a factor of two during any increment of Shutdown Bank withdrawal, rod withdrawal shall be stopped and the Shutdown Bank reinserted. Until Reactor Engineering has made a satisfactory evaluation of the situation, rod withdrawal shall not resume.

   B. Source Range Control:

      1) Source Range Counts and Digital Rod Position indication should be monitored during any Shutdown and Control Bank withdrawal or insertion.

      2) While in the Source Range, positive reactivity may be changed by only one controlled method.

   C. Anticipate criticality anytime:

      1) During rod motion.

      2) Boron dilution is in progress.

INITIALS/DATE

Step 3.13 continued

f. Record the following Critical Data:

1) RCS pressure: _____ psig ☐

2) T_{avg}: _____ °F ☐

3) Bank _____ at _____ steps ☐

4) Boron Concentration: _____ ppm ☐

5) Time: _____ ☐

6) Stable Power: _____% ☐

g. If performing an initial cycle startup, refer to REP-107.001, Controlling Procedure For Refueling Startup And Power Ascension Testing, for physics testing instructions. ☐

GOP 3 REFERENCE PAGE

1. GENERAL NOTES

   A. Procedure steps should normally be performed in sequence. However, it is acceptable to perform steps in advance after thorough evaluation of plant conditions and impact by the Shift Supervisor or Control Room Supervisor.

   B. At least two licensed operators, one of whom is SRO licensed, must be present in the Control Room during Reactor Startup.

2. REACTOR CONTROL

   A. Shutdown Bank Control:

      1) The Shutdown Banks must be fully withdrawn whenever reactivity additions are being made by dilution, Xenon, T_{avg}, or control rods unless one of the following conditions exists:

         a) The RCS is borated to Cold Shutdown concentration and verified by sample.

         b) T_{avg} is 557°F and the RCS is borated to the hot, Xenon-free concentration and verified by sample.

      2) If the count rate on any source range channel increases by more than a factor of two during any increment of Shutdown Bank withdrawal, rod withdrawal shall be stopped and the Shutdown Bank reinserted. Until Reactor Engineering has made a satisfactory evaluation of the situation, rod withdrawal shall not resume.

   B. Source Range Control:

      1) Source Range Counts and Digital Rod Position indication should be monitored during any Shutdown and Control Bank withdrawal or insertion.

      2) While in the Source Range, positive reactivity may be changed by only one controlled method.

   C. Anticipate criticality anytime:

      1) During rod motion.

      2) Boron dilution is in progress.

INITIALS/DATE

CAUTION 3.14

While operating with a positive Moderator Temperature Coefficient:

a. All reactivity additions should be slow and controlled.

b. A stable Startup Rate of 0.3 decade per minute should not be exceeded.

c. Rods should be moved in 1/2 step increments until the effect of rod motion has been evaluated.

NOTE 3.14

Ensure sufficient Emergency Feedwater Flow exists prior to raising power.

3.14 Increase Reactor Power to between 1% and 3%. _____/_____

3.15 At the Point of Adding Heat, if NR-45, NIS RECORDER, had previously been selected to HI speed place the recorder in LO speed. _____/_____

CAUTION 3.16

a. Adjustment of Tavg with the Rod Control System must not be attempted with the ROD CNTRL BANK SEL Switch in any position other than MAN.

b. Manual rod control is required to establish equilibrium conditions, since C-5 blocks automatic rod withdrawal.

3.16 Maintain T_{avg} between 555°F and 559°F. _____/_____

3.17 Complete Attachment II.G, Operational Mode Change Plant Startup - Entering Mode 1, of GTP-702. _____/_____

3.18 Proceed to GOP-4A, Power Operation (Mode 1 - Ascending). _____/_____

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4.0 REFERENCES

4.1 CP-625, Chemistry Refueling Shutdown And Startup Plan. CHG F

4.2 FSAR Section 5.0.

4.3 GOP Appendix A.

4.4 GOP-4A, Power Operation (Mode 1 - Ascending).

4.5 GTP-702, Operational Mode Change and Contingency Surveillance Requirements.

4.6 OAP-100.4, Communication.

4.7 REP-107.001, Controlling Procedure For Refueling Startup And Power Ascension Testing.

4.8 REP-109.002, Inverse Count Rate Ratio Plot.

4.9 SAP-630, Procedure / Commitment Accountability Program.

4.10 SOP-103, Boron Thermal Regeneration System.

4.11 SOP-106, Reactor Makeup Water System.

4.12 SOP-114, Reactor Building Ventilation System.

4.13 SOP-201, Main Steam System.

4.14 SOP-205, Turbine Sealing Steam System.

4.15 SOP-206, Main and Auxiliary Condenser Air Removal System.

4.16 SOP-207, Circulating Water.

4.17 SOP-208, Condensate System.

4.18 SOP-209, Feedwater Turbine Lube Oil System.

4.19 SOP-210, Feedwater System.

4.20 SOP-211, Emergency Feedwater System.

4.21 SOP-212, Steam Generator Blowdown.

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4.22 SOP-215, Main Turbine Lube Oil Supply System.

4.23 SOP-403, Rod Control And Position Indicating System.

4.24 SOP-404, Excore Nuclear Instrumentation System.

4.25 STP-134.001, Shutdown Margin Verification.

4.26 STP-345.039, Reactor Trip P-4 Trip Actuating Device Operational Test.

4.27 V.C. Summer Precautions, Limitations, and Setpoints.

4.28 V.C. Summer Reactor Engineering Procedures.

4.29 V.C. Summer Tech Specs.

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JPM a Handout 2

Recommended Rod Positions for ICRR

Bank A		Bank B		Bank C		Bank D		Purpose
0	X							Start
10	X							Rod Bottom lights
53	X							**ICRR**
103	X							**ICRR**
129	X	1						Overlap
138		10	X					**ICRR**, RB lights
181		53	X					**ICRR**
230		103	X					**ICRR**, Overlap
		129	X	1				Overlap
		138		10	X			**ICRR**, RB lights
		181		53	X			**ICRR**
		230		103	X			**ICRR**, Overlap
				*118-134**	X			*LO-LO Alarm Clear*
				129	X	1		Overlap
				*118-134**		*0-6*	☐	*LO-LO Alarm Clear*
				138		10	☐	**ICRR**, RB lights,
				138-144		*10-16*	☐	*LO Alarm Clear*
				181		53	☐	**ICRR**
				206		78	☐	**ICRR** (If < 0.2)
				230		103	☐	**ICRR**, Overlap
						128	☐	**ICRR** (If < 0.2)
						153	☐	**ICRR**
						178	☐	**ICRR**
						203	☐	**ICRR**

☐ = placekeeping checkbox

*LO-LO Alarm should clear in the 118-134 range and overlap should be checked at 129.

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **NJPSF-007A (R1)**

2015 NRC Sim b SRO & RO: Steam Generator Tube Rupture
(Depressurize RCS to < Ruptured S/G Pressure)

CANDIDATE: _____

EXAMINER: _____

TASK:

000-038-05-01 RESPOND TO STEAM GENERATOR TUBE RUPTURE PER EOP-4.0

TASK STANDARD:

RCS pressure is reduced to less than ruptured S/G pressure with PZR level > 10% or PZR level 76% or RCS subcooling < 52.5°F. The use of applicable Human Performance Tools (3-way communications, self checking, peer checking, phonetic alphabet, etc) and industrial safety practices meets expectations. This JPM is related to PRA event OAP2 " Depressurize RCS to stop leakage into ruptured S/G"

TERMINATING CUE: RCS depressurization completed with task standard met and the chosen PORV Block valve closed.

PREFERRED EVALUATION LOCATION *PREFERRED EVALUATION METHOD*

SIMULATOR PERFORM

REFERENCES:

EOP-4.0 E-3, STEAM GENERATOR TUBE RUPTURE

INDEX NO.	*K/A NO.*		*RO*	*SRO*
010000A203	A2.03	PORV failures	4.1	4.2

TOOLS: Copy of EOP-4.0 marked for current plant conditions (tube rupture on S/G "C") up to step 24.

EVALUATION TIME 15 *TIME CRITICAL* No *10CFR55:* 45(a)6

TIME START: _____ TIME FINISH: _____ PERFORMANCE TIME: _____

PERFORMANCE RATING: SAT: _____ UNSAT: _____

CANDIDATE: _____

EXAMINER: _____ _____ /

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS:

INITIAL CONDITION: A Steam Generator Tube Rupture is in progress.

S/G "C" has been isolated per EOP-4.0.

An operator initiated cooldown has been performed according to EOP-4.0, through Step 23.

INITIATING CUES: A surrogate operator will be provided to respond to non-related alarms per your direction.

Control Room Supervisor directs you as ROATC to depressurize the RCS using PZR Spray, per EOP-4.0, Step 24.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

STEPS

CRITICAL: No ***SEQUENCED:*** Yes ***SAT*** ☐ ***UNSAT*** ☐

STEP: 1

Attempt to depressurize the RCS using normal spray valve PCV-444D.

STEP STANDARD:

Places PZR Spray Valve PCV-444D controller in MANUAL and increases output to 100% demand. Determines that PCV-444D did not open based on Red light OFF and Green light ON for PCV-444D.

CUES:

Evaluator note: Give candidate 1-2 minutes to become familiar with control board indications and status of procedure implementation.

Evaluator cue: Provide the marked up copy of EOP-4.0, E-3 Steam Generator Tube Rupture at this time.

Evaluator note: With "B" and "C" RCP secure candidate should NOT attempt to open PCV-444C. Proceeds to Step 25 based on alternative action Step 24 a.

COMMENTS:

CRITICAL: No ***SEQUENCED:*** Yes ***SAT*** ☐ ***UNSAT*** ☐

STEP: 2

Verifies at least one PZR PORV is available.

STEP STANDARD:

Notes all three PZR PORVs are available by observing Green lights ON for all PORV position indicators.

CUES:

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 3

Opens one PZR PORV until any termination criteria is met; RCS pressure < 'C' (ruptured) S/G pressure and PZR level > 10%; or PZR level >76; or RCS subcooling <52.5°F.

STEP STANDARD:

Selected PORV indicates Red light ON, Green light OFF.

RCS pressure decreases.

Recognizes one of the following from MCB indications:

-RCS pressure < 'C' S/G pressure with PZR level >10% or,
-PZR level >76% or,
-RCS subcooling <52.5°F.

CUES:

Evaluator note: Using the MCB indicators it is most likely that candidate will terminate on RCS pressure < Ruptured ('C') S/G pressure and PZR level > 10%, but if using IPCS values it is possible that they will terminate on PZR level >76. Both termination criteria occur at about the same time and terminating on either one is satisfactory.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 4

Closes Selected PORV.

STEP STANDARD:

Takes PORV Control Switch for the Selected PORV to the CLOSE position.

- Notes Selected PORV position indicates Red light ON, Green light OFF and RCS pressure still decreasing.
- Candidate notes that selected PORV failed to close.

CUES:

Evaluator note: This is the point that the JPM becomes alternate path.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 5

Stops RCS depressurization by closing block valve for associated PORV.

STEP STANDARD:

Places associated PORV Block Valve (MVG-8000A/B/C) to close observes Red light OFF, Green light ON.

CUES:

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: NJPSF-007A (R1)

DESCRIPTION: 2015 NRC Sim b SRO & RO: Steam Generator Tube Rupture (Depressurize RCS to < Ruptured S/G Pressure)

IC SET: 311

INSTRUCTIONS:

If IC-311 is designated for this JPM then reset to IC-311, leaving simulator in FREEZE.

Set IPSC to display 2PS1 at the RO station.

Mark up EOP-4.0 for current plant conditions (tube rupture on SG "C") up to step 24.

When Examinee is ready, (on evaluator cue) go to RUN.

If IC-311 is not designated for this JPM then initial conditions may be established by reseting to IC-10 and following the below directions:

1. Insert: MAL-RCS002C Final Value = 600 Ramp = 0 (S/G Tube Rupture on 'C' S/G)
   MAL-PRS003B Final Value = 0 (PRESSURIZER SPRAY VALVE 444D FAILURE)
2. Set Event #1 as X05i386o >0
   Set Event #2 as X05i387o >0
   Set Event #3 as X05i388o >0
3. Insert: VLV-RC004P Final Value = 100 (PCV-445A STUCK OPEN), set to event #1
   VLV-RC001P Final Value = 100 (PCV-444B STUCK OPEN), set to event #2
   VLV-RC005P Final Value = 100 (PCV-445B STUCK OPEN), set to event #3
4. RUN 180 seconds
5. Manual SI and perform actions of EOP-1.0 & EOP-4.0 up through step 4.
6. Throttle EFW to 'C' S/G when level > 40%.
7. FREEZE
8. Insert: LOA-MSS033 Position To = RACK OUT, (RACK OUT BKR FOR MVG-2802B (STM SUPPLY TO TDEFP))
9. RUN
10. Trip RCPs "B" and "C".
11. Perform actions of steps 5 to step 23 of EOP-4.0.
12. FREEZE
13. Set IPSC to dsplay 2PS1 at the RO station.
14. Mark up EOP-4.0 for current plant conditions (tube rupture on SG "C") up to step 24.
15. When Examinee is ready: RUN

COMMENTS:

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS:

INITIAL CONDITION: A Steam Generator Tube Rupture is in progress.

S/G "C" has been isolated per EOP-4.0.

An operator initiated cooldown has been performed according to EOP-4.0, through Step 23.

INITIATING CUES: A surrogate operator will be provided to respond to non-related alarms per your direction.

Control Room Supervisor directs you as ROATC to depressurize the RCS using PZR Spray, per EOP-4.0, Step 24.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **NJPS-065 (R1)**

2015 NRC Sim c RO:

Establish Hot Leg Injection During Loss of RHR at Mid-Loop Conditions

CANDIDATE: _____

EXAMINER: _____

TASK:

000-083-05-01 RESPOND TO LOSS OF RESIDUAL HEAT REMOVAL SYSTEM WHILE AT MID-LOOP CONDITIONS PER AOP-115.5/SOP-115

TASK STANDARD:

- SI flow verified on FI-940, CHG LOOP A CLD/HOT LG FLOW and hot leg level increasing.

TERMINATING CUE: SI flow verified on FI-940 and hot leg level increasing.

PREFERRED EVALUATION LOCATION *PREFERRED EVALUATION METHOL*

SIMULATOR PERFORM

REFERENCES:

AOP-115.1 RHR PUMP VORTEXING

AOP-115.5 LOSS OF RHR WITH THE RCS NOT INTACT (MODES 5 AND 6)

INDEX NO.	*K/A NO.*		*RO*	*SRO*
000025K301	AK3.01	Shift to alternate flowpath	3.1	3.4

TOOLS: AOP-115.5 marked to match initial conditions.

EVALUATION TIME 15 *TIME CRITICAL* No *10CFR55:* 41(b)10

TIME START: _____ TIME FINISH: _____ PERFORMANCE TIME: _____

PERFORMANCE RATING: SAT: _____ UNSAT: _____

CANDIDATE: _____

EXAMINER: _____ _____ / _____

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The plant was in Mode 5 with RCS at Mid-loop conditions with the Reactor head installed and the Pressurizer Manway removed.

The 'A' RHR loop was the in-service loop.

Due to lowering hot leg level, the Crew entered AOP-115.1 and then AOP-115.5.

The present conditions are:

- RCS hot leg level is in the region of unacceptable operation for RHR.
- Step 17 of AOP-115.5 has been reached and core exit TC temperatures are >200°F and increasing.
- The 'B' Charging pump is in service.

INITIATING CUES: A surrogate operator will be provided to respond to non-related alarms per your direction.

The CRS directs you as NROATC to establish Hot Leg Injection per AOP-115.5, Attachment 2.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

STEPS

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 1

Step 1. Check if a Charging Pump is available.

STEP STANDARD:

Verifies 'B' charging pump is available by observing Red light ON above pump control switch and amps indicated on ammeter.

CUES:

Evaluator note: Assure that SIPCS screens are set up per the JPM Setup Instructions.

Evaluator cue: Provide the marked up copy of AOP-115.5, Loss of RHR with the RCS not Intact (Modes 5 and 6) at this time.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 2

Step 2. Stop any running Charging Pump

STEP STANDARD:

Stops 'B' Charging pump by placing control switch to STOP.

CUES:

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 3

Step 3. Close MVG-8107 and MVG-8108, CHG LINE ISOL.

STEP STANDARD:

Positions MVG-8107 & 8108, CHG LINE ISOLs, to closed position, Red light OFF and Green light ON for each valve.

CUES:

Evaluator note: At least one of the valves must be closed to satisfy step.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 4

Step 4.a. Ensure all of the following are closed

MVG-8885, CHG LP A ALT TO COLD LEGS.

MVG-8801A(B), HI HEAD TO COLD LEG INJ.

STEP STANDARD:

Verifies MVG-8885, CHG LP A ALT TO COLD LEGS, indicates Red light OFF and Green light ON.

Verifies MVG-8801A & B, HI HEAD TO COLD LEG INJ, indicates Red light OFF and Green light ON.

CUES:

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 5

Step 4.b. Open MVG-8884, CHG LP A TO HOT LEGS..

STEP STANDARD:

Places TRN A PWR LCKOUT switch to ON.

Positions MVG-8884, CHG LP A ALT TO HOT LEGS, to Open position; Red light ON and Green light OFF.

CUES:

Evaluator note: The procedure does not describe operation of the Power Lockout Switch but this action is required to get MVG-8884 to change position.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 6

Step 4.c. Close MVG-8106, CHG PP, Miniflow Isolation.

STEP STANDARD:

Positions MVG-8106 CHG PP, Miniflow Isolation to Closed position; Red light OFF and Green light ON

Places TRN A LCKOUT switch to OFF.

CUES:

Evaluator note; MVG-8106 operation relies on the same power lockout switch as MVG-8884.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 7

Step 4.d. Close MVT-8105, SEAL WTR INJ ISOL.

STEP STANDARD:

Positions MVT-8105, SEAL WTR INJ ISOL, to Closed position; Red light OFF and Green light ON.

CUES:

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 8

Step 5. Start one Charging Pump.

STEP STANDARD:

Starts 'B' Charging pump by placing control switch to START position. Pump indicates Red light ON and Green light OFF with normal pump amps.

CUES:

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 9

Step 6. Verify SI flow on FI-940, CHG LOOP A CLD/HOT LG FLOW GPM.

STEP STANDARD:

SI flow verified on FI-940, CHG LOOP A CLD/HOT LG FLOW.

CUES:

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 10

Restores Hot Leg level

STEP STANDARD:

Hot Leg level > 15.5"

CUES:

Evaluator cue: End JPM when level begins to increase.

Evaluator note: The RCS Mid Loop Level Monitoring system LR-1330/1331 indicates in inches above the bottom of the Hot Leg and 15.5" is the desired indication. The Mansell indication is in feet elevation and 430' 10" is the desired reading.

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: NJPS-065 (R1)

DESCRIPTION: 2015 NRC Sim c RO: Establish Hot Leg Injection During Loss of RHR at Mid-Loop Conditions

IC SET: 312

INSTRUCTIONS:

If IC 312 is designated for this JPM then reset to IC 312, leaving the simulator in FREEZE.

1. Set one SIPCS screen to HALFPIPE from the Map Menu selections and another to ZZSHTDWN, Shutdown off the ZZ Menu pad.

2. Set up Mansell Level monitoring cart at the CCW end of the Main Control Boards. Turn on CRS SIPCS screen by typing MLMSA or MLMSB from any SIPCS screen. If the SIPCS function is NOT enabled just set up the computer cart for Mansell Indication.

3. When Examinee is ready (on evaluator cue) go to RUN

If IC-312 is not designated for this JPM then initial conditions may be established by reseting to IC-20 and following the below directions:

1. Insert: MAL-RCS006C Final Value = 4000 (RCS Cold leg leak)
   OVR-AA028 Override To = True (Ann acknowledge)
   LOA-RCS053 Final Value = POWER_ON (Mid-loop Monitor Disconnect Switch)

2. Set one SIPCS screen to HALFPIPE from the Map Menu selections and another to ZZSHTDWN, Shutdown off the ZZ Menu pad..

3. Set up Mansell Level monitoring cart at the CCW end of the Main Control Boards. Turn on CRS SIPCS screen by typing MLMSA or MLMSB from any SIPCS screen. If the SIPCS function is NOT enabled just set up the computer cart for Mansell Indication.

4. RUN

5. Perform actions of AOP-115.1, step 1 waiting for break flow to require Alternative Action 1 d.

6. Perform actions of AOP-115.5 steps 1-4 and steps 11 - 17.

7. When core exit TC temperature is >200°F, with LT1330/1331 < 15.5" and Mansell < 430' 10" modify MAL-RCS006C to 2,000.

9. FREEZE

8. When Examinee is ready (on evaluator cue): RUN

COMMENTS:

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The plant was in Mode 5 with RCS at Mid-loop conditions with the Reactor head installed and the Pressurizer Manway removed.

The 'A' RHR loop was the in-service loop.

Due to lowering hot leg level, the Crew entered AOP-115.1 and then AOP-115.5.

The present conditions are :

- RCS hot leg level is in the region of unacceptable operation for RHR.
- Step 17 of AOP-115.5 has been reached and core exit TC temperatures are >200°F and increasing.
- The 'B' Charging pump is in service.

INITIATING CUES: A surrogate operator will be provided to respond to non-related alarms per your direction.

The CRS directs you as NROATC to establish Hot Leg Injection per AOP-115.5, Attachment 2.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **NJPSF-019A (R1)**

2015 NRC Sim d RO & SRO-U:

Manually Initiate Reactor Building Spray

CANDIDATE: _____

EXAMINER: _____

TASK:

026-005-01-01 MANUALLY INITIATE REACTOR BUILDING SPRAY PER SOP-116/EOP1.0.

TASK STANDARD:

At least one train of containment spray is manually actuated with >2500 gpm per EOP-1.0 and RCPs are secured PRIOR to damaging RCP due to loss of CCW as evident from Motor Bearing temperature exceeding 195°F or Lower Seal Water Bearing temperature exceeding 225°F or Seal Water Outlet temperature exceeding 235°F.

TERMINATING CUE: RB Spray initiated.

PREFERRED EVALUATION LOCATION *PREFERRED EVALUATION METHOL*

SIMULATOR PERFORM

REFERENCES:

EOP-1.0 E-0, REACTOR TRIP/SAFETY INJECTION ACTUATION

INDEX NO.	*K/A NO.*		*RO*	*SRO*
026000A401	A4.01	CSS controls	4.5	4.3

TOOLS: EOP-1.0, E-0, REACTOR TRIP/SAFETY INJECTION ACTUATION marked through step 7.

EVALUATION TIME 5 *TIME CRITICAL* NO *10CFR55:* 45(b)(8)

TIME START: _____ TIME FINISH: _____ PERFORMANCE TIME: _____

PERFORMANCE RATING: SAT: ____ UNSAT: ____

CANDIDATE: _____

EXAMINER: _____ / _____

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The reactor has tripped from 100% power and an SI has occurred.

INITIATING CUES: A surrogate operator will be provided to respond to non-related alarms per your direction.

The CRS directs you as the ROATC to perform Step 8 of EOP-1.0, E-0, REACTOR TRIP/ SAFETY INJECTION ACTUATION.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

STEPS

CRITICAL: No ***SEQUENCED:*** Yes ***SAT*** ☐ ***UNSAT*** ☐

STEP: 1

Step 8; Verify RB pressure has remained LESS THAN 12 psig on PR-951, RB PSIG (P-951), red pen

STEP STANDARD:

Verifies RB pressure >12 PSIG, moves to Alternative Action column for step 8.

CUES:

Evaluator cue: Provide the marked up copy of EOP-1.0, E- 0, REACTOR TRIP/SAFETY INJECTION ACTUATION marked through step 7.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 2

AA Step 8 a); Verify both the following annunciators are lit:

XCP-612 3-2 (RB SPR ACT).

XCP-612 4-2 (PHASE B ISOL).

IF either annunciator is NOT lit, THEN actuate RB Spray by placing the following switches to ACTUATE:

Both CS-SGA1 and CS-SGA2.

OR

Both CS-SGB1 and CS-SGB2.

STEP STANDARD:

Verifies both annunciators are NOT lit.

Places (CS-SGA1 and CS-SGA2) or (CS-SGB1 and CS-SGB2) to the ACTUATE position.

CUES:

Evaluator note: These switches require two hand operation to turn both switches at once.

Evaluator note: Examinee may try both trains of switches. If only "A" train switches are used they will fail to work and starting individual components becomes critical. If "B" train switches are used they will cause all spray system functions to occur EXCEPT the Train "A" RB Spray pump discharge valve, MVG-3003A, will not automatically open and must be manually opened. The JPM becomes alternate path once the Examinee begins manual realignment actions.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 3

AA Step 8 b); Verify Phase B Isolation by ensuring RB SPRAY/PHASE B ISOL monitor lights are bright on XCP-6105.

STEP STANDARD:

PHASE B Isol monitor lights are bright on XCP-6105.

CUES:

Evaluator cue: If told as the SS that Phase B monitor lights are not bright on XCP-6105 then direct Examinee to ensure valves are aligned as required for Phase B.

Evaluator note: If only the "A" train switches were used then PHASE B lights will not turn bright.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 4

AA Step 8c); Ensure the following are open:

MVG-3001A(B), RWST TO SPRAY PUMP A(B) SUCT.

MVG-3002A(B), NAOH TO SPRAY PUMP A(B) SUCT.

MVG-3003A(B), SPRAY HDR ISOL LOOP A(B).

STEP STANDARD:

MVG-3001A(B), RWST TO SPRAY PUMP A(B) SUCT. Indicates Red light ON, Green light OFF.

MVG-3002A(B), NAOH TO SPRAY PUMP A(B) SUCT. Indicates Red light ON, Green light OFF.

MVG-3003A(B), SPRAY HDR ISOL LOOP A(B). Indicates Red light ON, Green light OFF.

CUES:

Evaluator Note: If only "A" train switches were used in JPM step 2 the Examinee must manually open all valves from their MCB switches.

Evaluator Note: MVG-3003A must be opened manually regardless of which train switches were attempted to actuate RB spray. Examinee must manually open the valve from its MCB switches.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 5

AA Step 8 d); Ensure both RB Spray Pumps are running.

STEP STANDARD:

Verifies 'A' and 'B' RB Spray Pumps are running by Red light ON indication and normal running amps.

CUES:

Evaluator Note: This step is critical if the "B" train switches were not attempted to actuate RB spray. If only "A" train switches were used in JPM step 2 the Examinee must manually start the pumps from their MCB switches.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 6

AA Step 8 e); Verify RB Spray flow is GREATER THAN 2500 gpm for each operating train on:

FI-7368, SPR PP A DISCH FLOW GPM.

FI-7378, SPR PP B DISCH FLOW GPM.

STEP STANDARD:

FI-7368, SPR PP A DISCH FLOW, and FI-7378, SPR PP B DISCH FLOW, are > 2500 gpm.

CUES:

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 7

AA Step 8 f); Stop all RCPs.

STEP STANDARD:

Places 'A', 'B', & 'C' RCP switches in Stop; Red light OFF, Green light ON, flow decreasing and 0 running amps PRIOR to damaging RCP due to loss of CCW as evident from Motor Bearing temperature exceeding 195°F or Lower Seal Water Bearing temperature exceeding 225°F or Seal Water Outlet temperature exceeding 235°F.

CUES:

Evaluator Note: It is possible that the Examinee may decide to trip RCPs at the beginning of this JPM based on RB Hi 3 pressure. The EOP-1.0 reference page lists the Phase B actuation annunciator (XCP-612 4-2) as criteria for tripping RCPs not the Hi 3 pressure. The phase B has not happened at the beginning of the JPM but it should have. The Examinee will ensure that it does happen. A premature trip of the RCPs would be technically incorrect but NOT grounds for failure.

****

Booth Operator note: Do not reset the simulator until Evaluator is satisfied that RCP temperatures were not exceeded. Provide information from SIPCS in the booth.

****

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: NJPSF-019A (R1)

DESCRIPTION: 2015 NRC Sim d RO & SRO-U: Manually Initiate Reactor Building Spray

IC SET: 313

INSTRUCTIONS:

If IC-313 is designated for this JPM then reset to IC 313 leaving the simulator in FREEZE.

1. RUN, silence annunciators and FREEZE promptly.

2. Silence DCS speaker.

3. Set up SIPCS in Booth with RCP temperatures; Motor Bearings, Lower Seal Water Bearing and Seal Watrer Outlet.

4. When Examinee is ready (on Evaluator cue) go to run.

If IC-313 is not designated for this JPM then initial conditions may be established by reseting to IC-10 and following the below directions:

1. Insert: LOA-PCS109 Position To = AS IS (HI-3 Channel 1 fail as is)
   LOA-PCS110 Position To = AS IS (HI-3 Channel 2 fail as is)
   LOA-PCS116 Position To = AS IS (HI-3 Channel 4 fail as is)
   MAL-RHR008A Reactor Building Spray Pump "A" discharge valve (3003A) fail
   MAL-MSS003A Final Value = 1.2E7, (Steamline break inside containment)
   OVR-SG011 Override To = FALSE, (Fail RB Spray actuation switch) CS-SGA1 (Train A)
   OVR-SG012 Override To = FALSE, (Fail RB Spray actuation switch) CS-SGA2 (Train A)

2. Set event #1 as x02i101o = = 1 (Allows manual opening of 3003A when 101 switch taken to open)

3. Insert a "new" MAL-RHR008A, set to Event #1, set Delete in = 1 second.

4 .RUN until RB pressure >12 psig and ESF loading sequencer is complete (approximately 60 seconds). Leave RCPs running.

5. FREEZE

6. Ensure RCS pressure is greater than the 1418 psig RCP trip criteria then modify MAL-MSS003A to final value = 1.8E6

7. RUN, silence annunciators and FREEZE promptly.

8. Silence DCS speaker.

9. Set up SIPCS in Booth with RCP temperatures; Motor Bearings, Lower Seal Water Bearing and Seal Watrer Outlet.

10. When Examinee is ready (on evaluator cue): RUN

COMMENTS:

Failing 1/2 RB Spray Actuation switches in a train will disable that function.

**********CAUTION:**********

Booth Operator do NOT reset simulator until Evaluator has verified RCP Temperatures did NOT exceed critical standard of Motor Bearing > 195°F, Lower Seal Water Bearing > 225°F and Seal Water Outlet >235ºF.

****

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The reactor has tripped from 100% power and an SI has occurred.

INITIATING CUES: A surrogate operator will be provided to respond to non-related alarms per your direction.

The CRS directs you as the ROATC to perform Step 8 of EOP-1.0, E-0, REACTOR TRIP/ SAFETY INJECTION ACTUATION.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **NJPS-025 (R2)**

2015 NRC Sim e RO:

Start and Load "B" Emergency Diesel Generator

CANDIDATE: _____

EXAMINER: _____

TASK:

064-003-01-01 LOAD THE DIESEL GENERATOR

TASK STANDARD:

"B" Diesel Generator is started and loaded to 4150-4250 KW. The use of applicable Human Performance Tools (3-way communications, self checking, peer checking, phonetic alphabet, etc) and industrial safety practices meets expectations.

TERMINATING CUE: "B" D/G operating at >4150 KW load.

PREFERRED EVALUATION LOCATION *PREFERRED EVALUATION METHOD*

SIMULATOR PERFORM

REFERENCES:

SOP-306 EMERGENCY DIESEL GENERATOR

INDEX NO.	*K/A NO.*		*RO*	*SRO*
064000A401	A4.01	Local and remote operation of the ED/G	4.0	4.3

TOOLS: SOP-306 with section IV.B step 2.1 and 2.2 marked as complete. (JPM e handout)

EVALUATION TIME 15 *TIME CRITICAL* No *10CFR55:* 45(a)8

TIME START: TIME FINISH: PERFORMANCE TIME:

PERFORMANCE RATING: SAT: UNSAT:

CANDIDATE:

EXAMINER: _____ _____ /

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS:

INITIAL CONDITION:

The plant is operating at 100% power.

"B" D/G is to be started and loaded for monitoring cylinder temperatures using SOP-306 Section IV.B.

Normal and Alternate AC power is available to buses 1DA and 1DB.

It is an B2 Maintenance Work Week.

Hourly logging of ESF XFMR FEED KV (MCB) voltage and 1DB VOLTS (MCB) is being performed by another licensed operator per SOP-306, Section IV B step 2.1.

All pre-start check steps have been completed.

INITIATING CUES:

CRS directs you to start and load "B" D/G to 4150-4250 KW per SOP-306, Section IV.B, steps 2.3 & 2.4.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

STEPS

CRITICAL: No ***SEQUENCED:*** Yes ***SAT*** ☐ ***UNSAT*** ☐

STEP: 1

Step 2.3 a. Ensure the diesel is ready to be started as indicated by the following:

1) Verify Annunciator XCP-637 1-2, DG B AUTOSTART NOT READY, is NOT in alarm.

STEP STANDARD:

Verifies Annunciator XCP-637 1-2, DG B AUTOSTART NOT READY, is clear.

CUES:

Evaluator cue: Provide JPM e Handout to Examinee at conclusion of initial briefing.

Evaluator note: Examinee may take extra time to review Precautions as a matter of familiarizing with task prior to commencing start and load.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 2

Step 2.3 a. Ensure the diesel is ready to be started as indicated by the following:

2) The READY FOR AUTO START light is lit at the Diesel Generator B Local Control Panel (DB-436).

STEP STANDARD:

Calls the IB operator and verifies the "READY FOR AUTO START" light is lit at the "B" D/G Local Control Panel.

CUES:

Booth Operator cue: When requested, as the IB operator, inform the Examinee that the "READY FOR AUTO START" light is lit at the "B" D/G Local Control Panel.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 3

Step 2.3 b. Momentarily place the Diesel Generator B TEST Switch to START.

STEP STANDARD:

Momentarily rotates "B" Diesel Generator TEST switch to the START position.

CUES:

Evaluator note: Examinee should request a peer check.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 4

Step 2.3 c. Verify the Diesel Generator starts and stabilizes between the following:

1) 58.9 Hz and 61.1 Hz.

2) 6800 volts and 7600 volts.

STEP STANDARD:

DG B VOLTS indicates 6800-7600 volts and FREQUENCY indicates 58.9 - 61.1 Hertz.

CUES:

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 5

Step 2.3 d. Reset the tripped Diesel Generator B relay flags at the local panel (XCX-5202, DB-436).

STEP STANDARD:

Calls the IB operator and verifies the Diesel Generator B relay flags are reset at the Local Control Panel.

CUES:

Booth Operator cue: When requested, as the IB operator, inform the Examinee that the Diesel Generator B relay flags have been reset.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 6

Procedure NOTE 2.4

If time permits, the following guidelines should be utilized to achieve the desired load:

a. Prior to closing the Diesel Generator Breaker, the Diesel should be run at no-load for at least ten minutes.
b. Once the Diesel Generator Breaker is closed, load should be adjusted to between 850 KW and 1000 KW and maintained for at least ten minutes.
c. Load should be adjusted to between 2250 KW and 2550 KW and maintained for at least ten minutes.
d. Load should be adjusted to between 3250 KW and 3550 KW and maintained for at least ten minutes.
e. Load should be adjusted to between 4150 KW and 4250 KW and maintained for at least ten minutes.

Step 2.4 If the Diesel Generator is to be loaded, perform the following:

a. Ensure the VOLT REG Switch is in AUTO.

STEP STANDARD:

VOLT REG switch for the 'B' D/G indicates AUTO.

CUES:

Evaluator cue: As CRS direct Examinee as BOP to load "B" DG

per Note 2.4. Evaluator note: Examinee should request a peer

check.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 7

Step 2.4 b. Place the DG B SYNC SEL switch in DSL.

STEP STANDARD:

DG B SYNC SEL switch indicates DSL.

CUES:

Evaluator note: Examinee should request a peer check.

Evaluator cue: When examinee mentions that he is waiting at least 10 minutes for diesel running at no-load or appears to be paused and waiting the 10 minutes, inform examinee that he may continue with a minimum time compression of 1 min. = 10 minutes.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 8

Step 2.4 c. Using the VOLT REG RAISE-LOWER Switch adjust Diesel Generator B SYNC VOLTS to slightly higher than 1DB SYNC VOLTS.

STEP STANDARD:

VOLT REG RAISE LOWER switch used to adjust DG 'B' SYNC VOLTS slightly higher than 1DB SYNC VOLTS.

CUES:

Evaluator note: Examinee should request a peer check.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 9

Step 2.4 d. Using the SPEED Switch adjust Diesel Generator B frequency to cause the SYNCHROSCOPE to rotate slowly in the FAST direction (clockwise).

STEP STANDARD:

DG 'B' SPEED switch used to adjust D/G speed so that SYNCHROSCOPE rotates slowly in the FAST direction.

CUES:

Evaluator note: Examinee should request a peer check.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 10

Step 2.4 e. When the SYNCHROSCOPE passes 11 o'clock and slowly approaches 12 o'clock, close BUS 1DB DG FEED Breaker.

STEP STANDARD:

When synchroscope is between 11 o'clock and 12 o'clock, closes BUS 1DB DG FEED breaker.

Bus 1DB DG FEED breaker indicates red light ON, green light OFF.

CUES:

Evaluator note: Examinee should request a peer check.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 11

NOTE 2.4.f
Limits per Enclosure B, Diesel Generator Power Factor, should be maintained.

Step 2.4 f. Using the SPEED Switch adjust load as necessary while monitoring the following:

1) KILOWATTS Meter.
2) AMPS Meters.
3) KILOVARS Meter.

STEP STANDARD:

D/G 'B' KILOWATTS indicates 850-1000 KW for at least 10 minutes. DG B VOLTS indicates 6840-7344 volts and DG AMPS indicates ~100 amps, Kvars indicates ~400.

CUES:

Evaluator note: Examinee should be applying the loading schedule described in procedure note 2.4.

Evaluator note: Examinee should promptly load to 850-1000 KW.

Evaluator cue: When examinee mentions that he is waiting at least 10 minutes for pressures and temperatures to stabilize or appears to be paused and waiting the 10 minutes, inform examinee that he may continue with a minimum time compression of 1 min. = 10 minutes.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 12

Step 2.4 g. Place the DG B SYNC SEL Switch in OFF.

STEP STANDARD:

DG B SYNC SEL switch indicates OFF.

CUES:

Evaluator note: Examinee should request a peer check.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 13

Step 2.4 f. (Repeated) Using the SPEED Switch adjust load as necessary while monitoring the following:
1) KILOWATTS Meter.
2) AMPS Meters.
3) KILOVARS Meter.

STEP STANDARD:

D/G 'B' KILOWATTS indicates 2250-2550 KW for at least 10 minutes. DG B VOLTS indicates 6840-7344 volts and DG AMPS indicates ~ 2200 amps and Kvars indicate ~ 1100. D/G 'B' indicates 2250 - 2550 KW for at least 10 minutes.

CUES:

Evaluator cue: When examinee mentions that he is waiting at least 10 minutes for pressures and temperatures to stabilize or appears to be paused and waiting the 10 minutes, inform examinee that he may continue with a minimum time compression of 1 min. = 10 minutes.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 14

Step 2.4 f (Repeated). Using the SPEED Switch adjust load as necessary while monitoring the following:

1) KILOWATTS Meter.
2) AMPS Meters.
3) KILOVARS Meter.

STEP STANDARD:

D/G 'B' KILOWATTS indicates 3250-3550 KW for at least 10 minutes. DG B VOLTS indicates 6840-7344 volts and DG AMPS indicates ~ 290 amps and Kvar indicate~ 1600. D/G 'B' indicates 3250 - 3550 KW for at least 10 minutes.

CUES:

Evaluator cue: When examinee mentions that he is waiting at least 10 minutes for pressures and temperatures to stabilize or appears to be paused and waiting the 10 minutes, inform examinee that he may continue with a minimum time compression of 1 min. = 10 minutes.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 15

Step 2.4 f (Repeated). Using the SPEED Switch adjust load as necessary while monitoring the following:
1) KILOWATTS Meter.
2) AMPS Meters.
3) KILOVARS Meter.

STEP STANDARD:

D/G 'B' KILOWATTS indicates 4150-4250 KW at 6800-7400 VOLTS and DG AMPS indicates ~ 360 amps and Kvar indicate~ 2100.

CUES:

Evaluator cue: When examinee mentions that he is waiting at least 10 minutes for pressures and temperatures to stabilize or appears to be paused and waiting the 10 minutes, inform examinee that he may continue with a minimum time compression of 1 min. = 10 minutes.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 16

Step 2.4 h. Using the VOLT REG RAISE-LOWER Switch adjust KILOVARS.

STEP STANDARD:

Using VOLT REG RAISE-LOWER switch, adjusts Kilovars to 2100

CUES:

Evaluator cue: CRS directs adjusting Kilovars to 2100 per SOP-306, Enclosure B.

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: NJPS-025 (R2)

DESCRIPTION: 2015 NRC Sim e RO: Start and Load "B" Emergency Diesel Generator

IC SET: 10

INSTRUCTIONS:

1. When student is ready; RUN

COMMENTS:

JPM Initial Condition of "Cylinder Monitoring" was intentionally used to prevent requiring STP-125.002 attachments from having to be available. Also to prevent having to have a stopwatch available. This is too much effort to test the same skills as in SOP-306.

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS:

INITIAL CONDITION:

The plant is operating at 100% power with normal AC power available to all buses.

"B" D/G is to be started and loaded for monitoring cylinder temperatures using SOP-306 Section IV.B.

Normal and Alternate AC power is available to buses 1DA and 1DB.

It is an B2 Maintenance Work Week.

Hourly logging of ESF XFMR FEED KV (MCB) voltage and 1DB VOLTS (MCB) is being performed by another licensed operator per SOP-306, Section IV B step 2.1.

All pre-start check steps have been completed.

INITIATING CUES:

CRS directs you to start and load "B" D/G to 4150-4250 KW per SOP-306, Section IV.B, steps 2.3 & 2.4.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

B. OPERATION OF DIESEL GENERATOR B FROM THE CONTROL ROOM IN THE TEST START MODE

1.0 INITIAL CONDITIONS

1.1 A **Pre-Job Brief** has been conducted per OAP-100.3.

1.2 The Precautions of Section II have been reviewed.

1.3 Diesel Generator B is prepared to start per Section III.

1.4 Enclosure F, Tech Spec/EOOS/Functionality Review has been reviewed.

2.0 INSTRUCTIONS

2.1 If XTF0004, UNIT 1 ENGINEERED SAFEGUARD TRANSFORMER, is in service and Diesel Generator B will be paralleled to the 115KV line, perform one of the following (YD-380 SSW):

NOTE 2.1.a

Immediately prior to and during the time the XTF0006, XTF0004 7.2KV VOLTAGE REGULATOR, AUTO-OFF-MANUAL Switch is placed in MANUAL or OFF, the 115KV and the 7.2KV Bus voltages being supplied from XTF0006 should be monitored continuously. 115KV Bus voltage should be verified and recorded to be within the limits specified in OAP-106.1 for the present transformer configuration with the regulator out of service. If the OAP limits are exceeded, the System Controller should be notified to restore 115KV Bus voltage to within the limits.

a. With XTF0006, XTF0004 7.2KV VOLTAGE REGULATOR in service, perform the following:

1) Monitor ESF XFMR FEED KV (MCB) voltage and either 1DA VOLTS and/or 1DB VOLTS (MCB) Bus voltage being supplied from XTF0006.

2) Using the Generic Log attachment from OAP-106.1, Operating Rounds, record an initial ESF XFMR FEED KV (MCB) voltage and either 1DA VOLTS and/or 1DB VOLTS (MCB) Bus voltage and then record hourly thereafter.

3) Place the XTF0006, XTF0004 7.2KV VOLTAGE REGULATOR, AUTO-OFF-MANUAL Switch, in OFF.

Step 2.1 continued

NA SRO Today

☐ b. With XTF0006, XTF0004 7.2KV VOLTAGE REGULATOR out of service, ensure XES0008, 7.2KV TRANSFER & DISC SWITCHES Transfer Switch is in the LOAD position.

NOTE 2.2

If Diesel Generator B has been run in the last twenty-four (24) hours, Step 2.2 may be omitted.

C01↓ 2.2 Verify the Diesel Generator B cylinders are free of fluid as follows:

a. At the Main Control Board momentarily place the EXCITER Switch, in SHUTDN. **(PEER ✓)**

b. Place the REMOTE/LOCAL/MAINT Switch in MAINT (DB-436). **(PEER ✓)**

c. Verify the fuel injection racks move freely (DB-436).

d. Open all twelve cylinder test cocks (DB-436).

e. Place the fuel rack in the NO FUEL position by one of the following methods (DB-436):

1) Hold the Stop Lever in the STOP position.

2) Place the Stop Lever in the STOP position and install the Fuel Rack Stop Lever Blocking Device.

Step 2.2 continued

CAUTION 2.2.f

Personnel should stand clear of both sides of Diesel Generator B when barring the engine due to the exhaust of high pressure air from the test cocks.

NOTE 2.2.f

Some discharge from the cylinder test cocks, such as a spray or mist, is to be expected. Excessive discharge which results in accumulation of fluid in the area indicates a potential coolant leak in the cylinders. If excessive fluid is found in one or more cylinders, the Diesel Generator must be declared Inoperable and the appropriate actions taken.

☐ f. While observing the cylinder test cocks to detect the possibility of fluid leakage into the cylinders, bar the engine over by one of the following methods (DB-436):

1) Starting air by momentarily depressing the TEST START Pushbutton.

2) Starting air by using the spanner wrench on the top of one of the Main Air Start Valves on the engine.

3) Barring device motor.

4) Manually, using a wrench attached to the shaft end.

g. Remove the Stop Lever from STOP by one of the following methods (DB-436):

☐ 1) If the Stop Lever was held in the STOP position, release the Stop Lever from the STOP position.

NA RO Today

2) If the Fuel Rack Stop Lever Blocking Device was installed, perform the following:

☐ a) Remove the Fuel Rack Stop Lever Blocking Device.

☐ b) Release the Stop Lever from the STOP position.

C01↑ ☐ h. Close all twelve cylinder test cocks (DB-436).

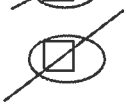
Step 2.2 continued

i. Place the REMOTE/LOCAL/MAINT Switch in REMOTE (DB-436). **(PEER ✓)**

j. At the Main Control Board perform the following:

1) Depress the GEN RELAYS RESET Pushbutton.

2) Momentarily place the EXCITER Switch, to RESET.



3) Ensure XCP-637 1-2 (DG B AUTOSTART NOT READY) is NOT in alarm.

CAUTION 2.3 through 2.7

The REMOTE/LOCAL/MAINT Switch should not be operated anytime the Diesel Generator is running.

2.3 To start Diesel Generator B from the Main Control Board perform the following:

a. Ensure the diesel is ready to be started as indicated by the following:

☐ 1) XCP-637 1-2 (DG B AUTOSTART NOT READY) is NOT in alarm.

☐ 2) The READY FOR AUTO START Light is lit at the Diesel Generator B Local Control Panel (DB-436).

☐ b. Momentarily place the Diesel Generator B TEST Switch to START. **(PEER ✓)**

c. Verify the Diesel Generator starts and stabilizes between the following:

☐ 1) 58.9 Hz and 61.1 Hz.

☐ 2) 6800 volts and 7600 volts.

☐ d. Reset the tripped Diesel Generator B relay flags at the local panel (XCX-5202, DB-436).

NOTE 2.4

If time permits, the following guidelines should be utilized to achieve the desired load:

a. Prior to closing the Diesel Generator Breaker, the Diesel should be run at no-load for at least ten minutes.

b. Once the Diesel Generator Breaker is closed, load should be adjusted to between 850 KW and 1000 KW and maintained for at least ten minutes.

c. Load should be adjusted to between 2250 KW and 2550 KW and maintained for at least ten minutes.

d. Load should be adjusted to between 3250 KW and 3550 KW and maintained for at least ten minutes.

e. Load should be adjusted to between 4150 KW and 4250 KW and maintained for at least ten minutes.

2.4 If the Diesel Generator is to be loaded, perform the following:

☐ a. Ensure the VOLT REG Switch is in AUTO. **(PEER ✓)**

☐ b. Place the DG B SYNC SEL Switch in DSL. **(PEER ✓)**

☐ c. Using the VOLT REG RAISE-LOWER Switch adjust Diesel Generator B SYNC VOLTS to slightly higher than 1DB SYNC VOLTS. **(PEER ✓)**

☐ d. Using the SPEED Switch adjust Diesel Generator B frequency to cause the SYNCHROSCOPE to rotate slowly in the FAST direction (clockwise). **(PEER ✓)**

☐ e. When the SYNCHROSCOPE passes 11 o'clock and slowly approaches 12 o'clock, close BUS 1DB DG FEED Breaker. **(PEER ✓)**

Step 2.4 continued

NOTE 2.4.f

Limits per Enclosure B, Diesel Generator Power Factor, should be maintained.

f. Using the SPEED Switch adjust load as necessary while monitoring the following:

☐ 1) KILOWATTS Meter.

☐ 2) AMPS Meters.

☐ 3) KILOVARS Meter.

☐ g. Place the DG B SYNC SEL Switch in OFF. **(PEER ✓)**

☐ h. Using the VOLT REG RAISE-LOWER Switch adjust KILOVARS.

CAUTION 2.5

While operation in this configuration is not prohibited by Tech Specs, the time spent separated from Offsite Power should be limited to that required for troubleshooting.

2.5 If it is desired to divorce XSW1DB from Offsite Power, perform the following: N/A RO Today

☐ a. Utilizing Enclosure D estimate the present load on XSW1DB.

☐ b. Using the SPEED Switch adjust Diesel Generator B load until the estimated XSW1DB load is being carried by Diesel Generator B.

☐ c. Open one of the following as appropriate for the Offsite Power source currently in parallel with the Diesel Generator: **(PEER ✓)**

1) BUS 1DB NORM FEED Breaker.

2) BUS 1DB ALT FEED Breaker.

☐ d. Using the SPEED Switch, adjust Diesel Generator B as necessary to maintain frequency between 59.5 Hz and 60.5 Hz.

NA RO Today

Step 2.5 continued

☐ e. Using the VOLT REG RAISE-LOWER Switch adjust Diesel Generator B as necessary to maintain voltage between 6800 VAC and 7600 VAC.

f. When time permits, perform the following:

1) Direct I&C to connect a Fluke 45 DMM to the back of Main Control Board meter DG B VOLTS (V-DGB) with the following settings (inside MCB):

☐ a) AC volts.

☐ b) AUTO.

☐ c) Medium rate.

☐ 2) Using the VOLT REG RAISE-LOWER Switch adjust Diesel Generator B as necessary to maintain voltage between 114.67 VAC and 122.90 VAC by Fluke 45 indication connected at the MCB (between 6880.1 VAC and 7373.8VAC).

2.6 If the Diesel Generator Breaker is closed and Diesel Generator B is no longer required as a source of power, perform one of the following:

a. If the Diesel Generator is the only power source supplying XSW1DB, perform the following to parallel with Offsite Power:

☐ 1) Place the DG B SYNC SEL Switch in one of the following positions as appropriate: **(PEER ✓)**

a) NORM - allows paralleling with the 230 KV offsite source.

b) EMERG - allows paralleling with the 115 KV offsite source.

☐ 2) Using the VOLT REG RAISE-LOWER Switch, adjust Diesel Generator B 1DB SYNC VOLTS to slightly lower than SYNC VOLTS. **(PEER ✓)**

☐ 3) Using the SPEED Switch, adjust Diesel Generator B frequency to cause the SYNCHROSCOPE to rotate slowly in the SLOW direction (counter-clockwise). **(PEER ✓)**

Step 2.6.a continued

☐ 4) When the SYNCHROSCOPE indicator passes 1 o'clock and slowly approaches 12 o'clock, close one of the following as appropriate for the synchroscope position selected: **(PEER ✓)**

a) BUS 1DB NORM FEED Breaker.

b) BUS 1DB ALT FEED Breaker.

☐ 5) Place the DG B SYNC SEL Switch in OFF. **(PEER ✓)**

NOTE 2.6.b

If time permits, the following guidelines should be utilized to unload the Diesel Generator:

1) Load should be reduced to between 2150 KW and 2550 KW and maintained for three to five minutes.

2) Load should be reduced to between 850 KW and 1250 KW and maintained for three to five minutes.

3) Load should be reduced to 50 KW.

b. If the Diesel Generator is running in parallel with an Offsite Power source, perform the following:

☐ 1) Unload Diesel Generator B by holding the SPEED Switch in LOWER until load is 50 KW.

☐ 2) Using the VOLT REG RAISE-LOWER Switch, reduce KILOVARS to minimum.

☐ 3) Open BUS 1DB DG FEED Breaker. **(PEER ✓)**

☐ 4) Ensure DG B VOLTS indicates between 6800 volts and 7600 volts.

☐ 5) Momentarily place the EXCITER Switch in SHUTDN. **(PEER ✓)**

Step 2.6.b continued

NOTE 2.6.b.6)

The VOLT REG RAISE-LOWER Switch should NOT be adjusted for the remainder of this procedure.

6) Verify the steady-state, no-load, voltage for Diesel Generator B as follows:

☐ a) Momentarily depress the EMERG START Pushbutton. **(PEER ✓)**

☐ b) Verify DG B VOLTS indicates between 6800 volts and 7600 volts.

☐ c) Momentarily depress the EMERG START OVRRIDE Pushbutton. **(PEER ✓)**

☐ d) Momentarily place the Diesel Generator B TEST Switch, in START. **(PEER ✓)**

2.7 To return Diesel Generator B to standby status perform the following:

☐ a. Momentarily place the EXCITER Switch in SHUTDN. **(PEER ✓)**

☐ b. Momentarily place the TEST Switch in STOP. **(PEER ✓)**

☐ c. Unless otherwise directed prepare Diesel Generator B for automatic/manual operation by performing the appropriate steps of Section III.

2.8 If Diesel Generator B has been run for greater than or equal to an hour, perform the following steps to check for and remove any accumulated water in XTK0020B-DG, DG FUEL OIL DAY TANK B (DB-436):

☐ a. If required, install a drain hose between XVT30955-DG, HI ISOL VLV FOR TEST CONNECTION, and a suitable container.

☐ b. Throttle open XVT30955-DG, HI ISOL VLV FOR TEST CONNECTION.

☐ c. Unlock and throttle open XVT00990B-DG, DG FUEL OIL DAY TANK B DRAIN VALVE.

Step 2.8 continued

d. When Diesel Generator B Day Tank is free of water, perform the following:

☐ 1) Close XVT00990B-DG, DG FUEL OIL DAY TANK B DRAIN VALVE.

☐ 2) Lock XVT00990B-DG, DG FUEL OIL DAY TANK B DRAIN VALVE.

☐ 3) Close XVT30955-DG, HI ISOL VLV FOR TEST CONNECTION.

☐ 4) If necessary, remove the drain hose from XVT30955-DG, HI ISOL VLV FOR TEST CONNECTION.

NOTE 2.9

a. XTF0005, UNIT 2 ENGINEERED SAFEGUARD TRANSFORMER, must be in standby prior to placing XTF0006, XTF0004 7.2KV VOLTAGE REGULATOR, in AUTO.

b. If the Band Indicator HIGH or LOW light is lit, the Voltage Regulator will step immediately when placed in AUTO.

☐ 2.9 If AUTO operation is desired, place the XTF0006, XTF0004 7.2KV VOLTAGE REGULATOR, AUTO-OFF-MANUAL Switch in AUTO and stop recording hourly Bus Voltage readings (YD-380 SSW).

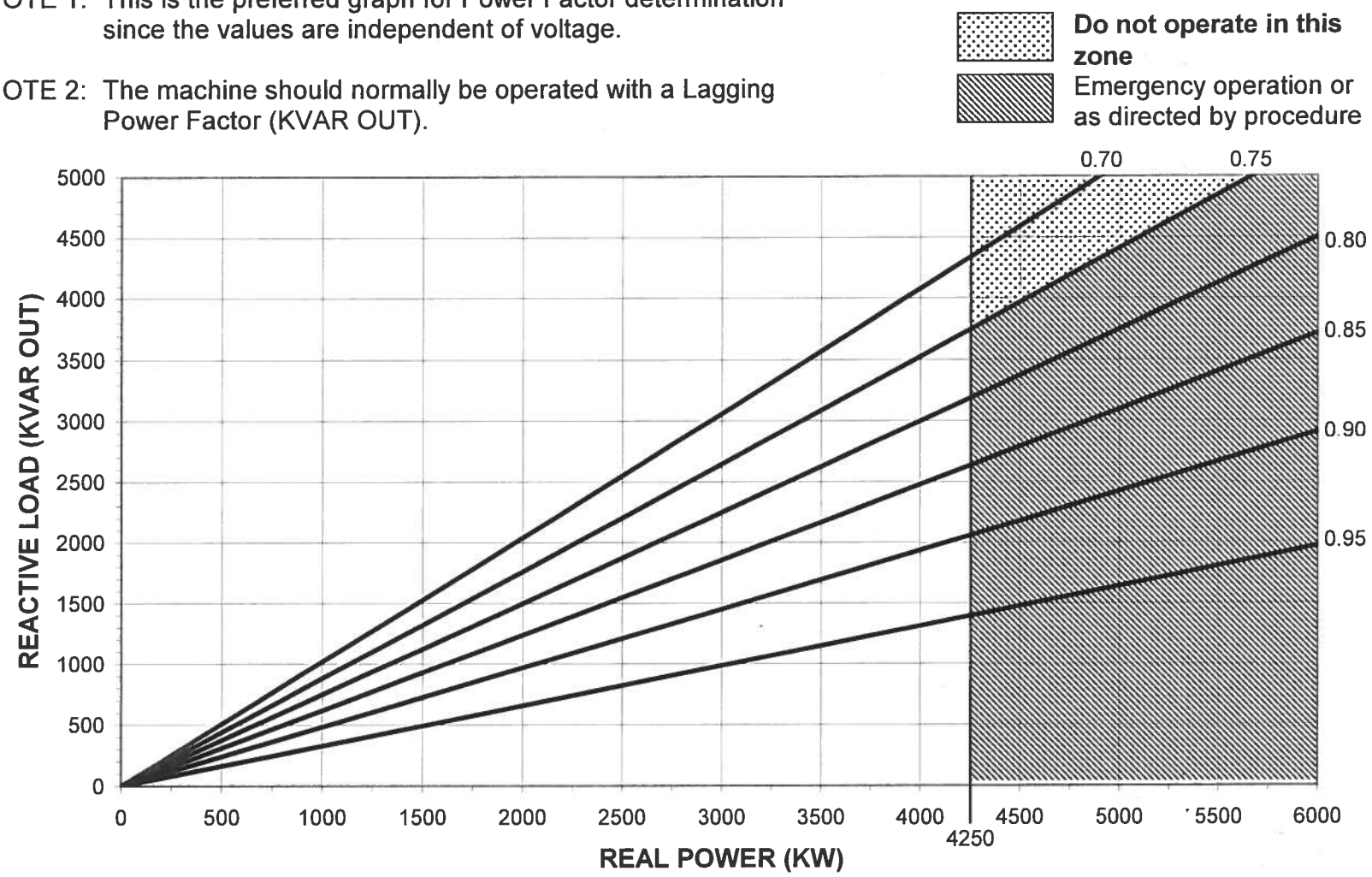
☐ 2.10 If previously installed, direct I&C to disconnect the Fluke 45 DMM from V-DGB (inside MCB).

END OF SECTION

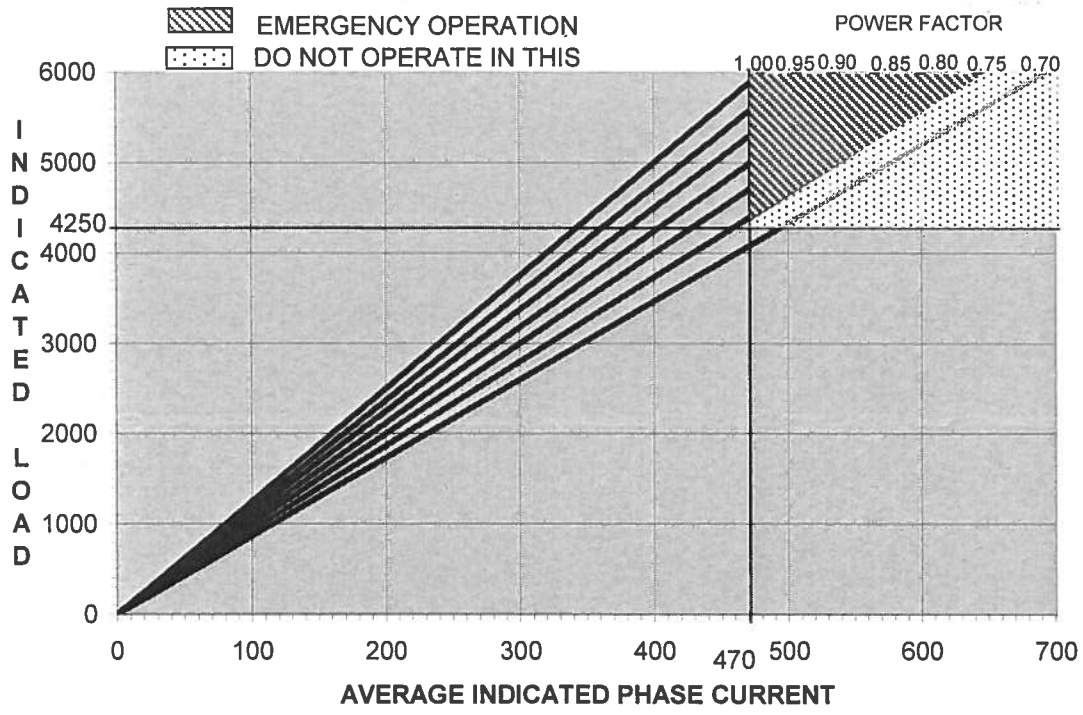
DIESEL GENERATOR POWER FACTOR

NOTE 1: This is the preferred graph for Power Factor determination since the values are independent of voltage.

NOTE 2: The machine should normally be operated with a Lagging Power Factor (KVAR OUT).



DIESEL GENERATOR POWER FACTOR



NOTE 1: The values on this graph are based on generator voltage of 7200 volts. A higher voltage results in a high Power Factor and a lower voltage results in a lower Power Factor. These variations will fall within a ± 10% range.

NOTE 2: If current increases with Voltage Regulator increase, Power Factor is lagging. If current decreases with Voltage Regulator increase, Power Factor is leading.

NOTE 3: When in the Test Start Mode the Diesel Generator Output Breaker trips on Overcurrent (51VDG Relay) at 480 amps.

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **NJPS-1000 (R1)**

2015 NRC Sim f RO: Respond to Steam Generator Pressure Channel Failure

CANDIDATE _____

EXAMINER _____

TASK:

000-103-05-01 Respond to Excessive Feedwater Increase per AOP-401.3

TASK STANDARD:

SG "B" level restored to between 60-65% such that an unnecessary plant trip is avoided and the failed channel (PT-485) has been correctly identified.

TERMINATING CUE: SG "B" level is under control and the failed channel has been correctly identified.

PREFERRED EVALUATION LOCATION *PREFERRED EVALUATION METHOD*

SIMULATOR PERFORM

REFERENCES:

SOP-401	REACTOR PROTECTION AND CONTROL SYSTEM
AOP-401.3	STEAM FLOW-FEEDWATER FLOW PROTECTION CHANNEL FAILURE

INDEX NO.	*K/A NO.*		*RO*	*SRO*
059000A211	A2.11	Failure of feedwater control system	3.0	3.3

TOOLS: AOP-401.3, Steam Flow - Feedwater Flow Protection Channel Failure

EVALUATION TIME 10 *TIME CRITICAL* *10CFR55:* 10CFR55.4

TIME START: _____ TIME FINISH: _____ PERFORMANCE TIME: _____

PERFORMANCE RATING: SAT: _____ UNSAT: _____

CANDIDATE: _____

EXAMINER: _____ / _____

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS: None

INITIAL CONDITION: The plant is operating at 100% power with all controls in automatic.

INITIATING CUES: Respond to developing plant conditions.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

STEPS

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 1

Step 1. Verify the failed channel is the controlling channel.

STEP STANDARD:

FI-484 indicates ~ 5 MPPH, PI-485 indicates ~ 1300 psig. Examinee notes FI-484 is the controlling channel.

CUES:

Evaluator cue: When Examinee has accepted turnover and has completed board walk down signal Booth Operator to activate Event #1.

Evaluator note: This is an immediate operator action.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 2

Step 2. Select the operable flow channel:

Place FW CONTROL CHANNEL SEL Switch to the operable channel.

Place STEAM CONTROL CHANNEL SEL Switch to the operable channel.

STEP STANDARD:

Places FW CONTROL CHANNEL SEL switch and STEAM CONTROL CHANNEL SEL switch to the opposite position.

CUES:

Evaluator note: This is an immediate operator action.

Evaluator note: This step is critical to remove the failed channel from control and to restore "B" SG level to program value (60-65%) such that an unnecessary plant trip is avoided.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 3

NOTE - Step 3
CTRL+ALT+S on either EHC HMI is equivalent to 50 MWe, and is the preferred method to accomplish a rapid load reduction.

Step 3. Verify turbine load LESS THAN 950 MWE.

Alternative Action 3. Using any method available reduce Turbine Load by 40MWe to 50 MWe.

STEP STANDARD:

Observes > 950 MWE and reduces turbine load by 40 MWE to 50 MWE.

CUES:

Evaluator note: This is an immediate operator action.

Evaluator Note : This step could become critical on a case by case basis depending on the magnitude of the resulting Feedwater transient.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 4

Step 4. Verify only one SG AFFECTED.

STEP STANDARD:

Verifies only "B" SG affected.

CUES:

Evaluator note: This is an immediate operator action.

Evaluator note: The failed channel does input to Feedwater Pump Speed Control and thus may have some slight impact on "A" and "C" SG level as well as "B" SG. It is not expected that there will be any appreciable impact on "A" or "C" SG levels.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 5

Step 5. Adjust the Feedwater Flow Control Valve as necessary to restore feed flow to the AFFECTED SG.

STEP STANDARD:

Manually controls the SG "B" FWC controller as necessary to restore SG "B" level.

CUES:

Evaluator note: This is an immediate operator action.

Evaluator note: Typically this step does not require any operator action once an operable channel is selected. Examinee may place Feedwater Flow Control Valve in manual and lower flow to obtain program SG level.

Evaluator note: This step is critical if the examinee is slow in selecting the operable SF and FF channels and SG NR level has exceeded 70% (approaching Hi Hi level Turbine trip)

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 6

Step 6. Check if Feedwater Pump speed control is operating properly:

Feedwater Header pressure is GREATER THAN Main Steam Header pressure.

Feed flow is normal for steam flow and power level.

All operating Feedwater Pump speeds and flows are balanced.

STEP STANDARD:

Verifies:

-FW Header Pressure > Main Steam Header Pressure.

-FW flow is normal.

-All operating FWP speeds and flows are balanced.

CUES:

Evaluator note: This is an immediate operator action.

Evaluator cue: As CRS provide a copy of AOP-401.3 and direct Examinee to complete AOP-401.3 through step 9. Examinee should reference the AOP for remaining actions.

Evaluator note: The failed Steam Pressure Channel affects the controlling Steam Flow Channel which in turn feeds into the program value for Main Feedwater Pump Delta P. Once the examinee has selected the non-failed Steam Flow channel the program Delta P will return to normal and Main Feed Pump speed should restore to normal without any Operator Action. Examinee may place Main Feedpump Speed Control in manual and lower FW Flow and FW Header pressure to obtain program SG level.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 7

Step 7. Verify Narrow Range levels in all SGs are between 60% and 65%.

Alternative Action 7. Adjust the Feedwater Flow Control Valve as necessary to restore feed flow to the AFFECTED SG(s).

STEP STANDARD:

Restores and maintains "B" SG level to between 60% and 65% in Manual as necessary.

CUES:

Evaluator note: It is not expected that candidate will need to take manual control of the Feedwater Flow Control Valve or Feedwater Pump Speed control for this failure.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 8

Step 8. Restore the AFFECTED SG control systems to normal:

Place the Feedwater Flow Control Valve in AUTO.

Place the Feedwater Pump Speed Control System in AUTO. REFER TO SOP-210, FEEDWATER SYSTEM.

STEP STANDARD:

Ensures Feedwater Control Valve is in automatic and Feedwater Pump Speed Control is in automatic

CUES:

Evaluator note: It is expected that the Feedwater Flow Control Valve and the Feedpump Speed Control will have remained in automatic for this failure.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 9

Step 9 a. Identify the associated bistables for the failed channel. REFER TO AOP 401.3, Attachment 1.

STEP STANDARD:

Examinee identifies instrument PT-485 (Compensates FT-484).

CUES:

Evaluator Cue: Have examinee identify the failed channel by pointing out the correct instrument number (PT-485) on AOP-401.3 Attachment 1.

Evaluator note: Annunciator XCP-624; 4-1, SG A STMLN ΔP HI and 6-1, SG C STMLN ΔP HI are providing alternate indication that the failure was a pressure channel and not the corresponding steam flow channel.

Evaluator note: The task of completing the bistable tripping data sheet (SOP-401 Attachment 1) is performed by SROs with a Shift Engineer review.

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: NJPS-1000 (R1)

DESCRIPTION: 2015 NRC Sim f RO: Respond to Steam Generator Pressure Channel Failure

IC SET: 315

INSTRUCTIONS:

If IC 315 is designated for this JPM then reset to IC-315 leaving the simulator in FREEZE.

1. When Examinee is ready (on Evaluator cue) go to RUN

2. On evaluator cue activate Event #1

If IC 315 is not designated for this JPM then initial conditions may be established by reseting to IC 10 and following the below directions:

1.Insert: MAL-MSS001E Final Value = 1300, Ramp = 3 sec (SG PT 485 Fail) set to Event #1

2. When Examinee is ready: RUN

3. On evaluator cue activate Event #1

COMMENTS:

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: None

INITIAL CONDITION: The plant is operating at 100% power with all controls in automatic.

INITIATING CUES: Respond to developing plant conditions.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **NJPS-084 (R1)**

2015 NRC Sim g RO: Restore Spent Fuel Pool Level During Refueling

CANDIDATE: _____

EXAMINER: _____

TASK:

000-140-05-01 RESPOND TO DECREASING WATER LEVEL IN THE SPENT FUEL POOL OR REFUELING CAVITY PER AOP-123.5/AOP-123.1.

TASK STANDARD:

Spent Fuel Pool Level greater than or equal to 460 ft 6 inches on LI-7431 and LI-7433.

TERMINATING CUE: Spent Fuel Pool Level greater than or equal to 460 ft 6 inches on LI-7431 and LI-7433.

PREFERRED EVALUATION LOCATION *PREFERRED EVALUATION METHOD*

SIMULATOR PERFORM

REFERENCES:

AOP-123.1 DECREASING LEVEL IN THE SPENT FUEL POOL OR REFUELING CAVITY DURING REFUELING

INDEX NO.	*K/A NO.*		*RO*	*SRO*
033000A203	A2.03	Abnormal spent fuel pool water level or loss of water level	3.1	3.5

TOOLS: AOP-123.1 marked up through step 10.

EVALUATION TIME 10 *TIME CRITICAL* No *10CFR55:* 45(a)(7)

TIME START: _____ TIME FINISH: _____ PERFORMANCE TIME: _____

PERFORMANCE RATING: SAT: _____ UNSAT: _____

CANDIDATE: _____

EXAMINER: _____ / _____

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The Plant is in MODE 6 with Core Off Load in Progress. The 'A' RHR Loop is in service providing Core Cooling. AOP-123.1 has been entered due to lowering level in the Spent Fuel Pool. The leakage was isolated in step 8. The "A" RHR Train has been verified as intact.

INITIATING CUES: A surrogate operator will be provided to respond to non-related alarms per your direction.

The CRS has directed you as the ROATC, to respond to a lowering level in the Spent Fuel Pool in accordance with AOP-123.1 starting with Step 10.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

STEPS

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 1

Step 10 a: Check if the operating RHR train is intact.

STEP STANDARD:

Verifies normal pump amps and flow on 'A' RHR pump.

CUES:

Evaluator cue: Provide the marked up copy of AOP-123.1, Decreasing Level in the Spent Fuel Pool or Refueling Cavity at this time.

Evaluator note: The "A" RHR Train was described as intact in the initiating cue.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 2

Step 10 b: Open MVG-8809A(B), RWST TO RHR PP A(B).

STEP STANDARD:

Opens MVG-8809A, RWST TO RHR PP A, and verifies Red light ON and Green light OFF.

CUES:

Evaluator note: This step is critical because opening MVG-8809A assures that the "A" RHR pump has a suction source and that RHR can add inventory to the RCS.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 3

Step 10 c: Close MVG-8701A(B), RCS LP A(C) TO PUMP A(B).

STEP STANDARD:

Closes MVG-8701A, RCS LP A TO PUMP A and verifies Red light OFF and Green light ON

CUES:

Evaluator note: This step is critical because closing MVG-8701A or MVG-8702A assures that the RHR suction source is the RWST and not the Refueling Cavity.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 4

Step 10 d: Close MVG-8702A(B), RCS LP A(C) TO PUMP A(B).

STEP STANDARD:

Closes MVG-8702A, RCS LP A TO PUMP A and verifies Red light OFF and Green light ON

CUES:

Evaluator note: This step is critical because closing MVG-8701A or MVG-8702A assures that the RHR suction source is the RWST and not the Refueling Cavity.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 5

Step 10 e: Close HCV-603A(B), A(B) OUTLET.

STEP STANDARD:

Closes HCV-603A, A OUTLET, by turning potentiometer to zero (0).

CUES:

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 6

Step 10 f: Adjust FCV-605A(B), A(B) BYP, as necessary to establish the desired refueling water level.

STEP STANDARD:

Takes manual control of FCV-605A and controls flow to raise SFP level.

CUES:

Evaluator note: This step is critical because FCV-605A must remain open in order to assure a discharge flow path from the RHR pump to the refueling cavity/spent fuel pool.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 7

Step 10 g: Ensure the associated Component Cooling train is operating. REFER TO SOP-118, COMPONENT COOLING WATER.

STEP STANDARD:

Verifies 'A' CCW pump is running with normal pump amps and flow. Verifies 'A' CCW is the active loop by verifying MVB-9524A/9526A, LP A NON-ESSEN LOAD ISOL, and MVB-9687A/9525A, LP A NON-ESSEN LOAD ISOL, are open, and by verifying MVB-9524B/9526B, LP B NON-ESSEN LOAD ISOL, and MVB-9687B/9525B, LP B NON-ESSEN LOAD ISOL, are closed

CUES:

Evaluator note: JPM may be terminated at Evaluator discretion any time after Examinee verifies rising Spent Fuel Pool level.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 8

Step 10 h: Verify CCW flow through the RHR Pump A(B) Seal Cooler:

FM-7245, A RHR PP (IUR14400, M3/SW 5-3).

FM-7255, B RHR PP (IUR14401, M4/SW 5-3).

STEP STANDARD:

Verifies flow indicated on FM-7245, flow recorder for RHR Pump "A"

CUES:

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 9

Step 11: Locally align the Spent Fuel Cooling System to fill the Spent Fuel Pool via Spent Fuel Cooling Pump B. REFER TO SOP-123, SPENT FUEL COOLING SYSTEM.

STEP STANDARD:

Directs building operator to align Spent Fuel Cooling to fill the SFP from the RWST per SOP-123.

CUES:

Booth Operator cue: Inform Examinee as the building operator that you acknowledge the order to align Spent Pool Fuel Cooling to fill the Spent Fuel Pool.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 10

Step 12: Verify that Refueling Cavity AND Spent Fuel Pool level is recovering.

STEP STANDARD:

Verifies that Spent Fuel Pool level on LI-7431/7433 is increasing.

CUES:

Booth Operator cue: If examinee calls a building operator to verify Refueling Cavity Level, report that it is rising provided Examinee has observed Spent Fuel Pool level as rising on LI-7431/7433.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 11

Step 13: Check if Refueling Cavity AND Spent Fuel Pool level is adequate:

a. Refueling Cavity level is GREATER THAN OR EQUAL TO 460 ft 6 inches.

b. Spent Fuel Pool level is GREATER THAN OR EQUAL TO 460 ft 6 inches

STEP STANDARD:

Verifies that Spent Fuel Pool level on LI-7431/7433 is GREATER THAN OR EQUAL TO 460 ft 6 inches.

Verifies that Refueling Cavity level on LI-7403 and or Mansell is GREATER THAN OR EQUAL TO 460 ft 6 inches

CUES:

Booth Operator cue: If examinee calls a building operator to verify Refueling Cavity Level, report that it is 460 ft 6 inches once Spent Fuel Pool level is observed as 460 ft 6 inches on LI-7431/7433.

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: NJPS-084 (R1)

DESCRIPTION: 2015 NRC Sim g RO: Restore Spent Fuel Pool Level During Refueling

IC SET: 316

INSTRUCTIONS:

If IC-316 is designated for this JPM then reset to IC-316 leaving the simulator in FREEZE.

1. Select 'shutdown' from ZZMENU on MCB1 IPCS screen.
2. IF available, set up Mansell Level monitoring cart at the CCW end of the Main Control Boards. IF available Turn on CRS SIPCS screen by typing MLMSA or MLMSB from any SIPCS screen. IF the SIPCS function is NOT enabled just set up the computer cart for Mansell Indication.
3. Place red tags on RB spray pumps, PZR Back up heaters
4. When Examinee is ready (on Evaluator cue) go to RUN.

If IC-316 is not designated for this JPM then initial conditions may be established by reseting to IC-379 and following the below directions:

1. Insert: MAL-RHR005A Final Value = 3000 (RHR bypass line leak)
   OVR-AA028 Override To = True (Override Radiation Monitoring Panel Annunciators)
   LOA-AUX135 Position To = NORMAL (SS-SF10 Refuel Cavity Level Alarm Bypass Switch)
   ANN-SF010 Fail To = ON (Fuel XFER Canal LVL HI/LO)
   ANN-SF010 Fail To = OFF (New) tied to trigger 1
   Set Trigger 1 to XO3D022A>461 (Refuel Cavity level greater than 461
2. Verify: LOA-FHB001 Final Value = 1 (Fuel Transfer Tube Isolation - Open)
   LOA-FHB002 Final Value = 1 (Spent Fuel Gate to Transfer Tube - Open)
3. RUN
4. When refueling cavity/SFP levels indicate < 460 feet, FREEZE
5. Set MAL-RHR005A Final Value = 10
6. Select 'shutdown' from ZZMENU on MCB1 IPCS screen
7. IF available, set up Mansell Level monitoring cart at the CCW end of the Main Control Boards. IF available Turn on CRS SIPCS screen by typing MLMSA or MLMSB from any SIPCS screen. IF the SIPCS function is NOT enabled just set up the computer cart for Mansell Indication.
8. Place red tags on RB spray pumps and PZR Back up heaters.
9. When Examinee is ready (on Evaluator cue): RUN

COMMENTS:

Note as of April 1, 2015 Mansell was not correctly modeled for refuel cavity full. A Simulator DR was written as part of the ILO 13-01 NRC exam prep.

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The Plant is in MODE 6 with Core Off Load in Progress.

The 'A' RHR Loop is in service providing Core Cooling.

AOP-123.1 has been entered due to lowering level in the Spent Fuel Pool.

The leakage was isolated in step 8.

The "A" RHR Train has been verified as intact.

INITIATING CUES: A surrogate operator will be provided to respond to non-related alarms per your direction.

The CRS has directed you as the ROATC, to respond to a lowering level in the Spent Fuel Pool in accordance with AOP-123.1 starting with Step 10.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **NJPS-1001 (R1)**

2015 NRC Sim h RO: Establish Reactor Building Purge Supply and Exhaust

CANDIDATE: _____

EXAMINER: _____

TASK:

088-505-01-04 Perform Line ups of the Reactor Building Ventilation Systems.

TASK STANDARD:

The RB Purge System is in service with at least one Purge Exhaust Fan and no more than one Purge Supply Fan started.

TERMINATING CUE: The RB purge system is in service.

PREFERRED EVALUATION LOCATION	*PREFERRED EVALUATION METHOL*
SIMULATOR	PERFORM

REFERENCES:

OAP-100.5	GUIDELINES FOR CONFIGURATION CONTROL AND OPERATION OF PLANT EQUIPMENT
HPP-709	Sampling and Release of Radioactive Gaseous Effluents
SOP-114	REACTOR BUILDING VENTILATION SYSTEM

INDEX NO.	*K/A NO.*		*RO*	*SRO*
029000A201	A2.01	Maintenance or other activity taking place inside containment	2.9	3.6

TOOLS: JPM h Handout 1; Marked up copy of SOP-114, Reactor Building Ventilation System.

JPM h Handout 2; HPP-709 Attachment VI, Reactor Building Purge Release Permit.

JPM h Handout 3; OAP-106.3 Attachment II Locked Component Operating Sheet.

Copy of HPP-709, Sampling and Release of Radioactive Gaseous Effluents.

Four yellow plastic Test in Progress tags for Plant Status labeling on RM-A2 and RM-A4 sample pump CMC switches and Containment isolation valves PVA-9312A(B) CMC switches.

Red hold tag for placement on XFN-13B, EXH FAN B.

EVALUATION TIME 30 *TIME CRITICAL* NO *10CFR55:* 45(a)(8)

TIME START: _____ TIME FINISH: _____ PERFORMANCE TIME: _____

PERFORMANCE RATING: SAT: _____ UNSAT: _____

CANDIDATE: _____

EXAMINER: _____ _____ / _____

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS: None

INITIAL CONDITION: The plant is in Mode 5 with preparations for a refueling outage in progress

The equipment hatch is open.

The RB atmosphere sample analysis has been completed.

The RM-A2 and RM-A4 setpoints have been adjusted for this release and source checks are completed on both channels.

Plant status labels have been placed on the radiation monitoring equipment required for RB ventilation operability; RMA-2 and RMA-4.

Reactor Building Purge had been in service but was shutdown on the previous shift.

Reactor Building Purge Exhaust Fan, XFN-13B is tagged out for corrective maintenance.

INITIATING CUES: A surrogate operator will be provided to respond to non-related alarms per your direction.

You are being directed to place Reactor Building Purge in service using SOP-114, Reactor Building Ventilation System Section III.C .

All applicable procedure Initial Conditions are completed.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

STEPS

CRITICAL: No ***SEQUENCED:*** Yes ***SAT*** ☐ ***UNSAT*** ☐

STEP: 1

Step 2.1; Ensure RMA0004, ATM GASEOUS IODINE-RB PURGE EXHAUST (gas channel) is in service (Rad Monitoring Panel).

STEP STANDARD:

Ensures RMA-4 is in service by checking for power and indication at Rad Monitoring Panel.

CUES:

Evaluator cue: Once the examinee acknowledges the initiating cue provide them the marked copy of SOP-114, Reactor Building Ventilation System (JPM h Handout 1) and HPP-709, Attachment VI Reactor Building Purge Release Permit (JPM h Handout 2).

Evaluator note: If Examinee becomes distracted by annunciators on Main Control Board that are NOT related to the task of placing purge in service, then cue that plant monitoring will be assigned to a surrogate operator.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 2

Step 2.2; If core alterations are in progress, ensure RMA0002, ATM GASEOUS IODINE RB SAMPLE LINE (gas channel), is in service (Rad Monitoring Panel).

STEP STANDARD:

Marks step N/A and proceeds to step 2.3.

CUES:

Evaluator note: Since Unit is NOT in Mode 6 and no core alterations are in progress Steps 2.2 (Check of RMA-2) is N/A. Examinee may mark step complete as RM-A2 is in service and will be required in service once core alterations begin.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 3

Step 2.3; If RB atmosphere sample analysis dictates, place RB Charcoal Cleanup System in service per Section III.

a. XFN-66A, FAN A (RB CHAR CLEANUP).

b. XFN-66B, FAN B (RB CHAR CLEANUP).

STEP STANDARD:

Marks step N/A and proceeds to step 2.4.

CUES:

Evaluator cue: Inform Examinee as HP that RB atmosphere sample analysis does NOT dictate Charcoal Cleanup.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 4

Step 2.4; Align RMA0004 sample point for RB Purge Exhaust Fan operation as follows (AB-485):

a. Open XVA00006-AH, RMA0004 SAMPLE INLET ISOLATION VALVE.

b. Close XVA00005-AH, RMA0004 SAMPLE INLET ISOLATION VALVE.

STEP STANDARD:

Calls Building operator and directs OPEN XVA-6-AH and CLOSE XVA-5-AH.

CUES:

Booth Operator cue: As Building Operator acknowledge request for sample valve alignment or verification and report task completed per the request. Use time compression for response.

Evaluator note: Since Purge had previously been in service the building operator may only be asked to verify sample valve alignment correct.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 5

Step 2.5; Ensure the following radiation monitors high radiation alarm setpoints are adjusted per Reactor Building Purge Release Permit:

a. RMA0002, ATM GASEOUS IODINE RB SAMPLE LINE.

b. RMA0004, RB PURGE EXH GAS ATMOS MONITOR.

STEP STANDARD:

Ensures setpoint on RMA-2 and RMA-4 at Rad monitor panel match the Purge Release Permit values.

CUES:

Evaluator cue: Provide simulated Reactor Building Purge Release Permit, HPP-709, Attachment VI, (NJPS-1001 Handout) if not already done.

Evaluator note: This was provided as complete in the initial conditions. The simulator does not model setpoint changes. Provide following cue if needed.

Evaluator cue: If asked as CRS state that the alarm setpoints have been verified by another RO.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 6

Step 2.6; Prior to placing RB Purge System in operation for the first time during an outage, perform STP-130.005B, AH Valve Operability Testing (Mode 5).

STEP STANDARD:

Marks step N/A and proceeds to step 2.6.

CUES:

Evaluator note: Initiating cue provided information that RB Purge had been in service previously.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 7

Step 2.7; Unlock and open the following:

a. XVB00001A-AV2-AH, IA HDR ISOLATION VLV FOR XVB00001A-AH (FB-479).

b. XVB00001B-AV2-AH, IA HDR ISOLATION VLV FOR XVB00001B-AH (RB-463).

c. XVB00002B-AV2-AH, IA HDR ISOLATION VALVE FOR XVB00002B-AH (RB-463).

d. XVB00002A-AV2-AH, IA HDR ISOLATION VLV FOR XVB00002A-AH (FB-479).

STEP STANDARD:

Calls Building operators and directs opening XVB-1A(B) and XVB-2A(B) air header isolations.

OR

Requests OAP-106.3, Locked Component Tracking Sheets for the XVB-1A(B) and XVB-2A(B) air header isolations.

CUES:

Booth Operator cue: As Building Operator acknowledge requests for valve alignment or verification and report task completed per the request. Use time compression for response.

Evaluator note: Since Purge had previously been in service the building operator may only be asked to verify air header isolation valve alignment correct.

Evaluator cue: Provide JPM h Handout 3 if Examinee requests OAP-106.3 Locked Component Tracking Sheets.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 8

Step 2.8; Ensure a Reactor Building Purge Release Permit has been issued per HPP-709.

STEP STANDARD:

Ensures permit is current and less than 24 hours old.

CUES:

Evaluator note: The NJPS-1001 Handout 2 (Release Permit) already indicates a SAT source check.

Evaluator note: Have a Copy of HPP-709 available for Examinee to refer to if they ask for it.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 9

Step 2.9; Start Reactor Building Purge as follows:

a. Open PVB-2A, CNTMT EXH ISOL

STEP STANDARD:

Places control switch to OPEN and holds in OPEN until Red light ON and Green light OFF.

CUES:

Evaluator note: This task is critical in order to ensure that the Reactor Building atmosphere is exchanged with fresh air.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 10

Procedure NOTE 2.9.b; If both trains of RB Purge are to be run, both exhaust fans should be started simultaneously.

Step 2.9 b; Hold PVB-2B, CNTMT EXH ISOL, to OPEN while simultaneously holding one or both of the following fan control switches in the START position:

1) XFN-13A, EXH FAN A.

2) XFN-13B, EXH FAN B.

STEP STANDARD:

Places control switch for PVB-2B to OPEN and Holds in OPEN. Places control switches for XFN-13A in START and holds in START until Red light ON and Green light OFF for fan and PVB-2B.

Completes Section II, Actual Release Data on Purge Release Permit:

1. Release Start Date and Time (current date and time)
2. Start Readings on RM-A2 and RM-A4 in cps.

CUES:

Evaluator note: Only Exh Fan A (XFN-13A) should be started. Examinee should ask for a peer check.

Evaluator note: This task is critical in order to ensure that the Reactor Building atmosphere is exchanged with fresh air. Completion of the Purge Release Permit Data is NOT critical.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 11

Step 2.9 c; Verify the following:

1) XFN-13A(B)-AH inlet damper opens.

2) XFN-13A(B)-AH outlet damper opens.

STEP STANDARD:

Verifies White light ON for the INLET and OUTLET dampers for the Fan that was started (XFN-13A).

CUES:

Evaluator note: Fan inlet and outlet damper indications are on the mimic board above the control switches.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 12

Step 2.9 d; Open XDP-28, INTAKE DMPR.

STEP STANDARD:

Places control Switch for XDP-28 to OPEN and verifies Red light ON and Green light OFF.

CUES:

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 13

Step 2.9 e; Open the following:

1) PVB-1A, CNTMT SPLY ISOL.

2) PVB-1B, CNTMT SPLY ISOL.

STEP STANDARD:

Places control Switch for PVB-1A to OPEN and holds until Red light ON and Green light OFF.

Places control Switch for PVB-1A to OPEN and holds until Red light ON and Green light OFF.

CUES:

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 14

Step 2.9 f; Start one or both of the following, as necessary:

1) XFN-11A, SPLY FAN A.

2) XFN-11B, SPLY FAN B.

STEP STANDARD:

Starts no more than ONE Purge Supply Fan.

CUES:

Evaluator cue: If asked as CRS which supply fan to start, state "Operate supply fans as required by SOP-114".

Evaluator note: There is a procedure note prior to the step which starts the Purge Supply Fans. The note informs the Operator that in order to maintain a negative pressure on the RB with the Equipment Hatch open, fewer Supply Fans than Exhaust Fans should be operated. In this case no supply fans or one supply fan should be started.

Evaluator note: Since the equipment hatch is open no more than ONE supply fan should be started. This step is critical because the Examinee must maintain negative pressure on the RB.

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: NJPS-1001 (R1)

DESCRIPTION: 2015 NRC Sim h RO: Establish Reactor Building Purge Supply and Exhaust

IC SET: 317

INSTRUCTIONS:

If IC 317 is designated for this JPM then reset to IC-317 leaving the simulator in FREEZE.

1. Place yellow plastic Test in Progress tags on sample pump CMC switches for RM-A2 and RM-A4 at the rad monitor panel.
2. Place yellow plastic Test in Progress tags on CMC switches for Containment isolation valves PVA-9312A(B) on Panel 2.
3. Place red hold tag on CMC switch for XFN-13B, EXH FAN B at HVAC panel.
4. Verify SIPCS mode set to "CLD Shutdown"
5. Go to run, clear any alarms. Use the HVAC acknowledge button not the LOA reset if HVAC alarms.
6. FREEZE
7. When Examinee is ready (on Evaluator cue) go to RUN.

If IC 317 is not designated for this JPM then initial conditions may be established by reseting to IC 3 and following the below directions:

1. RUN
2. Perform the following at the HVAC Control Panel, XCP-6210:
   Verify CMC switch for RB Purge Supply Fan A in STOP
   Verify CMC switch for RB Purge Supply Fan B in STOP
   Verify CMC switch for RB Purge Exhaust Fan A in STOP
   Verify CMC switch for RB Purge Exhaust Fan B in STOP
   Verify CMC switch for XDP-28, Intake Damper in CLOSE
   Verify CMC switch for RB Charcoal Cleanup fan A in STOP
   Verify CMC switch for RB Charcoal Cleanup fan B in STOP
3. Insert: OVR-AH076A Override To = Off (SS-AH243 Purge Exh Fan (XFN-13B-AH) GREEN
   OVR-AH076C Override To = Off (SS-AH243 Purge Exh Fan (XFN-13B-AH) WHITE
4. Place yellow plastic Test in Progress tags on sample pump CMC switches for RM-A2 and RM-A4 at the rad monitor panel.
5. Place yellow plastic Test in Progress tags on CMC switches for Containment isolation valves PVA-9312A(B) on Panel 2.
6. Place red hold tag on CMC switch for XFN-13B, EXH FAN B at HVAC panel.
7. Verify SIPCS mode set to "CLD Shutdown"
8. FREEZE
9. When Examinee is ready (on Evaluator cue) go to RUN.

COMMENTS:

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: None

INITIAL CONDITION: The plant is in Mode 5 with preparations for a refueling outage in progress

The equipment hatch is open.

The RB atmosphere sample analysis has been completed.

The RM-A2 and RM-A4 setpoints have been adjusted for this release and source checks are completed on both channels.

Plant status labels have been placed on the radiation monitoring equipment required for RB ventilation operability; RMA-2 and RMA-4.

Reactor Building Purge had been in service but was shutdown on the previous shift.

Reactor Building Purge Exhaust Fan, XFN-13B is tagged out for corrective maintenance.

INITIATING CUES: A surrogate operator will be provided to respond to non-related alarms per your direction.

You are being directed to place Reactor Building Purge in service using SOP-114, Reactor Building Ventilation System Section III.C.

All applicable procedure Initial Conditions are completed.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **NJPP-402**

2015 NRC In Plant i RO & SRO-U: Locally Dilute the Boric Acid Tanks

CANDIDATE: _____

EXAMINER: _____

TASK:

000-055-05-01 RESPOND TO LOSS OF OFF SITE AND ON SITE POWER

TASK STANDARD:

The 'A' BAT has been drained to 50%, then refilled to 90-95%. XVD08324A-CS is closed and both the drain rig and fill rig have been removed.

TERMINATING CUE: The "A" BAT has been diluted.

PREFERRED EVALUATION LOCATION *PREFERRED EVALUATION METHOD*

PLANT SIMULATE

REFERENCES:

EOP-6.0 LOSS OF ALL ESF AC POWER

INDEX NO.	*K/A NO.*		*RO*	*SRO*
000024K302	AK3.02	Actions contained in EOP for emergency boration	4.2	4.4

TOOLS: JPM i Handout (EOP-6.0, Attachment 6)
Key KA1 from a set of Rover keys from the SS key box or key G1A from a ring on hook 45 of the CR key box.

EVALUATION TIME 15 *TIME CRITICAL* NO *10CFR55:* 45(a)(6)

TIME START: TIME FINISH: PERFORMANCE TIME:

PERFORMANCE RATING: SAT: UNSAT:

CANDIDATE:

EXAMINER: _____ _____

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The plant has experienced an ESF Bus Blackout with the CRS implementing EOP-6.0. Annunciator "BAT A TEMP HI/LO" has been received and local verification indicates that temperature is 68°F in 'A' BAT room.

INITIATING CUES: CRS directs diluting the "A" BAT per EOP-6.0, Attachment 6.

AT NO TIME ARE YOU TO OPERATE ANY PLANT EQUIPMENT!

FOR ELECTRICAL MANIPULATIONS, AT NO TIME ARE YOU TO BREAK THE PLANE OF THE ELECTRICAL PANEL!

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

STEPS

CRITICAL; Yes ***SEQUENCED:*** Yes ***SAT*** ☐ ***UNSAT*** ☐

STEP: 1

Step 1a. Connects the drain rig stored in the BAT room to XVD08324A-CS, BORIC ACID TANK A DRAIN ISOL VALVE, and to the 2-inch capped pipe which penetrates the floor.

STEP STANDARD:

Shows location of drain rig and XVD08324A and the floor penetration. Identifies necessary tools and equipment and explains how to make the connection.

CUES:

Evaluator cue: Provide a copy of JPM i Handout (EOP-6.0 Attachment 6)

Evaluator cue: Provide key to Examinee once they explain where they would obtain it (either on rover key ring or from CR key box)

Evaluator note: Requires obtaining Key G1A from the control room key box hook 45 or key KA1 on a set of rover keys from the SS key box. The tool box has a lock on either side and can be difficult to open due to the nature of the lock mechanism.

Evaluator note: Examinee must identify hoses and fittings and demonstrate where each should be installed and actual layouts. Does not require removal of components from locker. Following is a description of fittings and connection points:

1. Using a pipe wrench remove the 2" stainless steel pipe cap from the nipple downstream of XVD08324A-CS
2. Thread on the Male Quick disconnect fitting labeled "Hook to Tank Drain" at the 8324A nipple. Tighten with wrench. Fitting has 2" threads and a 1.5" quick connect for a cam lock connector.
3. Using a pipe wrench remove the 2" stainless steel pipe cap from the vertical pipe stub rising from the floor next to valve 8323A.
4. Thread on the Male Quick disconnect fitting labeled "Hook to Floor Drain" at the vertical pipe stub rising from the floor next to valve 8323A. Tighten with wrench. Fitting has 2" threads and a 1.5" male quick connect for a cam lock connector.
5. Connect the red rubber hose labeled "Drain Rig" to the male fittings just installed. Place one female quick connect cam lock on the tank drain and the other one on the floor drain connection. Connections are made by placing the male fitting inside the female fitting with the tabs on the female fitting perpendicular to the fitting then locking it on by moving the tabs 90° to parallel to the fitting.

Evaluator cue: Once demonstration by Examinee is complete state: "The drain rig is connected."

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 2

Step 1b. Opens XVD08324A-CS, BORIC ACID TANK A DRAIN ISOL VALVE.

STEP STANDARD:

Simulates opening XVD08324A, by operating handwheel counter clockwise a few turns until resistance is felt.

CUES:

Evaluator cue: State, "Handwheel rotated CCW and stem is out".

Evaluator note: This step is critical because a sufficient volume of the tank contents must be removed to accomplish the desired outcome.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 3

Step 1c. Coordinate with the Control Room and drain the BAT to 50% level.

STEP STANDARD:

Contacts the CR by radio or the plant page system.

CUES:

Evaluator cue: As the NROATC, report that BAT level is 49%.

Evaluator note: This step is critical because a sufficient volume of the tank contents must be removed to accomplish the desired outcome.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 4

Step 1d. Close XVD08324A-CS, BORIC ACID TANK A DRAIN ISOL VALVE.

STEP STANDARD:

Simulates closing XVD08324A by operating the handwheel a few turns in the clockwise direction until it stops turning.

CUES:

Evaluator cue: State, "Handwheel rotated CW and stem is in".

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 5

Step 1e. Remove the drain rig.

STEP STANDARD:

Describes how to disconnect the rig from XVD08324A and the penetration from the floor.

CUES:

Evaluator note: Following is a description of necessary steps to disconnect the rig:

Disconnect the red rubber hose labeled "Drain Rig" from the male fittings at the tank drain and the floor drain. Disconnect is accomplished by raising the tabs on the female fittings 90° to the perpendicular position and then pulling off the quick connect. Does not remove male side of the connector which is threaded on.

Evaluator cue: Once Examinee completes the description of rig removal state: "Drain rig is removed."

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 6

Step 2a. Open the nearest Fire Hose Reel Isolation Valve and flush the fire hose to the floor drain until the water is clear.

STEP STANDARD:

Simulates operating the reel isolation valve counter clockwise until in line with pipe. Simulates operating the nozzle counter clockwise.

CUES:

Evaluator cue: When valve is open and the nozzle is rotated CCW, state: "The water is clear."

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 7

Step 2b. Close the Fire Hose Reel Isolation Valve.

STEP STANDARD:

Simulates operating the reel isolation valve in the clockwise direction until perpendicular with pipe

CUES:

Evaluator cue: State, "Handle is perpendicular to pipe."

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 8

Step 2c. Connect the fill rig to XVD08324A-CS BORIC ACID TANK A DRAIN ISOL VALVE, and to the fire hose from the hose reel.

STEP STANDARD:

Explains how to make the connection.

CUES:

Evaluator cue: State, "Fill rig is connected".

Evaluator note: Following is a description of necessary steps to connect the rig:

1. Take the red 1.5" fire hose labeled "fill rig" and connect the 1.5" female fire hose coupling labeled "Hook to Hose Reel" to the male threaded coupling on the fire hose from the reel station.
2. Connect the female cam lock connection labeled "To Boric Acid Tank" on the opposite end of the fill rig to the previously installed male fitting at the tank drain (valve 8324A). Connection is made by placing the male fitting inside the female fitting with the tabs on the female fitting perpendicular to the fitting then locking it on by moving the tabs 90° to parallel to the fitting.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 9

Step 2d. Opens XVD08324A-CS, BORIC ACID TANK A DRAIN ISOL VALVE.

STEP STANDARD:

Simulates opening XVD08324A, by operating handwheel counter-clockwise a few turns until resistance is felt.

CUES:

Evaluator cue: State, "Handwheel rotated CCW and stem is out".

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 10

Step 2e. Open the Fire Hose Reel Isolation Valve to fill the BAT.

STEP STANDARD:

Operates the hose reel isolation valve counter-clockwise until in-line with pipe.

CUES:

Evaluator cue: State, "Handle is in-line with pipe".

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 11

Step 2f. WHEN BAT level is between 90% and 95%, THEN close the Fire Hose Reel Isolation Valve.

STEP STANDARD:

Operates the reel isolation valve 90° clockwise to shut.

CUES:

Evaluator cue: As NROATC, report that 'A' BAT level is 92%.

Evaluator cue: State handle is perpendicular with pipe.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 12

Step 2g. Close XVD08324A-CS, BORIC ACID TANK A(B) DRAIN ISOL VALVE.

STEP STANDARD:

Operates XVD08324A in the clockwise direction a few turns until resistance is felt.

CUES:

Evaluator cue: State handwheel rotated CW and stem is in.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 13

Step 2h. Remove the fill rig.

STEP STANDARD:

Disconnects the rig from the fire hose and from XVD08324A. Stores the rig.

CUES:

Evaluator cue: State fill rig is removed.

Evaluator note: Following is a description of fill rig removal:

1. Removes cam lock female quick connect at tank drain by moving tabs 90° to perpendicular to fitting and lifts off coupling.
2. Removes fire hose coupling connecting fill rig to hose reel hose.
2. Removes male quick disconnects from tank drain and floor drain with wrench.
3. Reinstalls pipe caps on tank drain and floor drain.

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: NJPP-402

DESCRIPTION: 2015 NRC InPlant i RO & SRO-U: Locally Dilute the Boric Acid Tanks

IC SET: NA

INSTRUCTIONS:

COMMENTS:

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The plant has experienced an ESF Bus Blackout with the CRS implementing EOP-6.0. Annunciator "BAT A TEMP HI/LO" has been received and local verification indicates that temperature is 68°F in 'A' BAT room.

INITIATING CUES: CRS directs diluting the "A" BAT per EOP-6.0, Attachment 6.

AT NO TIME ARE YOU TO OPERATE ANY PLANT EQUIPMENT!

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

JPM i Handout

LOCALLY DILUTING THE BORIC ACID TANKS

ACTION/EXPECTED RESPONSE	ALTERNATIVE ACTION
1 Locally drain the BAT to 50% level (AB-463): a. Connect the drain rig stored in the BAT room to XVD08324A(B)-CS, BORIC ACID TANK A(B) DRAIN ISOL VALVE, and to the 2-inch capped pipe which penetrates the floor. ☐ b. Open XVD08324A(B)-CS, BORIC ACID TANK A(B) DRAIN ISOL VALVE. ☐ c. Coordinate with the Control Room, and drain the BAT to 50% level. ☐ d. Close XVD08324A(B)-CS, BORIC ACID TANK A(B) DRAIN ISOL VALVE. ☐ e. Remove the drain rig. ☐	

LOCALLY DILUTING THE BORIC ACID TANKS

ACTION/EXPECTED RESPONSE	ALTERNATIVE ACTION
2 Locally fill the BAT using the Fire Service System (AB-463): a. Open the nearest Fire Hose Reel Isolation Valve, and flush the fire hose to the floor drain until the water is clear. ☐ b. Close the Fire Hose Reel Isolation Valve. ☐ c. Connect the fill rig to XVD08324A(B)-CS, BORIC ACID TANK A(B) DRAIN ISOL VALVE, and to the fire hose from the hose reel. ☐ d. Open XVD08324A(B)-CS, BORIC ACID TANK A(B) DRAIN ISOL VALVE. ☐ e. Open the Fire Hose Reel Isolation Valve to fill the BAT. ☐ f. <u>WHEN</u> BAT level is between 90% and 95%, <u>THEN</u> close the Fire Hose Reel Isolation Valve. ☐ g. Close XVD08324A(B)-CS, BORIC ACID TANK A(B) DRAIN ISOL VALVE. ☐ h. Remove the fill rig. ☐	

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **NJPPF-049 (R1)**

2015 In Plant j NRC RO &SRO-U:

Control Room Evacuation (Duties of BOP Operator)

CANDIDATE: _____

EXAMINER: _____

TASK:

000-068-05-01 PERFORM CONTROL ROOM EVACUATION PER AOP-600.1.

TASK STANDARD:

AOP-600.1 Attachment 2 performed with the following complete:
1. All MFPs have been tripped
2. Rod Drive MG set "B" feeder breaker has been tripped
3. RCP "B" is left running ('A' and 'C' RCP are tripped already).
4. Two condensate pumps have been tripped
5. Three FWBP's have been tripped.

The use of applicable Human Performance Tools (3-way communications, self checking, peer checking, phonetic alphabet, etc) and industrial safety practices meets expectations.

TERMINATING CUE: Step 12 of Attachment 2 is complete or when examinee returns procedure to examiner.

PREFERRED EVALUATION LOCATION *PREFERRED EVALUATION METHOD*

PLANT SIMULATE

REFERENCES:

SOP-313	LOCAL SWITCHGEAR BREAKER OPERATIONS
ISP-027	ELECTRICAL SAFETY
AOP-600.1	CONTROL ROOM EVACUATION

INDEX NO.	*K/A NO.*		*RO*	*SRO*
0000682130	2.1.30	Ability to locate and operate components, including local controls.	4.4	4.0

TOOLS:
JPM j Handout 1; AOP-600.1, Attachment 2
JPM j Handout 2; Picture of the inside of a 7.2 KV breaker.
JPM j Handout 3; SOP-313 Section IV.K, Local Operation of a Remotely Operated 480 Volt Breaker.
JPM j Handout 4; SOP-313 Section IV.J, Local Operation of a 7.2KV Breaker.

EVALUATION TIME 14 *TIME CRITICAL* No *10CFR55:* 45(a)13

TIME START: _____ TIME FINISH: _____ PERFORMANCE TIME: _____

PERFORMANCE RATING: SAT: ____ UNSAT: ____

CANDIDATE: _____

EXAMINER: _____ _____
SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The plant was operating at 100% power, with all controls in automatic.
A call was received that a bomb has been placed in the control room.
The SS has directed a control room evacuation.
AC power is available to both ESF Buses.
The reactor has been tripped by the Reactor Operator.

INITIATING CUES: The Control Room Supervisor directs you as the BOP Operator to perform Attachment 2 of AOP-600.1, Steps 10 through 12.

AT NO TIME ARE YOU TO OPERATE ANY PLANT EQUIPMENT!

FOR ELECTRICAL MANIPULATIONS, AT NO TIME ARE YOU TO BREAK THE PLANE OF THE ELECTRICAL PANEL!

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

STEPS

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 1

Procedure CAUTION - Step 10 "Reactor Trip should be verified with the Reactor Operator prior to securing the Main Feedwater Pumps."

Verifies reactor has been tripped.

STEP STANDARD:

Calls the Reactor Operator and verifies reactor has been tripped.

CUES:

Evaluator note: Initial conditions have indicated that the RO has already tripped the reactor.

Evaluator cue: If the Examinee calls the Reactor Operator to verify the reactor trip, respond as the Reactor Operator that the reactor has been tripped.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 2

Step 10. Locally trip all Main Feedwater Pumps (436' TB).

STEP STANDARD:

Pulls MFP "PULL TO TRIP" handle on front standard for MFP's "A" "B" & "C". Verifies trip by noting RPM decrease locally OR trips MFPs from local DCS station.

CUES:

Evaluator cue: State that the handle withdraws and that the frequency of the sound from the pump is lowering.

Evaluator note: Tripping MFPs is critical because leaving them in service would result in excessive RCS cooldown and positive reactivity addition.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 3

Step 11 a. Locally at XSW1A Switchgear Room (TB-436): Trips XSW-1B1 06C - ROD DRIVE M/G SET "B".

STEP STANDARD:

Trips rod drive MG set "B" bkr 06C at XSW-1B1 by pushing on red TRIP pushbutton on left side on front of breaker. Verifies a Green "OPEN" flag results and Red light OFF, Green light ON.

CUES:

Evaluator cue: If asked as the Shift Supervisor if ISP-027, ELECTRICAL SAFETY INDUSTRIAL SAFETY PROCEDURE, requirements can be waived respond that the requirements can be waived. This waiver will be applied to the rest of the task. If Examinee does not wish to waive ISP-027 requirements then the following are required: Hard hat; safety glasses, hearing protection; Fire Retardant Pants and shirt or Fire Retardant coveralls.

Evaluator note: A copy of the applicable procedure is shown in JPM j Handout 3 (SOP-313 Section IV.K). If examinee describes the correct procedure and states they would obtain a copy then provide Handout 3.

Evaluator cue: Inform Examinee that MG Set "B" breaker cubicle has a Green "OPEN" flag with Red light OFF and Green light ON.

Evaluator cue: If the TRIP pushbutton on the right side of the breaker is used this is incorrect. Provide cue that there is no change in status (This pushbutton only works when the breaker is racked to test).

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 4

Step 11 b. Check status of XSW1A 06 FD WTR BOOSTER PUMP "A" breaker. (TB-436)

STEP STANDARD:

Verifies that the "A" FWBP, bkr 06 is closed by observing red light on outside of cubicle door.

CUES:

Evaluator cue: Inform Examinee that "A" FWBP, breaker cubicle has the Red light ON.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 5

Step 11 c. Checks status of XSW1A 09, RX COOLANT PUMP "A" breaker.(TB-436)

STEP STANDARD:

Checks RCP "A" breaker at XSW1A 09. Verifies breaker cubicle door has Green light ON.

CUES:

Evaluator cue: Inform Examinee that RCP "A" breaker cubicle has the Green light ON.

Evaluator note: This will "setup" alternate path portion of this JPM. Examinee will have to leave 'B' RCP running in Step 12.c.)

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 6

Step 11 d. Check status of XSW1A 07, COND PUMP "A" breaker. (TB-436)

STEP STANDARD:

Verifies that the "A" condensate pump bkr 07 is closed by observing Red light ON outside of cubicle door.

CUES:

Evaluator cue: Inform Examinee that "A" condensate pump breaker cubicle has the Red light ON.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 7

Step 12 Locally at XSW1B and XSW1C Switchgear Room (TB-412):

Step 12 a. If Condensate Pump "A" is running THEN trip both of the following:

Trip XSW1B 09, COND PUMP "B" breaker.(TB-412)

STEP STANDARD:

Trips breaker XSW1B 09 for Cond Pump "B" by pushing the "MANUAL TRIP" lever on front of breaker (inside cubicle door). Verifies breaker cubicle door has the Green light ON.

CUES:

Evaluator cue: If asked as the Shift Supervisor if ISP-027, ELECTRICAL SAFETY INDUSTRIAL SAFETY PROCEDURE, requirements can be waived respond that the requirements can be waived. If Examinee does NOT wish to waive ISP-027 requirements then the following are required: 25 Cal/cm2, arc flash suit and hood (use of an arc flash hood without a hard hat in an area with overhead work in progress will require manager approval. Otherwise no hard had is required when in an arc flash hood). Short sleeve natural fiber shirt, voltage rated gloves with leather, safety glasses, earmuffs are the preferred hearing protection when an arc flash suit is being worn, however earplugs may be used. Fire Retardant coveralls or Fire Retardant Shirt (tucked in) & Pants. A 10' flash protection boundary is established.

Evaluator Note: Do not let Examinee open the breaker door. A picture has been included of the inside of a 7.2 breaker (JPM j Handout 2).

Evaluator note: A copy of the applicable procedure is shown in JPM j Handout 4 (SOP-313 Section IV.J). If examinee describes the correct procedure and states they would obtain a copy then provide Handout 4. This handout is applicable to all of the 7.2 KV breaker local operations.

Evaluator cue: IF correct action is described inform the Examinee Condensate Pump "B" breaker cubicle door has the Green light ON. IF correct actions are NOT described inform the Examinee that the Red light is ON.

Evaluator note: Tripping Condensate Pumps is critical because leaving them in service would result in excessive RCS cooldown and positive reactivity addition.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 8

Step 12 a. Checks status of XSW1C 06, COND PUMP "C" breaker. (TB-412)

STEP STANDARD:

Checks COND PUMP "C" Breaker, XSW01C 06. Verifies breaker cubicle door has the Green light ON.

CUES:

Evaluator cue: Inform Examinee that COND PUMP "C" breaker cubicle has the Green light ON.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 9

Step 12 b. If Feedwater Booster Pump "A" is running, THEN trip all of the following:

Trips XSW1B 06, FD WTR BOOSTER PUMP "B" breaker. (TB-412)

STEP STANDARD:

Trips the FWBP "B" bkr 06 manually at XSW-1B by pushing the "MANUAL TRIP" lever on front of breaker (inside cubicle door). Verifies a green light on outside of cubicle door results.

CUES:

Evaluator note: Same ISP-027, ELECTRICAL SAFETY INDUSTRIAL SAFETY PROCEDURE, requirements as for the Condensate pumps.

Evaluator Note: Do not let Examinee open the breaker door. A picture has been included of the inside of a 7.2 breaker (JPM j Handout 2).

Evaluator cue: IF correct action is described inform the Examinee that Feed Water Booster Pump "B" breaker cubicle door has the Green light ON. IF correct actions are NOT described inform the Examinee that the Red light is ON.

Evaluator note: Tripping FW Booster Pumps is critical because leaving them in service would result in excessive RCS cooldown and positive reactivity addition.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 10

Step 12 b. Trips XSW1B 13, FD WTR BOOSTER PUMP "D" breaker. (TB-412)

STEP STANDARD:

Trips the FWBP "D" bkr 13 manually at XSW-1B by pushing the "MANUAL TRIP" lever on front of breaker (inside cubicle door). Verifies breaker cubicle door has the Green light ON.

CUES:

Evaluator note: Same ISP-027, ELECTRICAL SAFETY INDUSTRIAL SAFETY PROCEDURE, requirements as for the Condensate pumps.

Evaluator cue: IF correct action is described inform the Examinee that Feed Water Booster Pump "D" breaker cubicle door has the Green light ON. IF correct actions are NOT described inform the Examinee that the Red light is ON

Evaluator Note: Do not let Examinee open the breaker door. A picture has been included of the inside of a 7.2 breaker (JPM j Handout 2).

Evaluator note: Tripping FW Booster Pumps is critical because leaving them in service would result in excessive RCS cooldown and positive reactivity addition.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 11

Step 12 b. Trips XSW1C 08, FD WTR BOOSTER PUMP "C" XPP0028C-FW breaker. (TB-412)

STEP STANDARD:

Trips the FWBP "C" bkr 08 manually at XSW-1C by pushing the "MANUAL TRIP" lever on front of breaker (inside cubicle door). Verifies breaker cubicle door has the Green light ON.

CUES:

Evaluator note: Same ISP-027, ELECTRICAL SAFETY INDUSTRIAL SAFETY PROCEDURE, requirements as for the Condensate pumps.

Evaluator Note: Do not let Examinee open the breaker door. A picture has been included of the inside of a 7.2 breaker (JPM j Handout 2).

Evaluator cue: IF correct action is described inform the Examinee that Feed Water Booster Pump "C" breaker cubicle door has the Green light ON. IF correct actions are NOT described inform the Examinee that the Red light is ON

Evaluator note: Tripping FW Booster Pumps is critical because leaving them in service would result in excessive RCS cooldown and positive reactivity addition.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 12

Step 12 c. If RCP A is running (NO), goes to RNO.

Ensure one of the following is open:

XSW1B 07, RX COOLANT PUMP "B" breaker

OR

XSW1C 03, RX COOLANT PUMP "C" breaker.

STEP STANDARD:

Does NOT trip the RCP "B" bkr 07 at XSW-1B (because RCP "C" bkr 03 at XSW-1C is already open).

CUES:

Evaluator note: This is the alternative path portion of this JPM. It is critical that the "B" RCP be left running since both the "A" and "C" pumps are already tripped in this JPM.

Evaluator cue: The following cues are crucial since the both 'B' and 'C' RCP breakers will actually be indicating RED light on.

IF Examinee goes to RCP 'B' THEN state that the XSW1B 07, RX COOLANT PUMP B breaker cubicle has the RED light ON.

IF Examinee goes to RCP 'C' THEN state that the XSW1C 03, RX COOLANT PUMP C breaker cubicle has the GREEN light ON.

Evaluator note: Same ISP-027, ELECTRICAL SAFETY INDUSTRIAL SAFETY PROCEDURE, requirements as the Condensate pumps.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 13

Step 12 d. Ensure XSW 1C 02 Press Heater Transformer breaker is closed.

STEP STANDARD:

Verifies that the PZR Heater Transformer Breaker 02 at XSW-1C is closed by observing red light on outside of cubicle door or a red "closed" flag on front of breaker.

CUES:

Evaluator cue: Inform Examinee that PZR Heater Transformer breaker cubicle door has the Red light ON, Green light OFF.

Evaluator note: Same ISP-027 considerations as Condensate pumps if it was to be operated but since only verifying proper position there are no ISP-027 requirements.

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: NJPPF-049 (R1)

DESCRIPTION: 2015 InPlant j NRC RO &SRO-U: Control Room Evacuation (Duties of BOP Operator)

IC SET:

INSTRUCTIONS:

COMMENTS:

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The plant was operating at 100% power, with all controls in automatic.
A call was received that a bomb has been placed in the control room.
The SS has directed a control room evacuation.
AC power is available to both ESF Buses.
The reactor has been tripped by the Reactor Operator.

INITIATING CUES: The Control Room Supervisor directs you as the BOP Operator to perform Attachment 2 of AOP-600.1, Steps 10 through 12.

AT NO TIME ARE YOU TO OPERATE ANY PLANT EQUIPMENT!

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

DUTIES OF THE BOP OPERATOR

ACTION/EXPECTED RESPONSE	ALTERNATIVE ACTION
1 **Verify AC power is available to <u>both</u> ESF Buses.** ☑	1 **COMPLETE Attachment 2. <u>WHEN</u>** Attachment 2 is complete, **<u>THEN</u> COMPLETE Attachment 3.** ☐
2. **Check if time is available to perform additional Control Room actions.** ☐	2 **<u>GO TO Step 10</u>.** Observe the **CAUTION** prior to **Step 10.** ☑
<u>CAUTION - Step 3</u> Reactor Trip should be verified prior to securing the Main Feedwater Pumps.	
3 **Trip <u>all</u> Main Feedwater Pumps.** ☐	
4 **Ensure only <u>one</u> Feedwater Booster Pump is running.** ☐	
5 **Ensure only <u>one</u> Condensate Pump is running.** ☐	
6 **Verify RCP A is running.** ☐	6 Locally at the 7.2KV Switchgear on the TB-412, ensure the following: a) XSW1B 07, RX COOLANT PUMP B XPP0030B-RC, is open. ☐ b) XSW1C 02, PRESSURIZER HEATER TRANSFORMER XTF4103, is closed. ☐ c) **GO TO Step 8.** ☐
7 **Locally at the 7.2KV Switchgear on the TB-412, ensure the following:** a. XSW1B 07, RX COOLANT PUMP B XPP0030B-RC, is open. ☐ b. XSW1C 03, RX COOLANT PUMP C XPP0030C-RC, is open. ☐ c. XSW1C 02, PRESSURIZER HEATER TRANSFORMER XTF4103, is closed. ☐	

DUTIES OF THE BOP OPERATOR

ACTION/EXPECTED RESPONSE	ALTERNATIVE ACTION
8 **Locally verify <u>all</u> Main Feedwater Pumps are on their Turning Gears (TB-436).** ☐	
9 **GO TO Step 15.** ☐	

CAUTION - Step 10

Reactor Trip should be verified with the Reactor Operator prior to securing the Main Feedwater Pumps.

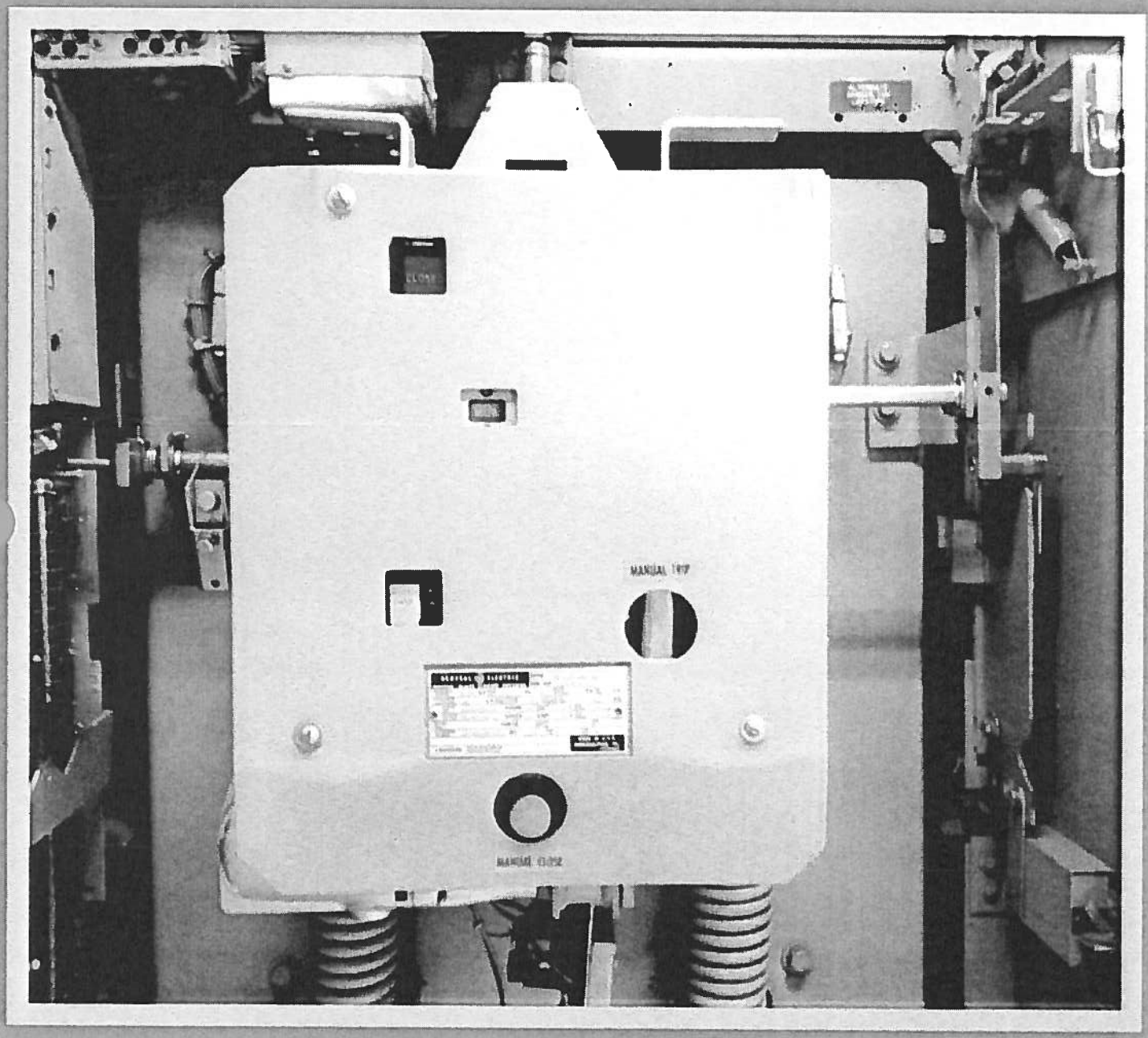
10 **Locally trip <u>all</u> Main Feedwater Pumps (TB-436).** ☐	
11 **Locally at XSW1A Switchgear Room (TB-436), perform the following:**	
a. Trip XSW1B1 06C, ROD DRIVE MG SET B XMG0001B-CR. ☐	
b. Check the status of XSW1A 06, FD WTR BOOSTER PUMP A XPP0028A-FW. ☐	
c. Check the status of XSW1A 09, RX COOLANT PUMP A XPP0030A-RC. ☐	
d. Check the status of XSW1A 07, COND PUMP A XPP0042A-CO. ☐	

ACTION/EXPECTED RESPONSE	ALTERNATIVE ACTION
12 **Locally at XSW1B and XSW1C Switchgear Room (TB-412), perform the following:**	
a. IF Condensate Pump A is running, THEN trip both of the following :	a. Ensure one of the following is open:
• XSW1B 09, COND PUMP B XPP0042B-CO. ☐	• XSW1B 09, COND PUMP B XPP0042B-CO. ☐
	OR
• XSW1C 06, COND PUMP C XPP0042C-CO. ☐	• XSW1C 06, COND PUMP C XPP0042C-CO. ☐
b. IF Feedwater Booster Pump A is running, THEN trip all of the following :	b. Ensure two of the following are open:
• XSW1B 06, FD WTR BOOSTER PUMP B XPP0028B-FW. ☐	• XSW1B 06, FD WTR BOOSTER PUMP B XPP0028B-FW. ☐
• XSW1B 13, FD WTR BOOSTER PUMP D XPP0028D-FW. ☐	• XSW1B 13, FD WTR BOOSTER PUMP D XPP0028D-FW. ☐
• XSW1C 08, FDWTR BOOSTER PUMP C XPP0028C-FW. ☐	• XSW1C 08, FDWTR BOOSTER PUMP C XPP0028C-FW. ☐
c. IF RCP A is running, THEN trip both of the following :	c. Ensure one of the following is open:
• XSW1B 07, RX COOLANT PUMP B XPP0030B-RC. ☐	• XSW1B 07, RX COOLANT PUMP B XPP0030B-RC. ☐
	OR
• XSW1C 03, RX COOLANT PUMP C XPP0030C-RC. ☐	• XSW1C 03, RX COOLANT PUMP C XPP0030C-RC. ☐
d. Ensure XSW1C 02, PRESSURIZER HEATER TRANSFORMER XTF4103, is closed. ☐	
13 **Locally trip XSW1C1 05D, ROD DRIVE MG SET A XMG0001A-CR (TB-412).** ☐	
14 **Locally verify all Main Feedwater Pumps are on their Turning Gears (TB-436).** ☐	

DUTIES OF THE BOP OPERATOR

ACTION/EXPECTED RESPONSE	ALTERNATIVE ACTION
15 **Report to CREP Room B.** ☐	

JPM j Handout 2



JPM j Handout 3

K. LOCAL OPERATION OF A REMOTELY OPERATED 480 VOLT BREAKER (600/1600/2000 AMPS)

1.0 INITIAL CONDITIONS

☐ 1.1 The Control Room has been informed of the local operations to be performed.

1.2 One of the following conditions have been met:

☐ a. The SS/CRS has entered the cubicle number and nomenclature for the breaker to be operated in Step 2.1.a, below. CHG A

☐ b. Personnel racking the breaker have a controlling document in the field (i.e. LOTO or SOP lineup) that identifies the correct component by listing both the breaker cubicle number and nomenclature.

NOTE 2.0

These steps shall only be performed when directed by the Shift Supervisor.

2.0 INSTRUCTIONS

2.1 Ensure you are at the correct breaker by one of the following:

☐ a. Per SS/CRS:_____ CHG A

_____

☐ b. Per controlling document in accordance with Step 1.2.b.

☐ 2.2 Verify the breaker nameplate data indicates that the Frame Size is either a 600/1600/2000 AMP breaker.

☐ 2.3 Verify proper Personal Protective Equipment and Approach Boundaries per ISP-027, Enclosures 8.4 and 8.2. CHG C

NOTE 2.4

At Motor Control Centers having an Automatic Transfer Unit (XMC1A1X, XMC1A4X, XMC1A4Y, XMC1B1X, and XMC1C1X) prior to operating the Normal or Emergency Feeder Breakers the Mode Selector Switch must be placed in MANUAL. Refer to SOP-308 for proper operation.

CHG C

2.4 To locally close a remotely operated breaker, perform the following:

☐ a. Lift up on the closing lever located between the left hand TRIP button and the center CLOSE button.

☐ b. Verify the breaker is closed, as indicated by the CLOSED flag being visible.

CAUTION 2.5

When possible, the breaker should be opened locally under minimal load.

2.5 To locally open a remotely operated breaker, perform the following:

☐ a. Depress the TRIP button on the front, left side of the breaker face.

☐ b. Verify the breaker is open, as indicated by the OPEN flag being visible.

END OF SECTION

JPM j Handout 4

J. LOCAL OPERATION OF A 7.2 KV BREAKER

1.0 INITIAL CONDITIONS

☐ 1.1 The Control Room has been informed of all local operations to be performed.

1.2 One of the following conditions have been met:

☐ a. The SS/CRS has entered the cubicle number and nomenclature for the breaker to be operated in Step 2.1.a, below.

☐ b. Personnel racking the breaker have a controlling document in the field (i.e. LOTO or SOP lineup) that identifies the correct component by listing both the breaker cubicle number and nomenclature.

CHG A

NOTE 2.0

These steps shall only be performed when directed by the Shift Supervisor.

2.0 INSTRUCTIONS

2.1 Ensure you are at the correct breaker by one of the following:

☐ a. Per SS/CRS:_____
_____

☐ b. Per controlling document in accordance with Step 1.2.b.

CHG A

☐ 2.2 Verify proper Personal Protective Equipment and Approach Boundaries per ISP-027, Enclosures 8.4 and 8.2.

CHG C

N01→ ☐ 2.3 Inform the Control Room of the component affected, by the breaker to be operated.

☐ 2.4 Locally close the breaker by performing one of the following:

a. For breakers that allow manual operation from inside the cubicle:

☐ 1) Depress the MANUAL CLOSE button on the lower, center portion of the breaker face.

☐ 2) Verify the breaker is closed, as indicated by the CLOSED flag being visible. CHG D

b. For breakers that are cannot be operated inside the cubicle and local use of the pistol grip switch is desired:

☐ 1) Place the pistol grip handle to the CLOSED position with a crisp hand motion.

☐ 2) Verify the breaker is closed, as indicated by the CLOSED flag being visible.

CAUTION 2.5

When possible, the breaker should be opened locally under minimal load.

☐ 2.5 Locally open the breaker by performing one of the following:

a. For breakers that allow manual operation from inside the cubicle:

☐ 1) Depress the MANUAL TRIP lever through the opening on the lower, right hand corner of the breaker face.

☐ 2) Verify the breaker is open, as indicated by the OPEN flag being visible. CHG D

b. For breakers that are cannot be operated inside the cubicle and local use of the pistol grip switch is desired:

☐ 1) Place the pistol grip handle to the TRIP position with a crisp hand motion.

☐ 2) Verify the breaker is open, as indicated by the CLOSED flag being visible.

END OF SECTION

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **NJPP-040**

2015 NRC In-Plant k RO: Transfer a Vital 120 Volt Instrument Power Supply

CANDIDATE: _____

EXAMINER: _____

TASK:

062-010-01-04 REMOVE ENGINEERING SAFETY FEATURES VITAL INVERTER FROM SERVICE

TASK STANDARD:

XIT-5901 is shutdown with APN-5901 supplied by alternate power from 1FA via manual bypass switch. The use of applicable Human Performance Tools (3-way communications, self checking, peer checking, phohetic alphabet; etc) and industrial safety practices meets expectations.

TERMINATING CUE: Examinee returns SOP-310 to examiner.

PREFERRED EVALUATION LOCATION *PREFERRED EVALUATION METHOL*

PLANT SIMULATE

REFERENCES:

SOP-310 ENGINEERED SAFETY FEATURES 120 VAC INSTRUMENT AND CONTROL SYSTEM

INDEX NO.	*K/A NO.*		*RO*	*SRO*
062000A203	A2.03	Consequences of improper sequencing when transferring to or from an inverter	2.9	3.4

TOOLS: JPM k Handout; SOP-310 Section IV.E Placing Inverter XIT5901 in an Alternate AC Lineup, marked through step 1.4 with steps 2.10 and 2.11 marked N/A.

EVALUATION TIME 10 *TIME CRITICAL* No *10CFR55:* 45(a)6

TIME START: _____ TIME FINISH: _____ PERFORMANCE TIME: _____

PERFORMANCE RATING: SAT: ____ UNSAT: ____

CANDIDATE: _____

EXAMINER: _____ / _____

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS:

INITIAL CONDITION: Plant is at 100% power. 'A1' Train maintenance work. XIT-5901 is scheduled for preventive maintenance.

INITIATING CUES: Shift Supervisor directs that XIT-5901 be removed from service and APN-5901 be placed on alternate power in accordance with SOP-310, Section IV.E for inverter PMs. Initial conditions are completed through step 1.4.

STP-506.005, DEENERGIZATION OF THE ESF LOAD SEQUENCER LOSS OF VOLTAGE AND DEGRADED VOLTAGE RELAYS has been completed.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

AT NO TIME ARE YOU TO OPERATE ANY PLANT EQUIPMENT!

FOR ELECTRICAL MANIPULATIONS, AT NO TIME ARE YOU TO BREAK THE PLANE OF THE ELECTRICAL PANEL!

STEPS

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 1

Step 1.5 On XIT5901 the following breakers are closed:

a. ALT. AC SOURCE.

b. BACKUP SOURCE.

c. NORMAL AC SOURCE.

STEP STANDARD:

Alternate source, Backup Source and Normal AC source breakers are all closed.

CUES:

Evaluator cue: Provide a copy of JPM k Handout, SOP-310 Section IV.E

Evaluator note: All 3 breakers should be closed during normal full power operation.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 2

Step 1.6 The MAN BYPASS Switch is in NORMAL.

STEP STANDARD:

Manual Bypass switch is in NORMAL

CUES:

Evaluator note: Manual Bypass should be in NORMAL during normal full power operation.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 3

1.7 The TEST TRANSFER Switch is in the CENTER Position.

STEP STANDARD:

The TEST TRANSFER Switch is in the CENTER Position.

CUES:

Evaluator note: Test Transfer switch should be in the CENTER position during normal full power operation.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 4

1.8 The SYNC MONITOR light is NOT lit.

STEP STANDARD:

Visually observes SYNC MONITOR Light OFF. (CB-436). (center of panel)

CUES:

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 5

Procedure CAUTION 2.0

STP-506.005, De-Energization Of The ESF Load Sequencer Loss Of Voltage And Degraded Voltage Relays A Train, XEG0001A, should be completed on Train A prior to removing Inverter XIT5901 from service. This should be tracked on the Diesel Generator A R&R.

Procedure NOTE 2.0

a. All steps are performed in the Relay Room (CB-436) unless otherwise stated.

b. XCP-636 1-5 (INV 1/2 TROUBLE) and XCP-636 1-6 (INV 1/2 AC INPUT LOSS) will be locked in alarm at the completion of this procedure.

Step 2.1 Ensure Alternate Source voltage is acceptable for transfer:

a. Place the SOURCE SELECTOR Switch in LINE.

b. Verify the Alternate AC Source voltage is acceptable as indicated by an AC OUTPUT voltage indication between 115 VAC and 125 VAC.

c. Place the SOURCE SELECTOR Switch in OUTPUT.

STEP STANDARD:

Simulates placing Source Selector to line, verifies AC Source Voltage and returns Source Selector switch to Output.

CUES:

Evaluator cue: When Examinee selects line point to AC Output voltage meter indicating 120 Volts.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 6

Procedure NOTE 2.2

Placing the TEST TRANSFER Switch in the ALT Position forces the Static Switch to receive power from the Alternate Source and deliver it to APN5901. This will also cause the following:

a) XCP-636 1-5 (INV 1/2 TROUBLE) annunciates (MCB).

b) ON ALTERNATE light illuminates.

c) ON INVERTER light is extinguishes.

Step 2.2; Place the TEST TRANSFER Switch to the ALT Position.

STEP STANDARD:

Simulates placing the TEST TRANSFER Switch to the ALT position. (right).

CUES:

Evaluator cue: Inform Examinee that the TEST TRANSFER Switch is in ALT position and the "ON ALTERNATE" light illuminates and the "ON INVERTER" light is extinguishes.

Evaluator cue: If Examinee contacts the control room respond that annunciator XCP-636 1-5 (INV 1/2 TROUBLE) did annunciate at the Main Control Board.

Evaluator note: Step 6 is critical is critical as the alternate source must be placed in service to accomplish the task standard.

COMMENTS:

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 7

Step 2.3; Verify the ON ALTERNATE light is lit.

STEP STANDARD:

Verifies the ON ALTERNATE light illuminated.

CUES:

Evaluator cue: Inform Examinee that the "ON ALTERNATE" Light is ON.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 8

Procedure CAUTION Step 2.4
If the ON ALTERNATE light is not illuminated, then it cannot be verified that the Static Switch has aligned itself to receive power from the Alternate Source. Proceeding with this procedure may result in a loss of APN5901.

Procedure NOTE 2.4 and 2.5:
The SYNC MONITOR Light should illuminate when the INVERTER STOP Pushbutton is pressed.

Step 2.4; Momentarily depress the INVERTER STOP Pushbutton and verify the SYNC MONITOR Light is lit.

STEP STANDARD:

Simulates momentarily depressing INVERTER STOP Pushbutton and verifies the SYNC MONITOR Light illuminates.

CUES:

Evaluator cue: Inform Examinee that the SYNC MONITOR Light is ON after the INVERTER STOP Pushbutton is depressed.

Evaluator note: Examinee should proceed to step 2.6.

Evaluator note: Step 8 is critical as the inverter is to be removed from service and this step accomplishes that.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 9

Procedure NOTE 2.6
The transfer performed with the MAN BYPASS switch is a Make-Before-Break operation which provides a momentary paralleling of power sources.

Step 2.6; Align Alternate AC power through the Static Switch to APN5901 by rotating the MAN BYPASS switch clockwise to the BYP TO ALT Position.

STEP STANDARD:

Simulates rotating the MAN BYPASS Switch to the BYP TO ALT position. (turn right)

CUES:

Evaluator note: Step 9 is critical to align the alternate source to 1FA.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 10

Step 2.7; Open the BACKUP SOURCE Breaker on the Inverter front.

STEP STANDARD:

Simulates manually positioning the BACKUP SOURCE breaker on the inverter front to OFF, (TO THE RIGHT OF THE MAIN PANEL).

CUES:

Evaluator note: Step 10 is critical to isolate inverter power per task standard

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 11

Step 2.8; Open the NORMAL AC SOURCE Breaker on the Inverter front.

STEP STANDARD:

Simulates manually positioning the NORMAL AC SOURCE Breaker on the inverter front to OFF, (Down).

CUES:

Evaluator note: Step 11 is critical to isolate inverter power per task standard

COMMENTS:

CRITICAL: No *SEQUENCED:* No *SAT* ☐ *UNSAT* ☐

STEP: 12

Step 2.9: Verify XCP-636 1-6 (INV 1/2 AC INPUT LOSS) is in alarm (MCB).

STEP STANDARD:

Calls control room to verify XCP-636 1-6 is in alarm.

CUES:

Evaluator cue: Respond as control room that XCP-636 1-6 did alarm.

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: NJPP-040

DESCRIPTION: 2015 NRC In-Plant k RO: Transfer a Vital 120 Volt Instrument Power Supply

IC SET: NA

INSTRUCTIONS:

COMMENTS:

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS:

INITIAL CONDITION: Plant is at 100% power. 'A1' Train maintenance work. XIT-5901 is scheduled for preventive maintenance.

INITIATING CUES: Shift Supervisor directs that XIT-5901 be removed from service and APN-5901 be placed on alternate power in accordance with SOP-310, Section IV.E for inverter PMs. Initial conditions are completed through step 1.4.

STP-506.005, DEENERGIZATION OF THE ESF LOAD SEQUENCER LOSS OF VOLTAGE AND DEGRADED VOLTAGE RELAYS has been completed.

AT NO TIME ARE YOU TO OPERATE ANY PLANT EQUIPMENT!

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

CAUTION

Placing APN5901, 120VOLT VITAL AC DISTR PANEL 1 NSSS on ALT SOURCE, from APN1FA, 120 VOLT AC INST MAIN DISTR PANEL 1FA, will prevent the Train A Engineered Safety Features Load Sequencer from operating during a Blackout condition.

NOTE

This procedure removes the Normal AC Source and the Backup DC Source from Inverter 5901 while providing a regulated AC power to APN5901 and APN5907 via APN1FA through Inverter XIT5901 operating in Bypass.

E. PLACING INVERTER XIT5901 IN AN ALTERNATE AC LINEUP

1.0 INITIAL CONDITIONS

☑ 1.1 A **Pre-Job Brief** has been conducted per OAP-100.3, Human Performance Tools. CHG D

☑ 1.2 APN5901, 120 VOLT VITAL AC DISTR PANEL 1 NSSS, must remain energized.

☑ 1.3 APN1FA, 120 VOLT AC INST MAIN DISTR PANEL 1FA, is energized.

☑ 1.4 APN1FA 19, ALT SOURCE FOR APN5901 VIA XIT5901, is closed (CB-436).

1.5 On XIT5901 the following breakers are closed:

☐ a. ALT AC SOURCE.

☐ b. BACKUP SOURCE.

☐ c. NORMAL AC SOURCE.

☐ 1.6 The MAN BYPASS switch is in NORMAL.

☐ 1.7 The TEST TRANSFER switch is in the CENTER Position.

☐ 1.8 The SYNC MONITOR light is NOT lit.

CAUTION 2.0

STP-506.005, De-Energization Of The ESF Load Sequencer Loss Of Voltage And Degraded Voltage Relays A Train, XEG0001A, should be completed on Train A prior to removing Inverter XIT5901 from service. This should be tracked on the Diesel Generator A R&R.

NOTE 2.0

a. All steps are performed in the Relay Room (CB-436) unless otherwise stated.

b. XCP-636 1-5 (INV 1/2 TROUBLE) and XCP-636 1-6 (INV 1/2 AC INPUT LOSS) will be locked in alarm at the completion of this procedure.

2.0 INSTRUCTIONS

N01→ 2.1 Ensure Alternate Source voltage is acceptable for transfer:

☐ a. Place the SOURCE SELECTOR switch in LINE. CHG D

☐ b. Verify the Alternate AC Source voltage is acceptable as indicated by an AC OUTPUT voltage indication between 115 VAC and 125 VAC.

☐ c. Place the SOURCE SELECTOR switch in OUTPUT.

NOTE 2.2

Placing the TEST TRANSFER Switch in the ALT Position forces the Static Switch to receive power from the Alternate Source and deliver it to APN5901. This will also cause the following:

a) XCP-636 1-5 (INV 1/2 TROUBLE) annunciates (MCB).

b) ON ALTERNATE light illuminates.

c) ON INVERTER light is extinguishes.

☐ 2.2 Place the TEST TRANSFER switch in the ALT position.

☐ 2.3 Verify that the ON ALTERNATE light is lit.

CAUTION Step 2.4

If the ON ALTERNATE light is not illuminated, then it cannot be verified that the Static Switch has aligned itself to receive power from the Alternate Source. Proceeding with this procedure may result in a loss of APN5901..

NOTE 2.4 and 2.5

The SYNC MONITOR light should illuminate when the INVERTER STOP pushbutton is pressed.

CHG D

☐ 2.4 Momentarily depress the INVERTER STOP pushbutton and verify the SYNC MONITOR light is lit.

2.5 If the INVERTER STOP pushbutton fails to stop the inverter, then complete the following:

☐ a. Simulate depressing the pushbutton by directing the Electricians to install a switchable jumper device for the INVERTER STOP Pushbutton (S103) at terminal wires 142 and 143.

☐ b. Actuate the switchable jumper device.

☐ c. Verify the SYNC MONITOR light is lit.

☐ d. Remove the switchable jumper device.

NOTE 2.6

The transfer performed with the MAN BYPASS switch is a Make-Before-Break operation which provides a momentary paralleling of power sources.

☐ 2.6 Align Alternate AC power through the Static Switch to APN5901 by rotating the MAN BYPASS switch clockwise to the BYP TO ALT Position.

☐ 2.7 Open the BACKUP SOURCE breaker on the Inverter front.

☐ 2.8 Open the NORMAL AC SOURCE breaker on the Inverter front.

☐ 2.9 Verify XCP-636 1-6 (INV 1/2 AC INPUT LOSS) is in alarm (MCB).

NA
R01
Today

CHG D

NOTE 2.10

Bypass around the Static Switch fully isolates the Static Switch and the Inverter output from the Alternate Source and will cause the following:

1) XCP-636 1-5 (INV 1/2 TROUBLE) annunciates (MCB).

2) AC OUTPUT FAIL lights.

3) ALTERNATE AC FAIL lights.

☐ 2.10 If desired, rotate the MAN. BYPASS switch clockwise to the BYP TO ALT ISOLATE position to align Alternate AC power around the Static Switch to APN5901.

NA
RO1
Today

NOTE 2.11

If the electricians are to perform inverter PMs and breakers are **NOT** red tagged, Step 2.10 may be omitted.

CHG D

2.11 Open the following feeder breakers:

☐ a. XMC1DA2Y 06ABL, INVERTER 1 NSSS FEED XIT5901-EV (AB-412).

☐ b. DPN1HA 22, INVERTER XIT5901 (IB-412).

END OF SECTION

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **NJPA-021A(R1)**

2015 NRC RO/SRO Common A1-a:
Perform Boric Acid Dilution Volume Determination

CANDIDATE: _____

EXAMINER: _____

TASK:

004-006-01-01 PERFORM BORIC ACID CONCENTRATION CHANGE CALCULATION

TASK STANDARD:

Examinee determines that about 9359 gals (interpolated value) will be required for dilution. A range of 9250 to 9450 (~ +/- 100 gal or ~ 1%) would be acceptable. If the examinee elects to calculate vice interpolate, the calculated value is the same range. Examinee determines that available volume in Recycle Holdup Tank is NOT sufficient to accomodate the calculated dilutior Volume required exceeds the volume at overflow 44,353 gallons required vice 42,989 gallons at overflow.

TERMINATING CUE: Calculations completed.

PREFERRED EVALUATION LOCATION *PREFERRED EVALUATION METHOD*

CLASSROOM PERFORM

REFERENCES:

SOP-106 REACTOR MAKEUP WATER SYSTEM

INDEX NO.	*K/A NO.*		*RO*	*SRO*
1940012125	2.1.25	Ability to interpret reference materials such as graphs, curves, tables, etc.	3.9	4.2
1940012137	2.1.37	Knowledge of procedures, guidelines, or limitations associated with reactivity management.	4.3	4.6

TOOLS: Curve Book (Accessible via Desk Top Computers)
Calculator
JPM A1-a, Dilution Calculation hand out.

EVALUATION TIME 20 *TIME CRITICAL* NO *10CFR55:* 45(a)(12)

TIME START: _____ TIME FINISH: _____ PERFORMANCE TIME: _____

PERFORMANCE RATING: SAT: _____ UNSAT: _____

CANDIDATE: _____

EXAMINER: _____ / _____

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The plant is in MODE 3 preparing for reactor startup in accordance with GOP-3.
Latest RCS boron sample was 2038 ppm.
Estimated critical boron concentration is 1688 ppm.
'A' Recycle Holdup Tank is in service.
'A' Recycle Holdup Tank level is 83%.

INITIATING CUES: The SS directs you to perform the following:

1. Determine the dilution volume required to establish the estimated critical boron concentration.

2. Determine if the necessary volume is available in 'A' Recycle Holdup Tank to accomodate the dilution. Assume that RCS temperature and Pressurizer Level remain constant. Show evidence to support your determination.

Show all work on the JPM A1-a Dilution Calculation hand out provided.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

STEPS

CRITICAL: Yes ***SEQUENCED:*** Yes ***SAT*** ☐ ***UNSAT*** ☐

STEP: 1

Examinee determines that the amount of dilution required.

STEP STANDARD:

Determines Ci - Cf = 350 ppm dilution required.

CUES:

Evaluator note: Ci and Cf values are given in the initiating cue.

COMMENTS:

CRITICAL: Yes ***SEQUENCED:*** Yes ***SAT*** ☐ ***UNSAT*** ☐

STEP: 2

Selects correct curve from curve book.

STEP STANDARD:

The examinee refers to Figure III-3, RCS Dilution Gallons (Vw) of Dilution Water Required, in the Curve Book.

CUES:

Evaluator note: Do NOT prompt Examinee on location of the dilution tables.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 3

Examinee interpolates or calculates the volume of water required and reports the dilution volume required to the CRS.

STEP STANDARD:

Examinee determines that 9359 gals (interpolated value) will be required for dilution.

CUES:

Evaluator note: The volume reported to the CRS should be the interpolated value or greater. A range of 9250 to 9450 (~+/- 100 gal) would be acceptable. If the examinee elects to calculate vice interpolate the same range applies. See NJPA-021A(R1) Key for calculations.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 4

Examinee determines if adequate volume is available in the 'A' Recycle Holdup Tank.

STEP STANDARD:

Volume required = 35,000 + 9,353 = 44,353 gallons (Minimum = 43,750 gallons)
Volume available = Volume at overflow = 42,989 gallons

Required Volume > Volume available
Recycle Holdup Volume is NOT Adequate

CUES:

Evaluator note: Examinee will refer to Curve Book Figure VI-24, Recycle Holdup Tank Volme XTK0006A/B to determine volume required and volume available. See NJPA-021A(R1) Key for calculations. The critical aspect of this step is to determine that adequate volume is NOT available.

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: NJPA-021A(R1)

DESCRIPTION: 2015 NRC RO/SRO Common A1-a: Perform Boric Acid Dilution Volume Determination

IC SET: NA

INSTRUCTIONS:

COMMENTS:

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The plant is in MODE 3 preparing for reactor startup in accordance with GOP-3.
Latest RCS boron sample was 2038 ppm.
Estimated critical boron concentration is 1688 ppm.
'A' Recycle Holdup Tank is in service.
'A' Recycle Holdup Tank level is 83%.

INITIATING CUES: The SS directs you to perform the following:

1. Determine the dilution volume required to establish the estimated critical boron concentration.

2. Determine if the necessary volume is available in 'A' Recycle Holdup Tank to accomodate the dilution. Assume that RCS temperature and Pressurizer Level remain constant. Show evidence to support your determination.

Show all work on the JPM A1-a Dilution Calculation hand out provided.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

JPM A1-a (R1) Dilution Calculation Handout

Examinee: _____
Date: _____

Dilution Volume Required

A range of 9250 to 9450 (~ +/- 100 gal) is acceptable if interpolation is used.

A range of 9250 to 9450 (~ +/- 100 gal) is acceptable if calculation is used.

Recycle Holdup Volume Adequate?

Volume required = 35,000 + 9,353 = 44,353 gallons (Minimum = 43,750 gallons)
Volume available = Volume at overflow = 42,989 gallons

Required Volume > Volume available
Recycle Holdup Volume is NOT Adequate

Revision Date: 11-11-94
Prepared By: LR Carter
Verified By: P.R. Boylan
Approved By:: Will Hatton

FIGURE III-3. RCS DILUTION
GALLONS (V_w) OF DILUTION WATER REQUIRED

$C_i - C_f = 350$ ppm

$$V_W = \frac{M}{8.33} \ln\left(\frac{C_i}{C_f}\right) = 49640 \ln\left(\frac{C_i}{C_f}\right)$$

M = RCS Mass (413,500 lbm) **C_i = Initial ppm** **C_f = Final ppm**

C_i ppm	PPM BORON DEDUCTION ($C_i - C_f$)									
	325	350	375	400	425	450	475	500	550	600
2,500	6,913	7,487	8,067	8,655	9,249	9,851	10,460	11,077	12,334	13,623
2,400	7,223	7,825	8,434	9,050	9,675	10,307	10,948	11,597	12,920	14,280
2,300	7,562	8,195	8,835	9,484	10,141	10,808	11,483	12,168	13,566	15,005
2,200	7,935	8,601	9,277	9,961	10,656	11,360	12,074	12,799	14,280	15,808
2,100	8,346	9,050	9,765	10,489	11,225	11,971	12,72			
2,000	8,803	9,549	10,307	11,077	11,859	12,653	13,46			
1,900	9,312	10,107	10,914	11,734	12,569	13,417	14,28			
1,800	9,885	10,733	11,597	12,475	13,370	14,280	15,20			
					14,280	15,263	16,26			
					15,326	16,393	17,48			
					16,537	17,705	18,90			
					17,959	19,249	20,572	21,933	24,770	27,779
					19,652					
					21,703					
					24,242	26,115	28,062	30,088	34,408	39,139
					27,470	29,677	31,986	34,408	39,638	45,485
					31,724	34,408	37,245	40,254	46,883	54,535
800	25,877	28,561	31,398	34,408	37,611	41,036	44,715	48,688	57,739	68,815
700	30,983	34,408	38,086	42,060	46,379	51,110	56,340	62,187	76,467	96,595
600	38,727	43,458	48,688	54,535	61,163	68,815	77,866	88,943	123,350	
						0	148,708			
300										
200										
100										

C_i = 2038 ppm

Interpolation for Dilution

$$\frac{9050 - 9549}{2100 - 2000} = \frac{9050 - X}{2100 - 2038}$$

$$\frac{-499}{100} = \frac{9050 - X}{62}$$

$$-309.4 = 9050 - X$$

$$X = 9359.4$$

Calculation for Dilution

$$Vw = 49640 \ln\left(\frac{2038}{1688}\right)$$

$$Vw = 49640 \ln (1.20735)$$

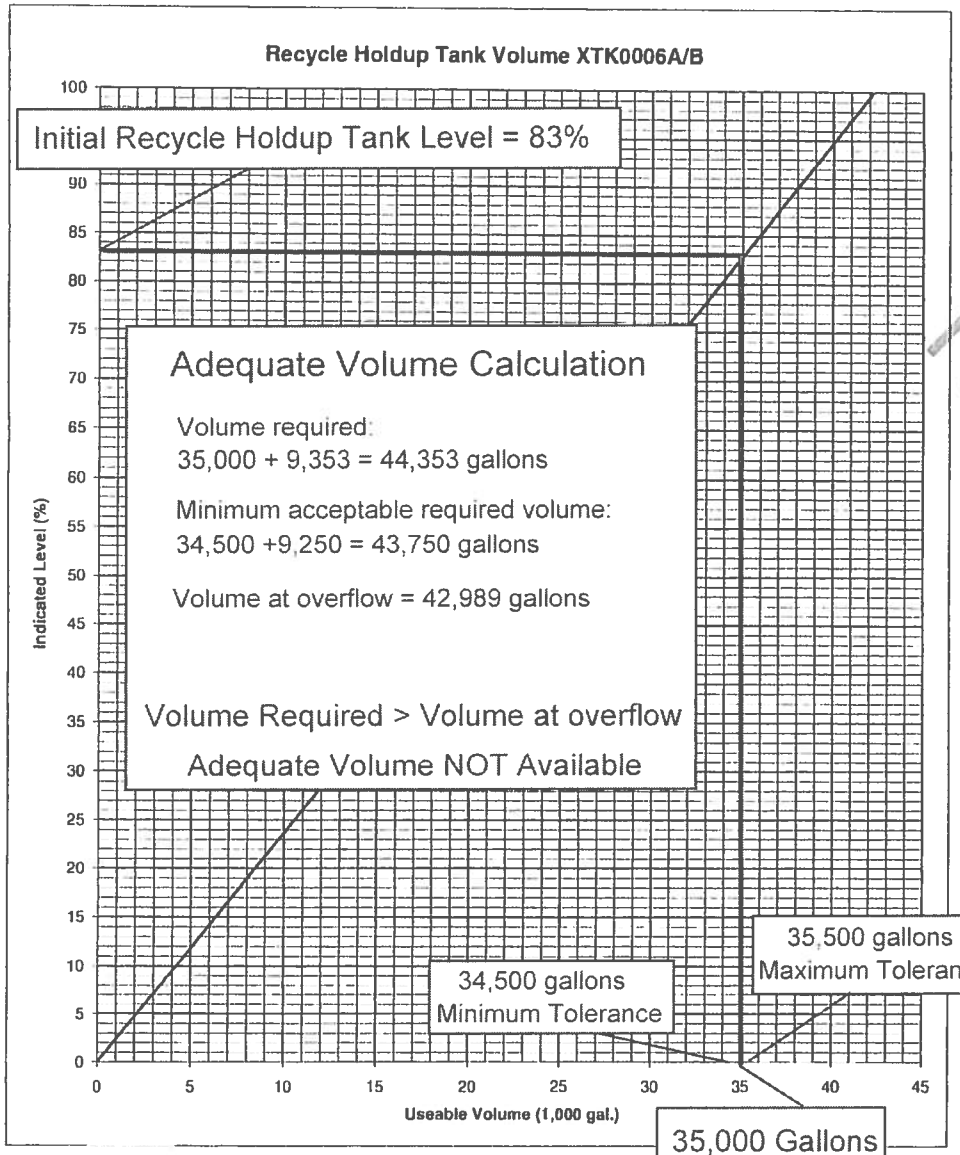
$$Vw = 9353.5$$

A range of 9250 to 9450 (~ +/- 100 gal) is acceptable if calculation is used

A range of 9250 to 9450 (~ +/- 100 gal) is acceptable if interpolation is used

Note: See Figure III-6 For Correction Factor

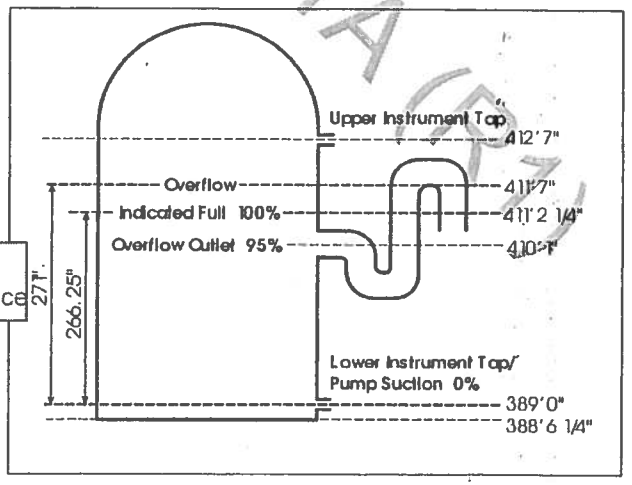
Tech. Spec. Ref.: N/A Procedure Ref.: N/A Figure Ref: DC00040-068



Level	Gallons Available
0%	0
5%	2,112
10%	4,224
15%	6,335
20%	8,447
25%	10,559
30%	12,671
35%	14,782
40%	16,894
45%	19,006
50%	21,118
55%	23,229
60%	25,341
65%	27,453
70%	29,565
75%	31,676
80%	33,788
85%	35,900
90%	38,012
95%	40,123
100%	42,235
Overflow	42,989

Figure: VI-24
Revision Date: 8-5-03
Prepared by:
Verified by:
Approved by:

NOTE: This figure only includes volume above the pump suction/ lower instrument tap centerline (0% level). The volume below the 0% level is 912 gallons. The volume between the 100% level and the overflow level is 753 gallons.



Tech Spec Ref.: N/A
Procedure Ref.: SOP-101
Figure Ref.: DC04360-004 Rev. 0

JPM A1-a Dilution Calculation Handout

Examinee: _____

Date: _____

Dilution Volume Required

Recycle Holdup Volume Adequate?

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **NJPA-1000 (R1)**

2015 NRC RO/SRO Common A1-b:

Calculate Work Hour Limitations.

CANDIDATE: _____

EXAMINER: _____

TASK:

341-038-03-02 INTERPRET AND ENSURE COMPLIANCE WITH PLANT ADMINISTRATIVE PROCEDURES DURING NORMAL AND OFF NORMAL PLANT OPERATIONS

TASK STANDARD:

Determines that work hours would be exceeded by RO-1, due to not having a 34 hour break in the 9 calendar days from 1/29 through 2/6 OR due to exceeding 72 hours worked in the 168 hour (7 day) period from 1900 1/30 to 1900 2/6. Work hours are exceeded by RO-2 due to not having an average of 2.5 days off in the 5 week fixed cycle.

TERMINATING CUE: Reviews work history and determines that RO-3 is eligible while RO-1 and RO-2 are NOT eligible to work the requested overtime shift without a waiver.

PREFERRED EVALUATION LOCATION *PREFERRED EVALUATION METHOD*

CLASSROOM PERFORM

REFERENCES:

SAP-152 FATIGUE MANAGEMENT AND WORK HOUR LIMITS

INDEX NO.	*K/A NO.*		*RO*	*SRO*
1940012105	2.1.5	Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.	2.9	3.9

TOOLS: JPM A1-b Work Sheet Handout.
JPM A1-b Schedules Handout.
SAP-152 (Available on Desk Top Computer)
Calculator

EVALUATION TIME 40 *TIME CRITICAL* NO *10CFR55:* 41(b) (10)

TIME START: _____ TIME FINISH: _____ PERFORMANCE TIME: _____

PERFORMANCE RATING: SAT: ____ UNSAT: ____

CANDIDATE: _____

EXAMINER: _____ _____ / _____
SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS: None.

INITIAL CONDITION: The Unit is at 100% power currently and has been at power continuously for the last 3 months.

The regular on-line 5 shift rotation is in effect.

The Control Room has been informed on February 5 night shift that an RO scheduled for the February 6 day shift cannot work due to illness.

You are asked to identify if any of three available individuals are eligible to work as an RO for Thursday February 6 day shift.

INITIATING CUES: Given the work schedules provided (JPM A1-b Schedules Handout) determine if any of three available ROs (RO-1, RO-2 or RO-3) are eligible to work the day shift beginning at 0700 on February 6 without reliance on a waiver or change to the scheduled OT.

JPM A1-b Schedules Handout includes all hours actually worked by all three ROs after December 31 AND all hours projected to be worked through February 28.

If any of the ROs is NOT eligible, identify the criteria that supports your determination.

Use the VCS fixed shift cycle method which begins on the first night of the 3 night portion of the schedule.

Assume RO-1, RO-2 and RO-3 are fully qualified. Show all work on JPM A1-b Work Sheet Handout provided.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

STEPS

CRITICAL: Yes ***SEQUENCED:*** Yes ***SAT*** ☐ ***UNSAT*** ☐

STEP: 1

Reviews RO-1 work history to determine if RO-1 is eligible to work the day shift on February 6.

STEP STANDARD:

Compares work history for RO-1 to SAP-152 criteria and notes that RO-1 is not eligible to work without reliance on a waiver **based on either ONE of the following**:

Identifies that RO-1 would not have had the required 34 hour break within the previous 9 calendar days. He would have had only a single 24 hour break (0700 on 2/4 to 0700 on 2/5) in the 9 days from 1/29 through 2/6.

or

Identifies that RO-1 would exceed 72 hours worked in the 168 hour (7 day) period from 1900 1/30 to 1900 2/6. He would have worked 84 hours in the 168 hour period.

CUES:

Evaluator cue: Provide a copy of JPM A1-b Work Sheet Handout and JPM A1-b Schedules Handout to the examinee. Instruct examinee to put their name and the date on JPM A1-b Work Sheet Handout and to return it to you when they are finished. Instruct Examinee to show all work on the Handout.

Evaluator note: SAP-152, Fatigue Management and Work Hour Limits should be referenced while reviewing JPM A1-b Schedules Handout.

Evaluator note: The cycle for RO-1 runs from Jan 7 through Feb 10 (fixed five weeks).

Evaluator note: Refer to NJPA-1000 (R1) Key. Critical elements are to determine eligibility and the correct reason for eligibility.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 2

Reviews RO-2 work history to determine if RO-2 is eligible to work the day shift on February 6.

STEP STANDARD:

Compares work history for RO-2 to SAP-152 criteria and notes that RO-2 is NOT eligible to work without reliance on a waiver.

Identifies that RO-2 would not have had an average 2.5 days off per week averaged over the shift cycle. If RO-2 works 2/6 he would have had 12 days off in the 5 week cycle, an average of 2.4 days per week

CUES:

Evaluator note: The cycle for RO-2 runs from Jan 14 through Feb 17 (fixed five weeks).

Evaluator note: Refer to NJPA-1000 (R1) Key. Critical elements are to determine eligibility and the correct reason for eligibility.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 3

Reviews RO-3 work history to determine if RO-3 is eligible to work the day shift on February 6.

STEP STANDARD:

Compares work history for RO-3 to SAP-152 criteria and notes that RO-3 is eligible to work without reliance on a waiver.

CUES:

Evaluator cue: Inform the examinee that the JPM has ended when they return JPM A1-b Work Sheet Handout to you.

Evaluator note: Refer to NJPA-1000 (R1) Key. Critical elements are to determine eligibility and the correct reason for eligibility.

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: NJPA-1000 (R1)

DESCRIPTION: 2015 NRC RO/SRO Common A1-b: Calculate Work hour limitations.

IC SET: NA

INSTRUCTIONS:

COMMENTS:

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: None.

INITIAL CONDITION: The Unit is at 100% power currently and has been at power continuously for the last 3 months.

The regular on-line 5 shift rotation is in effect.

The Control Room has been informed on February 5 night shift that an RO scheduled for the February 6 day shift cannot work due to illness.

You are asked to identify if any of three available individuals are eligible to work as an RO for Thursday February 6 day shift.

INITIATING CUES: Given the work schedules provided (JPM A1-b Schedules Handout) determine if any of three available ROs (RO-1, RO-2 or RO-3) are eligible to work the day shift beginning at 0700 on February 6 without reliance on a waiver or change to the scheduled OT.

JPM A1-b Schedules Handout includes all hours actually worked by all three ROs after December 31 AND all hours projected to be worked through February 28.

If any of the ROs is NOT eligible, identify the criteria that supports your determination.

Use the VCS fixed shift cycle method which begins on the first night of the 3 night portion of the schedule.

Assume RO-1, RO-2 and RO-3 are fully qualified. Show all work on JPM A1b Work Sheet Handout provided.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

JPM A1-b Work Sheet Handout

Examinee Name: _____ Date: _____

Note:

1. JPM A1-b Schedules Handout includes all hours actually worked by RO-1, RO-2 and RO-3 after December 31 AND all hours projected to be worked through Feb 28.
2. Day shift is 12 hours; 0700 to 1900 and Night shift is 12 hours 1900 to 0700 and Training is 10 hours 0730 to 1730.

1. Place a check mark in the appropriate box for RO-1, RO-2 and RO-3.

2. Provide basis if a worker is NOT eligible

☐ RO-1 is eligible to work 0700-1900 on 2/6.

☒ RO-1 is NOT eligible to work 0700-1900 on 2/6.

IF RO-1 is NOT eligible to work the overtime STATE the basis:

Per SAP-152 6.1.1 E. an individual must have at least one 34 hour break in any 9 calendar days. If RO-1 works 2/6 he would have had only a single 24 hour break (0700 on 2/4 to 0700 on 2/5) in the 9 days from 1/29 through 2/6. In addition SAP-152 6.1.1 C. allows no more than 72 hours in any 7-day period. If RO-1 worked the proposed OT he would have worked 84 hours in the 168 hour period from 1900 on 4/30 through 1900 on 2/6. Either reason is adequate for pass on the JPM. The cycle for RO-1 runs from Jan 7 through Feb 10 (fixed five weeks).

☐ RO-2 is eligible to work 0700-1900 on 2/6.

☒ RO-2 is NOT eligible to work 0700-1900 on 2/6.

IF RO-2 is NOT eligible to work the overtime STATE the basis:

Per SAP-152 6.1.2 A. an individual must have on average 2.5 days off per week averaged over the shift cycle. If RO-2 works 2/6 he would have had 12 days off in the 5 week cycle an average of 2.4 days per week. The cycle for RO-2 runs from Jan 14 through Feb 17 (fixed five weeks)

☒ RO-3 is eligible to work 0700-1900 on 2/6.

☐ RO-3 is NOT eligible to work 0700-1900 on 2/6.

IF RO-3 is NOT eligible to work the overtime STATE the basis:

The cycle for RO-3 runs from Jan 7 through Feb 10 (fixed five weeks)

JPM A1-b Work Sheet Handout

Examinee Name: _____ Date: _____

Note:

1. JPM A1-b, Schedules Handout includes all hours actually worked by RO-1, RO-2 and RO-3 after December 31 AND all hours projected to be worked through Feb 28.
2. Day shift is 12 hours; 0700 to 1900 and Night shift is 12 hours 1900 to 0700 and Training is 10 hours 0730 to 1730.

1. Place a check mark in the appropriate box for RO-1, RO-2 and RO-3.

2. Provide basis if a worker is NOT eligible

☐ RO-1 is eligible to work 0700-1900 on 2/6.

☐ RO-1 is NOT eligible to work 0700-1900 on 2/6.

IF RO-1 is NOT eligible to work the overtime STATE the basis:

☐ RO-2 is eligible to work 0700-1900 on 2/6.

☐ RO-2 is NOT eligible to work 0700-1900 on 2/6.

IF RO-2 is NOT eligible to work the overtime STATE the basis:

☐ RO-3 is eligible to work 0700-1900 on 2/6.

☐ RO-3 is NOT eligible to work 0700-1900 on 2/6.

IF RO-3 is NOT eligible to work the overtime STATE the basis:

JPM A1-b Work Sheet Handout

Additional work:

JPM A1-b
Schedules Handout

Jan-14

	W	Th	F	S	S	M	T	W	Th	F	S	S	M	T	W	Th	F	S	S	M	T	W	Th	F	S	S	M	T	W	Th	F
Shift	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
RO1	**OTN**						N	N	N					D	D	D	D			T	T	T	T		D	D	D		**OTN**	**OTN**	N
RO2		**OTN**	N	N	N	N	**OTN**						**OTN**	N	N	N	**OTN**				D	D	D	D		**OTD**	T	T	T	T	
RO3						**OTN**	N	N	N				**OTD**	D	D	D	D			T	T	T	T		D	D	D	**OTD**		**OTN**	N

Feb-14

	S	S	M	T	W	Th	F	S	S	M	T	W	Th	F	S	S	M	T	W	Th	F	S	S	M	T	W	Th	F
Shift	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
RO1	N	N	N		**OTD**	**OTD**					N	N	N				**OTD**	D	D	D	D			T	T	T	T	
RO2	D	D	D			**OTD**	N	N	N	N	**OTN**					**OTN**		N	N	N					D	D	D	D
RO3	N	N	N			**OTD**					N	N	N	**OTN**				D	D	D	D			T	T	T	T	

Proposed overtime shift

Note:

1. OTD = Overtime Days
2. OTN = Overtime nights
1. N and OTN = 1900 to 0700; 12 hours worked
2. D and OTD = 0700 to 1900; 12 hours worked
3. T = training; 0700 to 1700; 10 hours worked

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **NJPA-1006 (R1)**

2015 NRC RO A2:

Determine Surveillance Requirements due to loss of Main Control Board Annunciators

CANDIDATE: _____

EXAMINER: _____

TASK:

000-170-05-01 Respond to loss of Main Control Board annunciators per AOP-100.5.

TASK STANDARD:

Identifies the following panels from Attachment 2:
XCP-610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 624 and 626

Identifies the following surveillance requirements from Attachment 3:

XCP-615, 2-5; GTP-702 Att IV.G
XCP-615, 3-3; GTP-702 Att VI.V-3
XCP-615, 3-6; OAP-106.1, RB Sump Level and STP-114.002
XCP-620, 1-5; GTP-702, Att IV.E
XCP-620, 1-6; GTP-702, Att IV.E
XCP-620, 2-4; GTP-702, Att IV.D
XCP-620, 2-5; GTP-702, Att IV.B
XCP-620, 4-2; GTP-702, Att VI.L-2 (not critical)
XCP-620, 4-3; GTP-702, Att VI.L-2 (not critical)
XCP-621, 1-1; GTP-702, Att IV.C

TERMINATING CUE: Identifies required Surveillance Attachments associated with XCP-615, XCP-620 and XCP-621 from AOP 100.5 Attachment 3.

PREFERRED EVALUATION LOCATION *PREFERRED EVALUATION METHOD*

CLASSROOM PERFORM

REFERENCES:

AOP-100.5 Loss of Main Control Board Annunciators

INDEX NO.	*K/A NO.*		*RO*	*SRO*
1940012214	2.2.14	Knowledge of the process for controlling equipment configuration or status.	3.9	4.3

TOOLS: Copy of AOP-100.5, Loss of Main Control Board Annunciators - available on desk top computers.
JPM A2 RO Handout 1; AOP-100.5 Attachment 2
JPM A2 RO Handout 2; AOP-100.5 Attachment 3

EVALUATION TIME 5 *TIME CRITICAL* NO *10CFR55:* 45(a)(3)

TIME START: _____ TIME FINISH: _____ PERFORMANCE TIME: _____

PERFORMANCE RATING: SAT: _____ UNSAT: _____

CANDIDATE: _____

EXAMINER: _____ _____
SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS: NA

INITIAL CONDITION: The plant is at 100% power. A loss of multiple Main Control Board annunciators has been experienced due to a loss of power.

INITIATING CUES: I&C has verified that breaker DPN 1HX1 01 has tripped. The CRS has directed you to use the applicable Abnormal Operating Procedure (AOP) and:

1) Identify all affected Main Control Board Annunciator panels.

2) Identify all surveillance requirements associated with affected panels.

Record your answer on the JPM briefing sheet.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

STEPS

CRITICAL: Yes ***SEQUENCED:*** Yes ***SAT*** ☐ ***UNSAT*** ☐

STEP: 1

Refers to AOP-100.5 Attachment 2 to determine which Annunciator panels are associated with DPN 1HX1 01

STEP STANDARD:

Identifies that the following Annunciator panels are affected:

XCP-610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 624 and 626

CUES:

Evaluator cue: Tell examinee to put their name on the JPM Briefing Sheet.

Evaluator note: Examinee will identify applicable panels using AOP-100.5 Attachment 2 and the initiating cue of "panel DPN 1HX1 circuit 01 has tripped".

Evaluator note: If Examinee asks for a hard copy of AOP-100.5 Attachment 2 provide them with a copy of JPM A2 RO Handout 1.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 2

REFER TO ATTACHMENT 3, SURVEILLANCE ANNUNCIATORS, for annunciators that have surveillance requirements.

STEP STANDARD:

Identifies the following surveillance requirements from Attachment 3:

XCP-615, 2-5; GTP-702 Att IV.G
XCP-615, 3-3; GTP-702 Att VI.V-3
XCP-615, 3-6; OAP-106.1, RB Sump Level and STP-114.002
XCP-620, 1-5; GTP-702, Att IV.E
XCP-620, 1-6; GTP-702, Att IV.E
XCP-620, 2-4; GTP-702, Att IV.D
XCP-620, 2-5; GTP-702, Att IV.B
XCP-620, 4-2; GTP-702, Att VI.L-2 (not critical)
XCP-620, 4-3; GTP-702, Att VI.L-2 (not critical)
XCP-621, 1-1; GTP-702, Att IV.C

CUES:

Evaluator note: refer to NJPA-1006 (R1) Key for expected response.

Evaluator note: If Examinee asks for a hard copy of AOP-100.5 Attachment 3 provide them with a copy of JPM A2 RO Handout 2.

Evaluator note: Examinee may include reference to STP-134.001, Shutdown Margin Verification based on supplemental action of XCP-620, 4-2 or 4-3. This surveillance is not critical and not required as both Hi Flux at Shutdown annunciators are inoperable and GTP-702, Att VI.L-2 addresses the condition.

Evaluator note: GTP-702 Att VI.L-2 is NOT critical as the requirements are NOT applicable in Mode 1.

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: NJPA-1006 (R1)

DESCRIPTION: 2015 NRC RO A2: Determine Surveillance Requirements due to loss of Main Control Board Annunciators

IC SET: NA

INSTRUCTIONS:

COMMENTS:

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: NA

INITIAL CONDITION: The plant is at 100% power. A loss of multiple Main Control Board annunciators has been experienced due to a loss of power.

INITIATING CUES: I&C has verified that breaker DPN 1HX1 01 has tripped. The CRS has directed you to use the applicable Abnormal Operating Procedure (AOP) and:

1) Identify all affected Main Control Board Annunciator panels.

2) Identify all surveillance requirements associated with affected panels.

Record your answer on the JPM briefing sheet.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

SURVEILLANCE ANNUNCIATORS

Identifies these Surveillance Attachments as required. GTP-702 Att VI.L-2 is NOT critical since requirement does not apply in Mode 1.

This matrix is to aid in identifying fa
The applicable ARP shoud be utilized when performing the surveillance.

RANEL	WINDOW	SURVEILLANCE	ATTACHMENT
XCP-615	2-5	GTP-702	IV.G
XCP-615	3-3	GTP-702	VI.V-3
XCP-615	3-6	OAP-106.1 STP-114.002	RB SUMP LEVEL N/A
XCP-620	1-5	GTP-702	IV.E
XCP-620	1-6	GTP-702	IV.E
XCP-620	2-4	GTP-702	IV.D
XCP-620	2-5	GTP-702	IV.B
XCP-620	4-2	GTP-702	VI.L-2
XCP-620	4-3	GTP-702	VI.L-2
XCP-621	1-1	GTP-702	IV.C
XCP-632	6-5	GTP-702	IV.B, IV.D, IV.E, VI.KK, VI.NN
			B TEMPS
			B SUMP LEVEL
			W/KV/MVARS
			ENERIC LOG SR NI
		OAP-100.6	OPERATION AT LICENSED LIMIT
		OAP-107.1	RESTORATION OF IPCS FUNCTIONS
XCP-638	1-4	OAP-106.1	MW/KV/MVARS
XCP-638	2-4	OAP-106.1	MW/KV/MVARS

identifies Panels XCP-610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, and 624 as affected by applying AOP-100.5 Attachment 2 for breaker DPN 1HX1 01.

RESTORATION OF FAILED MAIN CONTROL BOARD ANNUNCIATORS

A. Make a list of the annunciator panels lost.

B. Contact I&C to verify the source of power to the annunciator panel per the following table.

DPN 1HA2 04		
XPN6091	XCP-601, 604, 606, 608, 622, 629, 636	13.7% MCB ANNUNCIATORS
13.7% MCB ANNUNCIATORS TOTAL		

DPN 1HX1 02		
XPN6092	XCP-603, 628, 630, 631, 632, 633	20.3% MCB ANNUNCIATORS
XPN6093	XCP-625, 627, 634, 635, 638	18.3% MCB ANNUNCIATORS
38.6% MCB ANNUNCIATORS TOTAL		

DPN 1HB 02		
XPN6094	XCP-602, 605, 607, 609, 623, 637	12.4% MCB ANNUNCIATORS
12.4% MCB ANNUNCIATORS TOTAL		

DPN 1HX1 01		
XPN6095	XCP-610, 611, 612, 613, 614, 615, 616	18.3% MCB ANNUNCIATORS
XPN6096	XCP-617, 618, 619, 620, 621, 624, 626	17.0% MCB ANNUNCIATORS
35.3% MCB ANNUNCIATORS TOTAL		

C. Determine if the actions taken in response to a failed annunciator are subject to OAP-113.1, Operator Workaround and Dark Board Program.

JPM A2 RO Handout 2

SURVEILLANCE ANNUNCIATORS

NOTE

This matrix is to aid in identifying failed annunciators which have surveillance requirements. The applicable ARP shoud be utilized when performing the surveillance.

PANEL	WINDOW	SURVEILLANCE	ATTACHMENT
XCP-615	2-5	GTP-702	IV.G
XCP-615	3-3	GTP-702	VI.V-3
XCP-615	3-6	OAP-106.1 STP-114.002	RB SUMP LEVEL N/A
XCP-620	1-5	GTP-702	IV.E
XCP-620	1-6	GTP-702	IV.E
XCP-620	2-4	GTP-702	IV.D
XCP-620	2-5	GTP-702	IV.B
XCP-620	4-2	GTP-702	VI.L-2
XCP-620	4-3	GTP-702	VI.L-2
XCP-621	1-1	GTP-702	IV.C
XCP-632	6-5	GTP-702 OAP-106.1 OAP-100.6 OAP-107.1	IV.B, IV.D, IV.E, VI.KK, VI.NN RB TEMPS RB SUMP LEVEL MW/KV/MVARS GENERIC LOG SR NI OPERATION AT LICENSED LIMIT RESTORATION OF IPCS FUNCTIONS
XCP-638	1-4	OAP-106.1	MW/KV/MVARS
XCP-638	2-4	OAP-106.1	MW/KV/MVARS

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **NJPA-210A (R1)**

2015 NRC SRO A2: Determine Administrative Actions to Place 1DB on Alternate Feed.

CANDIDATE: _____

EXAMINER: _____

SRO ONLY

TASK:

341-038-03-02 INTERPRET AND ENSURE COMPLIANCE WITH PLANT ADMINISTRATIVE PROCEDURES DURING NORMAL AND OFF NORMAL PLANT OPERATIONS

TASK STANDARD:

Section 1 and 2 of the Removal and Restoration Checklist is completed satisfactorily (see Key for NJPA-210A). It is critical to identify as an action R&R, that the Train is "B", the Equipment ID is XSW1DB 16, Equipment name is Bus 1DB Normal Incoming Breaker, to indicate that the TS is 3.8.1.1.a (the a is optional), that 3.0.4 does apply, that the restraining mode is 4 and that the mode discovered is 1, Compensatory Requirements are GTP-702, Att. VI.Y-1.

TERMINATING CUE: After the Removal and Restoration Checksheet is provided to the Evaluator this JPM is complete.

PREFERRED EVALUATION LOCATION CLASSROOM

PREFERRED EVALUATION METHOD PERFORM

REFERENCES:

OAP-106.1	Operating Rounds
STP-125.001	Electric Power Systems Weekly Test
SAP-205	STATUS CONTROL AND REMOVAL AND RESTORATION
SOP-304	115KV/7.2KV OPERATIONS
T.S.	Technical Specifications

INDEX NO.	*K/A NO.*		*RO*	*SRO*
1940012214	2.2.14	Knowledge of the process for controlling equipment configuration or status.	3.9	4.3

TOOLS:

JPM A2 SRO Handout (hardcopy of SAP-205, Attachment I, REMOVAL AND RESTORATION CHECKSHEET.)
Electronic access to the following:
SOP-304, 115KV/7.2KV OPERATIONS
Technical Specification 3.8.1.
GTP-702, SURVEILLANCE ACTIVITY TRACKING AND TRIGGERING
SAP-205, STATUS CONTROL AND REMOVAL AND RESTORATION
OAP-106.1, OPERATING ROUNDS

EVALUATION TIME 30 *TIME CRITICAL* NO *10CFR55:* 45(a)(13)

TIME START: _____ TIME FINISH: _____ PERFORMANCE TIME: _____

PERFORMANCE RATING: SAT: _____ UNSAT: _____

CANDIDATE: _____

EXAMINER: _____ _____
SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS: None.

INITIAL CONDITION: 100% power.
B1 Maintenance Week is in progress.
ESF Bus 1DB must be transferred to XTF-4/6 to allow XSW1DB 16, BUS 1DB NORMAL INCOMING BKR to be replaced.

The Integrated Fire Computer is being fed from Train "A".
XAC-12-IA, SUPP INST AIR COMPRESSOR is NOT running.

The work is expected to take approximately two hours. ESF Bus 1DA will remain on the normal source during the work and alarm setpoints will NOT be adjusted since the alignment will only be in effect for approximately two hours.

The BOP operator is preparing a pre-job brief for the evolution.

INITIATING CUES: As the CRS, complete Section 1 and Section 2 of a Removal and Restoration Checksheet against XSW1DB 16, BUS 1DB NORMAL INCOMING BKR to track all the requirements associated with transferring Bus 1DB to XTF-4/6 including any necessary compensatory actions.

The R&R number 150333 has been assigned.

Record your answers in section 1 and section 2 of the provided SAP-205, Attachment I, REMOVAL AND RESTORATION CHECKSHEET (JPM A2 SRO Handout).

Note: The required by date and time for compensatory requirements if necessary will be filled in when the breaker is declared inoperable. You are to leave that field blank for this JPM.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

STEPS

CRITICAL: Yes ***SEQUENCED:*** Yes ***SAT*** ☐ ***UNSAT*** ☐

STEP: 1

Complete section 1 of SAP-205, STATUS CONTROL AND REMOVAL AND RESTORATION, Attachment I, REMOVAL AND RESTORATION CHECKSHEET.

STEP STANDARD:

The section 1 data are:

Type: Action (critical)
Service Impact: Removed From Service (NOT critical)
Train: 'B' Train (critical)
R&R Number: 130333 (NOT critical)
System: ES (NOT critical)
Equipment ID: XSW1DB 16 (critical)
Equipment Name: Bus 1DB Normal Incoming Bkr (critical)
Reason Inoperable: Something to the effect of breaker replacement (NOT critical).

CUES:

Evaluator Note: Refer to NJPA-210A Key.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 2

Complete section 2 of SAP-205, STATUS CONTROL AND REMOVAL AND RESTORATION, Attachment I, REMOVAL AND RESTORATION CHECKSHEET.

STEP STANDARD:

The section 2 data are:

Compensatory Requirements: GTP-702, Att. VI.Y-1 (critical)
"Other" and some statement in "Removal Comments" about recording bus voltage hourly. (not critical.)
Technical Specifications: TS 3.8.1.1.a (critical). ("a" may be left off)
Tech Spec 3.0.4 applies: Yes (critical)
Restraining Mode: 4 (critical)
Mode Discovered: 1 (critical)
Redundant Equipment Operable: Yes or No (not critical)

CUES:

Evaluator note: Refer to NJPA-210A key.

Evaluator Note: Redundant Equipment Operable is typically used for things like charging pumps that have a swing component, but in this case there is an alternate feed.

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: NJPA-210A

DESCRIPTION: 2015 NRC SRO A2: Determine Administrative Actions to Place 1DB on Alternate Feed.

IC SET: NA

INSTRUCTIONS:

COMMENTS:
NJPA-210A folder in the Exam Data folder contains answer key

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: None.

INITIAL CONDITION: 100% power.
B1 Maintenance Week is in progress.
ESF Bus 1DB must be transferred to XTF-4/6 to allow XSW1DB 16, BUS 1DB NORMAL INCOMING BKR to be replaced.

The Integrated Fire Computer is being fed from Train "A".
XAC-12-IA, SUPP INST AIR COMPRESSOR is NOT running.

The work is expected to take approximately two hours. ESF Bus 1DA will remain on the normal source during the work and alarm setpoints will NOT be adjusted since the alignment will only be in effect for approximately two hours.

The BOP operator is preparing a pre-job brief for the evolution.

INITIATING CUES: As the CRS, complete Section 1 and Section 2 of a Removal and Restoration Checksheet against XSW1DB 16, BUS 1DB NORMAL INCOMING BKR to track all the requirements associated with transferring Bus 1DB to XTF-4/6 including any necessary compensatory actions.

The R&R number 150333 has been assigned.

Record your answers in section 1 and section 2 of the provided SAP-205, Attachment I, REMOVAL AND RESTORATION CHECKSHEET (JPM A2 SRO Handout).

Note: The required by date and time for compensatory requirements if necessary will be filled in when the breaker is declared inoperable. You are to leave that field blank for this JPM.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

Examinee *Examinee Name*

Date *Today*

SAP-205
ATTACHMENT I
PAGE 1 OF 1
REVISION 10

(*) Indicates Critical Items

REMOVAL AND RESTORATION CHECKSHEET

Section 1-Summary Data

TYPE:	SERVICE IMPACT:	TRAIN:	R&R NUMBER:
☒ Action (*) ☐ Tracking	☒ Removed From Service ☐ Restricted Service	☐ 'A' Train ☐ 'X' Train ☒ 'B' Train (*) ☐ N/A	150333
SYSTEM: ES	EQUIPMENT ID: XSW1DB 16 (*)	EQUIPMENT NAME: Bus 1DB Normal Incoming Breaker (*)	

REASON INOPERABLE: Breaker Replacement

Section 2-Removal Requirements

COMPENSATORY REQUIREMENTS:	Required By Date/Time	Completed Date/Time
☐ **None**		
☐ Trip/Bypass Bistables?	/	/
☐ Backup Fire Suppression?	/	/
☐ Roving Fire Watch?	/	/
☐ Continuous Fire Watch?	/	/
☐ Alternate Radiation Monitoring?	/	/
☐ Smoke Detectors Operable?	/	/
☒ GTP-702 Att. VI.Y-1 (*)	/	/
☒ Other:	/	/

TECHNICAL SPECIFICATIONS: 3.8.1.1.a (*)

TECH. SPEC. 3.0.4 APPLIES: ☒ Yes ☐ No (*)
Restraining Mode: 4 (*)
Mode Discovered: 1

REDUNDANT EQUIPMENT OPERABLE: ☒ Yes ☐ No ☐ N/A

SUPPORTING DOCUMENTATION: SOP-304, Technical Specification, OAP-106.1

REMOVAL COMMENTS: SOP-304 Precaution II.1 requires hourly logs of bus voltages until the alarm setpoint is changed.

Section 3-Restoration Req./Related Documents

RESTORATION REQUIREMENTS: / RELATED DOCUMENTS:

Operable STP	STTS #	Completed Date/Time	Document Type*	Document #	Completed Initials/Date	Comments
		/			/	
		/			/	
		/			/	
		/			/	
		/			/	
		/			/	

OAP-106.1 (step 6.12.b 2) requires hourly logging regardless of setpoint change, either reference is acceptable, need to mention voltage logging as well as GTP-702

All compen[...] restored or [...]
☐ Yes ☐ No ☐ N/A

☐ Yes ☐ No ☐ N/A

☐ Continued on Attachment VII.
*ECR, MWR, NCN, PMTS, RTO, STTS, WPO, etc.

RESTORATION COMMENTS:

Section 4-Removal/Restoration Status

REMOVAL/RESTORATION STATUS:		SS Authorization	OATC Concurrence	Date/Time	Updated MCB	Updated BISI	Updated EOOS
Declared Inoperable				/	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Time Limit to Declare Operable							
Restoration Required By				/			
Downgraded to:	☐ Tracking			/			
	☐ Restricted Service			/			☐ Yes ☐ No
Declared Operable				/	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Total Time:	Inoperable						
	Non-Functional						

COMMENTS:

JPM A2 SRO Handout

SAP-205
ATTACHMENT I
PAGE 1 OF 1
REVISION 10

Examinee _____

Date _____

REMOVAL AND RESTORATION CHECKSHEET

Section 1-Summary Data

TYPE:	SERVICE IMPACT:	TRAIN:	R&R NUMBER:
☐Action ☐Tracking	☐Removed From Service ☐Restricted Service	☐'A' Train ☐'X' Train ☐'B' Train ☐N/A	150333
SYSTEM:	EQUIPMENT ID:	EQUIPMENT NAME:	
REASON INOPERABLE:			

Section 2-Removal Requirements

COMPENSATORY REQUIREMENTS:	Required By Date/Time	Completed Date/Time
☐**None**		
☐Trip/Bypass Bistables?	/	/
☐Backup Fire Suppression?	/	/
☐Roving Fire Watch?	/	/
☐Continuous Fire Watch?	/	/
☐Alternate Radiation Monitoring?	/	/
☐Smoke Detectors Operable?	/	/
☐GTP-702 Att. _____	/	/
☐Other:	/	/

TECHNICAL SPECIFICATIONS:

TECH. SPEC. 3.0.4 APPLIES: ☐Yes ☐No
Restraining Mode:___
Mode Discovered:___

REDUNDANT EQUIPMENT OPERABLE: ☐Yes ☐No ☐N/A

SUPPORTING DOCUMENTATION:

REMOVAL COMMENTS:

Section 3-Restoration Req./Related Documents

RESTORATION REQUIREMENTS:

Operable STP	STTS #	Completed Date/Time
		/
		/
		/
		/

All compensatory requirements restored or terminated?
☐Yes ☐No ☐N/A

ECR Operability Form?
☐Yes ☐No ☐N/A

RELATED DOCUMENTS:

Document Type*	Document #	Completed Initials/Date	Comments
		/	
		/	
		/	
		/	
		/	
		/	

☐Continued on Attachment VII.
*ECR, MWR, NCN, PMTS, RTO, STTS, WPO, etc.

RESTORATION COMMENTS:

Section 4-Removal/Restoration Status

REMOVAL/RESTORATION STATUS:		SS Authorization	OATC Concurrence	Date/Time	Updated MCB	Updated BISI	Updated EOOS
Declared Inoperable				/	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
Time Limit to Declare Operable							
Restoration Required By				/			
Downgraded to:	☐Tracking			/			
	☐Restricted Service			/			☐Yes ☐No
Declared Operable				/	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
Total Time:	Inoperable						
	Non-Functional						

COMMENTS:

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **NJPA-083A(R1)**

2011 and 2015 NRC Admin A3 RO & SRO:
Apply Facility ALARA Principles to a Specific Task and Determine Overall Dose

CANDIDATE: _____

EXAMINER: _____

TASK:

000-061-05-02 RESPOND TO AREA RADIATION MONITORING SYSTEM ALARMS

TASK STANDARD:

Calculate dose for each case. Determines exposure as 590 to 670 mR with a respirator and 537 to 538 mR without a respirator. Determines that working WITHOUT respirator is the best option.

TERMINATING CUE: Options have been prioritized and provided to the Evaluator.

PREFERRED EVALUATION LOCATION	*PREFERRED EVALUATION METHOD*
CLASSROOM	PERFORM

REFERENCES:

HPP-0155	Control of Airborne Radiation Exposure (DAC-HRS)
VCS-HPP-0153	Administrative Exposure Limits

INDEX NO.	*K/A NO.*		*RO*	*SRO*
1940012312	2.3.12	Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.	3.2	3.7

TOOLS: HPP-0153 and HPP-0155 (Available via desk top computer)
Calculator
JPM A3 Handout 1 (Worksheet)
JPM A3 Handout 2 (Hardcopy of HPP-155 Attachment IX)

EVALUATION TIME 20 *TIME CRITICAL* NO *10CFR55:* 45(a)(10)

TIME START: _____ TIME FINISH: _____ PERFORMANCE TIME: _____

PERFORMANCE RATING: SAT: ____ UNSAT: ____

CANDIDATE: _____

EXAMINER: _____ / _____
SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS:

INITIAL CONDITION: A hydrogen explosion in the waste gas system has resulted in a radioactive leak. The crew is performing actions of ARP-019 XCP- 644; 2-1, GAS DECAY TK AREA RM-G10 HI RAD.

The leak will continue until several manual valves are manipulated to isolate the leak.

The general area radiation level where the work will be performed is 1000 mR/hour.

Airborne activity in the work area is estimated at a Weighted Derived Air Concentration of 30 DAC.

There are two options for performing the work:

- One person without a respirator = 30 minutes

or

- One person with an SCBA = 36 minutes.

INITIATING CUES: You have been assigned to calculate the expected dose for the two options and to identify the best option between them according to the VC Summer ALARA philosophy. For the purposes of the JPM, assume that no dose is received in transit and there is no additional external exposure due to respiratory equipment setup. Place your name on the JPM A3 Handout 1 and write your answer in the space provided. Round all calculation results to two (2) decimal points. Show all work.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

CRITICAL: No *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 1

Access necessary reference material.

STEP STANDARD:

Reviews conditions and refers to procedures for respirator factors and DAC conversion.

CUES:

Evaluator cue: Provide a copy of JPM A3 Handout 1 (worksheet) and if Examinee asks for a hard copy of HPP-155 Attachment IX provide JPM A3 Handout 2 (copy of HPP-155 Att IX)

Evaluator note: Procedures that are applicable are VCS-HPP-0153, Administrative Exposure Limits and HPP-0155, Control of Airborne Radiation Exposures (DAC-HRS). These are available via the desktop computers.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 2

Calculate dose for each option - One person without respirator.

STEP STANDARD:

External exposure = (1000 mr/hr) (1 hr/60 minutes) (30 minutes) = 500mR

Internal exposure = (30 DAC) (30 minutes) (1 hr/60 minutes) (2.5 mr/DAC-hr) = 37.5 mR.

Total Exposure without respirator = 537.5 mR.

CUES:

Evaluator note: Acceptable range is 537 to 538 mR. Step is critical since an accurate calculation is required in order to make correct ALARA decision.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 3

Calculate dose for each option - One person with a respirator.

STEP STANDARD:

External dose = (1000 mr/hr) (1 hr/60 minutes) (36 minutes) (1.1) = 660 mR
Internal Dose = (30 DAC) (36 min) (1 hr/60 min) (2.5 mr/DAC-hr) (1.1) / (1000 protection factor) = 0.0495 mR.
Total Exposure with respirator = 660.05 mR.

CUES:

Evaluator note: Acceptable range is 590 - 670 mR. The acceptable range allows for failure to apply the respirator inefficiency factor of 1.1. This factor is not common knowledge. Step is critical since an accurate calculation is required in order to make correct ALARA decision.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 4

Determines best option IAW the lowest total dose.

STEP STANDARD:

Best option is: One person WITHOUT respirator.

CUES:

Evaluator note: Step is critical since the correct comparison must be made in order to make correct ALARA decision.

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: NJPA-083A(R1

DESCRIPTION: 2011 and 2015 NRC Admin A3 RO & SRO: Apply Facility ALARA Principles to a Specific Task and Determine Overall Dose

IC SET: N/A

INSTRUCTIONS:

COMMENTS:

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS:

INITIAL CONDITION: A hydrogen explosion in the waste gas system has resulted in a radioactive leak. The crew is performing actions of ARP-019 XCP- 644; 2-1, GAS DECAY TK AREA RM-G10 HI RAD.

The leak will continue until several manual valves are manipulated to isolate the leak.

The general area radiation level where the work will be performed is 1000 mR/hour.

Airborne activity in the work area is estimated at a Weighted Derived Air Concentration of 30 DAC.

There are two options for performing the work:

- One person without a respirator = 30 minutes

or

- One person with an SCBA = 36 minutes.

INITIATING CUES: You have been assigned to calculate the expected dose for the two options and to identify the best option between them according to the VC Summer ALARA philosophy. For the purposes of the JPM, assume that no dose is received in transit and there is no additional external exposure due to respiratory equipment setup. Place your name on the JPM A3 Handout 1 and write your answer in the space provided. Round all calculation results to two (2) decimal points. Show all work.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

JPM A3 Handout -1

Examinee Name Examinee

Dose Calculation – One Person without a respirator:

Dose from General Area field = (1000 mR/hr) (1 hr/60 minutes) (30 minutes) = 500 mR

Dose from Airborne = 30 DAC (30 minutes) (1 hr/60 minutes) (2.5 mRr/DAC-hr) = 37.5 mR.

Total exposure w/o Respirator = (500 + 37.5) mR = 537.5 mR

(Accept 537-538 mR)

Dose Calculation – One Person with a respirator:

Dose from General Area field = (1000 mr/hr) (1 hr/60 minutes) (36 minutes) (1.1) = 660 mR

Note, if Examinee does not apply non-efficiency factor, following is the external dose:
Dose from General Area field = (1000 mr/hr) (1 hr/60 minutes) (36 minutes)= 600 mR

$$\text{Dose from Airborne} = \frac{(30\ \text{DAC})\ (36\ \text{min})\ (1\ \text{hr}/60\ \text{min})\ (2.5\ \text{mr/DAC -hr})\ (1.1)}{1000\ \text{protection factor}} = 0.0495\text{mR}$$

Total exposure w/ Respirator = (660 + 0.05) mR = 660.05 mR

(Accept 590-670 mR)

Best Option for ALARA: One Person WITHOUT respirator

JPM A3 Handout - 1

Examinee Name _____

Calculation Work Space:

Best Option for ALARA: _____

JPM A3 Handout 2

TEDE ALARA Respirator Evaluation

RWP #: _____

Task Evaluated: _____

_____

1. Radiological Considerations for Respirator Use

Average Expected Dose Rate in Work Area	_____	mrem/hr	(A)
Job Duration Expected	_____	hours	(B)
Weighted DAC (WDAC) in Work Area	_____	DAC	(C)

$$\text{WDAC-hr} = \Sigma \frac{(\text{Activity}_i)}{\text{DAC}_i} \times \text{Elapsed Time}$$

Respirator Protection Factor (Enclosure B)*	_____		(D)
Respirator-induced Inefficiency Factor (Enclosure A)	1.10		(E)
Conversion Factor (Enclosure A)	2.5	mrem/DAC-hr	(F)

TEDE = Total Exposure = External Exposure + Internal Exposure

a. Without Respiratory Equipment:

External = A x B = _____ x _____ = _____ mrem (G)

Internal = C x B x F = _____ x _____ x 2.5 = _____mrem (H)

TEDE = G + H = _____ + _____ = _____mrem‡

b. With Respiratory Equipment:

External = A x B x E + Resp_{ext}*
= _____ x _____ x _____ + _____ = _____ mrem (I)

Internal = (C / D) x B x 1.10 x 2.5
= (_____ / _____) x _____ x 1.10 x 2.5 = _____ mrem (J)

TEDE = I + J = _____ + _____ = _____mrem‡

*Resp_{ext} = External exposure due to respiratory equipment set-up, if applicable. Contact Respiratory Services if assistance is needed to estimate equipment set-up time or to choose appropriate equipment for task.

‡ These values are to be used to determine whether the use of respiratory protection will be detrimental to maintaining the work process ALARA.

2. Will wearing respiratory equipment increase the worker's industrial safety risk? ☐
or decrease the worker's industrial safety risk? ☐

Comments:

_____

_____

3. Would not wearing respiratory protection lead to post job negative implications?
   a. Personnel decontamination ☐
   b. Skin dose assessment ☐
   c. Portal monitor alarms ☐
   d. Extensive bioassay evaluation ☐

Comments:

_____

_____

_____

4. Other considerations: _____

_____

_____

_____

5. Overall Evaluation

Respirator use is indicated ☐

Respirator use is not indicated ☐

Evaluator _____ Date _____

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **NJPA-1003 (R1)**

2015 NRC SRO A4: Classify Emergency (Simulator - SAE - Inadequate Core Cooling) (ENF)

CANDIDATE: _____

EXAMINER: _____

SRO ONLY

TIME CRITICAL JPM

TASK:

344-019-03-02 CLASSIFY EMERGENCY EVENTS REQUIRING EMERGENCY PLAN IMPLEMENTATION

TASK STANDARD:

Emergency classification evaluated as a SITE AREA EMERGENCY per Fission Product Barriers EAL number FS1.1. Classification based on Potential Loss of Fuel Clad Barrier (Item B-2 - Core Exit TCs > 700°F) and Loss of Reactor Coolant System Barrier (Item D.2 - RCS leak rate > available make up capacity as indicated by a loss of RCS subcooling) or Potential Loss of Reactor Coolant System Barrier (D.2 - Unisolable leak exceeding the capacity of one charging pump in the normal charging mode). This is a time critical JPM and the declaration must be made within 15 minutes after the emergency condition exists, and successful completion of EPP-002, Communication and Notification, Attachment I, Nuclear Power Plant Notification Form, must be made within 15 minutes after the emergency declaration (see key for this JPM).

TERMINATING CUE: Successful completion of EPP-002, Communication and Notification, Attachment I, Nuclear Power Plant Notification Form.

PREFERRED EVALUATION LOCATION SIMULATOR

PREFERRED EVALUATION METHOD PERFORM

REFERENCES:

EPP-106	EMERGENCY PREPAREDNESS PERFORMANCE INDICATOR PROCEDURE
EOP-12.0	MONITORING OF CRITICAL SAFETY FUNCTIONS
EPP-001	ACTIVATION AND IMPLEMENTATION OF THE EMERGENCY PLAN
EPP-002	COMMUNICATION AND NOTIFICATION

INDEX NO.	*K/A NO.*		*RO*	*SRO*
1940012441	2.4.41	Knowledge of the emergency action level thresholds and classifications.	2.9	4.6
1940012440	2.4.40	Knowledge of the SRO's responsibilities in emergency plan implementation.	2.7	4.5

TOOLS:

Emergency Planning Tool Box from the SM office (simulator engineering).
EPP-001, Attachment 1 EAL Classification Matrix (available via desk top computer or as big board).
Copy of EOP-1.0 Marked up per event conditions (Including completed Attachment 3).
Copy of EOP-2.0 Marked up through step 12.
Extra copies of EPP-001.3 Att 1, Site Area Emergency Initial Actions Summary.
Extra copies of EPP-002 Att 1, Nuclear Power Plant Emergency Notification Form page 1 of 11.

EVALUATION TIME 20 *TIME CRITICAL* YES *10CFR55:* 45(a)(11)

TIME START: _____ TIME FINISH: _____ PERFORMANCE TIME: _____

PERFORMANCE RATING: SAT: ____ UNSAT: ____

CANDIDATE: _____

EXAMINER: _____ _____ / _____

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS: None

INITIAL CONDITION:

THIS IS A DRILL

1. The plant was in MODE 1. You are the Shift Manager.
2. Weekend night shift, only routine evolutions in progress.
3. The 'C' Charging pump was tagged out for maintenance on the previous shift. No other equipment is out of service.
4. An event occurred 20 minutes ago resulting in an automatic Reactor Trip and Safety Injection
5. The crew entered EOP-1.0, E-0, REACTOR TRIP OR SAFETY INJECTION
6. The CRS has received the following reports from the crew.
   a. "Reactor Trip."
   b. "Turbine Trip."
   c. "Safety Injection"
   d. "ESFLS complete on Train A and Train B"
   e. "The ' B' Charging pump failed to start"
   f. "RCS pressure is less than 1418 psig with flow on FI-943, Stopping RCPs"
7. The crew transitioned from EOP-1.0 to "EOP-2.0, LOSS OF REACTOR OR SECONDARY COOLANT"
8. The CRS was subsequently notified that the 'A' Charging pump has tripped.
9. The crew is taking action using EOP-2.0, at step 13.
10. EPP-002, Attachment I NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM, Message # 1 was completed 10 minutes ago.
11. The simulator was frozen at this point.
12. The pre-completed Emergency Notification Forms are NOT available.
13. The Emergency Planning Tool Box is available to use in the Simulator

INITIATING CUES:

1. Using references available in the Simulator, your task is to perform the following:
   a. Classify the event based on current conditions.
   b. Complete the required notification form.
2. Do not use SS Judgment as the basis for your classification.
3. The simulator will remain in freeze during the JPM.
4. The start time for classification will be the time when the Evaluator tells you to begin.
5. Inform the Evaluator when you have determined the classificaton.
6. Inform the Evaluator when you have completed the Emergency Notification Form.

THIS IS A TIME CRITICAL JPM!

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

STEPS

CRITICAL: Yes ***SEQUENCED:*** Yes ***SAT*** ☐ ***UNSAT*** ☐

STEP: 1

Determine that conditions require classification as SITE AREA EMERGENCY

STEP STANDARD:

Classifies event as a SITE AREA EMERGENCY based on:

EAL FS1.1 Loss or Potential Loss of any two barriers (Table F-1)

CUES:

Evaluator cue: Announce the Classification start time (T-0) based on the Simulator Clock. Record time T-0 for future reference.

Evaluator note: Examinee has 15 minutes from T-0 to arrive at event classification.

Evaluator cue: Tell the Examinee to inform you when the notification form is completed.

COMMENTS:

CRITICAL: Yes *SEQUENCED:* Yes *SAT* ☐ *UNSAT* ☐

STEP: 2

Complete EPP-002, Attachment 1, Nuclear Power Plant Emergency Notification Form and provide basis for classification.

STEP STANDARD:

Correctly completes EPP-002 Attachment 1 within 15 minutes of declaring event classification. See key for correct manner of completing the attachment.
Classification Basis:

1. Core exit TCs>700°F - Potential Loss of Fuel Clad Barrier, Item B.2.

AND

2. RCS leak rate > available make up capacity as indicated by a loss of RCS subcooling - Loss of Reactor Coolant System Barrier, Item D.2.

OR

2. Unisolable leak exceeding the capacity of one charging pump in the normal charging mode - Potential Loss of Reactor Coolant System Barrier, Item D.2.

CUES:

Evaluator cue: If Examinee appears to be using SIPCS for Rx trip time repeat cue that trip was 20 minutes prior to T-0 for the JPM.

Evaluator cue: If asked provide 803-334-1234 as the confirmation phone number.

Evaluator cue: Examinee must explain basis for classification. Ask Examinee for basis if it is not offered. If the basis is not correct, this constitutes failure even if the classification was correct and within 15 minutes. Step is critical since proper classification must be made within 15 minutes.

Evaluator note: The EPP-002 Attachment approved by time (line 17 on the EPP-002 Attachment 1) must be within 15 minutes of the time when their classification had been completed. Refer to NJPA-1003 (R1) Key.

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: NJPA-1003 (R1)

DESCRIPTION: 2015 NRC SRO A4: Classify Emergency (Simulator - SAE - Inadequate Core Cooling) (ENF)

IC SET: 318

INSTRUCTIONS:

If IC-318 is designated for this JPM then reset to IC-318 leaving the simulator in FREEZE.

1. Place Danger Tag on 'C' Charging pump for Maintenance.
2. Move Emergency Planning Tool Box from SM Office into simulator control room.
3. Mark up EOP-1.0, EOP-1.0 Attachment 3 and EOP-2.0 through step 12.

If IC-318 is not designated for this JPM then initial conditions may be established by reseting to IC-10 and following the below directions:

1. Place Danger Tag on 'C' Charging pump for Maintenance.

2. Insert:

MAL-RCS006A	Final Value = 10000	Delay = 10	(RCS loop 'A' LOCA)
MAL-CVC017A		Delay = 120	('A' Charging Pump Trip)
PMP-CS006F			(Charging Pump 'B' fail to start)
XMT-MI016F			10 Meter Wind Direction Fail As Is
XMT-MI008F			10 Meter Wind speed Fail As Is
XMT-MI015F			61 Meter Wind Direction Fail As Is
XMT-MI007F			61 Meter Wind speed Fail As Is

3. RUN
4. Manually trip RCPs when RCS pressure <1400 psig.
5. Perform the following actions >1 minute after SI is initiated:

   Reset SI
   Reset Phase A
   Reset Phase B
   Reset the ESFLS
   Establish IA to the RB

6. Place 'A' and 'B' Charging pumps in pull to lock once they have stopped.
7. Ensure steps of EOP-1.0 and in particular EOP-1.0 attachment 3 have been fully and correctly implemented
8. Align EFW for normal operation and throttle to approximatly 200 gpm per Steam Generator.
9. When RVLIS NR Level is <45%, reduce RCS leak to 500 GPM.
10. When Core Exit Thermocouples >715°F and <725°F with RVLIS >40%: FREEZE
11. If necessary adjust RVLIS NR to approximately 45% using:

XMT-MI002O	Final Value = 44	(RV NR Level LI-1311 Fail to Position)
XMT-MI005O	Final Value = 45	(RV NR Level LI-1321 Fail to Position)

12. Record met data from SIPCS, need Wind Direction, Wind Speed and Stability Class for the answer key
13. Move Emergency Planning Tool Box from SM Office into simulator control room.
14. Mark up EOP-1.0, EOP-1.0 Attachment 3 and EOP-2.0 through step 12.

COMMENTS:

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: None

INITIAL CONDITION:

THIS IS A DRILL

1. The plant was in MODE 1. You are the Shift Manager.
2. Weekend night shift, only routine evolutions in progress.
3. The 'C' Charging pump was tagged out for maintenance on the previous shift. No other equipment is out of service.
4. An event occurred 20 minutes ago resulting in an automatic Reactor Trip and Safety Injection
5. The crew entered EOP-1.0, E-0, REACTOR TRIP OR SAFETY INJECTION
6. The CRS has received the following reports from the crew.
   a. "Reactor Trip."
   b. "Turbine Trip."
   c. "Safety Injection"
   d. "ESFLS complete on Train A and Train B"
   e. "The ' B' Charging pump failed to start"
   f. "RCS pressure is less than 1418 psig with flow on FI-943, Stopping RCPs"
7. The crew transitioned from EOP-1.0 to "EOP-2.0, LOSS OF REACTOR OR SECONDARY COOLANT"
8. The CRS was subsequently notified that the 'A' Charging pump has tripped.
9. The crew is taking action using EOP-2.0, at step 13.
10. EPP-002, Attachment I NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM, Message # 1 was completed 10 minutes ago.
11. The simulator was frozen at this point.
12. The pre-completed Emergency Notification Forms are NOT available.
13. The Emergency Planning Tool Box is available to use in the Simulator

INITIATING CUES:

1. Using references available in the simulator, your task is to perform the following:
   a. Classify the event based on current conditions.
   b. Complete the required notification form.
2. Do not use SS Judgment as the basis for your classification.
3. The simulator will remain in freeze during the JPM.
4. The start time for classification will be the time when the Evaluator tells you to begin.
5. Inform the Evaluator when you have determined the classificaton
6. Inform the Evaluator when you have completed the Emergency Notification Form.

THIS IS A TIME CRITICAL JPM!

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM

1. [X] DRILL [ ] ACTUAL EVENT MESSAGE # 2
2. [X] INITIAL [ ] FOLLOW-UP NOTIFICATION: TIME _____ DATE ___/___/___ AUTHENTICATION #_____
3. SITE: V. C. Summer Confirmation Phone # (803) 334-1234
4. EMERGENCY CLASSIFICATION: [ ] A UNUSUAL EVENT [ ] B ALERT [X] C SITE AREA EMERGENCY [ ] D GENERAL EMERGENCY
   BASED ON EAL # FS1.1 EAL DESCRIPTION: Loss or Potential Loss of any two Barriers
5. PROTECTIVE ACTION RECOMMENDATIONS: [X] NONE
   [ ] B EVACUATE _____
   [ ] C SHELTER _____
   [ ] D CONSIDER THE USE OF KI (POTASSIUM IODIDE) IN ACCORDANCE WITH STATE PLANS AND POLICY.
   [ ] E OTHER _____
   Accept values as displayed; 40.9° and 5.4 mph
6. EMERGENCY RELEASE: [X] None [ ] B Is Occurring [ ] C Has Occurred
7. RELEASE SIGNIFICANCE: [X] Not applicable [ ] B Within normal operating limits [ ] C Above normal operating limits [ ] D Under evaluation
8. EVENT PROGNOSIS: [ ] A Improving [ ] B Stable [X] C Degrading
9. METEOROLOGICAL DATA: Wind Direction* from 41 degrees Wind Speed* 5.0 mph
   (*May not be available for Initial Notifications)
   Precipitation* None Stability Class* [ ] A [ ] B [ ] C [ ] D [X] E [ ] F [ ] G
10. [X] DECLARATION [ ] B TERMINATION Time Time Date ___/___/___
    Record Classified
11. AFFECTED UNIT(S): [X] 1 [ ] 2 [ ] 3 [ ] All
12. UNIT STATUS: (Unaffected Unit(s) Status Not Required for Initial Notifications)
    [X] U1 0 % Power Shutdown at Time 20 min prior to T-0 Date Today
    [ ] B U2 ____ % Power Shutdown at Time _____ Date ___/___/___
    [ ] C U3 ____ % Power Shutdown at Time _____ Date ___/___/___
13. REMARKS: Turbine Driven Emergency Feedwater pump is running
    Within 15 minutes of T-0

FOLLOW-UP INFORMATION (Lines 14 through 16 Not Required for Initial Notifications)
EMERGENCY RELEASE DATA. NOT REQUIRED IF LINE 6 A IS SELECTED.

14. RELEASE CHARACTERIZATION: TYPE: [ ] A Elevated [ ] B Mixed [ ] C Gr
    MAGNITUDE: Noble Gases:_____ Iodines:_____ Particu

Data from 4/16/15 IC-318 Build:

- CETC = 718.3°F
- RVLIS NR = 44.5%
- 10 Meter Preferred 15 min Wind Speed = 5.4 mph
- 10 Meter Preferred 15 min Wind direction = 40.9°
- Stability Class = E
- Subcooling = -161.1°F

Items circled as are critical ~ must be as shown for pass rating.

urs

TEDE (mrem) Adult Thyroid CDE (mrem)

Within 15 minutes of clasification

10 Miles

17. APPROVED BY: Examinee Title Interim Emergency Director Time_____ Date___/___/___
    NOTIFIED BY:_____ RECEIVED BY: _____ Time_____ Date___/___/___