Facility: VC SUMMER	Scenario No: 1	Op Test No: NRC-ILO-16-01	
Examiners:		Operators:	CRS:
			RO:
			BOP:

Initial Conditions:
- The Reactor power is 75%.
- "B" train work week.
- "B" MDEFW pump is OOS.
- XFN-0065B RBCU is OOS.
- Caution Tag on "C" Circulating Water pump.

Turnover:
- Lower power to 65% to take "A" Main Feed Pump out of service. The pump will be evaluated by Engineering.

Critical Tasks:
- Swap controlling steam flow channels without a reactor trip on SG level.
- Swap controlling Pressurizer Level channels without a reactor trip on Pressurizer Level.
- Insert negative reactivity before a constant positive SUR occurs causing recriticality. (Occurs at approximately 6.5 minutes)

Event No.	Malf No.	Event Type*	Event Description
1	N/A	N-BOP, CRS R-RO	Lower power to 65% IAW GOP-4B, Power Operation (Mode 1 - Descending).
2#	MAL-PRS002A	I-RO, CRS TS-CRS	LT-459 fails low, causing Letdown to isolate.
3	MAL-CRF004F10	C-RO, CRS TS-CRS	Dropped Rod, F-10.
4	XMT-MS003O	I-BOP, CRS TS-CRS	FT-484 (STM FLOW) fails LOW causing "B" SG level to lower.

5	XMT-FW017O	I-BOP, CRS	PT-508 (FW PP DISCH HDR PRESS) fails LOW causing Main Feed Pumps to speed up.
6	MAL-PCS009AB MAL-PCS009BB	M-ALL	ATWS
7	MAL-RCS006A	M-ALL	SBLOCA
8	PMP-CC001T PMP-CC003F PMP-CC002F	M-ALL	"A" CCW pump trips. "C" Fails to AUTO start. "B" CCW pump fails to start in AUTO.
9	PMP-CS006S	M-ALL	"B" Charging Pump sheared shaft.
10	VLV-SP006F	M-ALL	MVG-3003B, Spray header isolation valve, fails to open
11	MAL-FWM001A MAL-FWM001B MAL-FWM001C	M-ALL	Trip of all three Main Feedwater Pumps
TERMINATE: The scenario may be terminated once the crew has initiated a cooldown in EOP-2.1, ES-1.2 Post LOCA Cooldown and Depressurization or at the Examiners discretion.			
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Used on previous two NRC Exams. Event 2 was used on the 2017 NRC Exam.

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

IOA designates Immediate Operator Action steps.

***** designates Continuous Action steps.

TURNOVER:

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 "B" Motor Driven EFW pump will be inoperable for scheduled preventive maintenance. Tech Spec 3.7.1.2, Emergency

Feedwater System action a (restore “B” pump within 72 hours) has been in effect for 6 hours with pump return to service is expected 6 hours from now. Train “B” RBCU, XFN-0065B is tagged out for breaker maintenance and is to be returned to service in 10 hours. The “C” Circulating Water Pump has a Caution Tag that says “System Engineer will monitor pump vibrations while running “C” Circulating Water Pump”. The Crew will be instructed to lower power to 65% power to secure the “C” Main Feedwater pump.

- **PRE-LOAD**

  - OVR-AH022A
    CS-AH280 RBCU FAN 65B FAST SPEED GREEN L
    FINAL = OFF

  - OVR-AH023A
    CS-AH279 RBCU FAN 65B SLOW SPEED GREEN L
    FINAL = OFF

  - OVR-EF010A
    CS-EF02 MOTOR DRIVEN EMERG FW PP B (XPP-
    FINAL = OFF

EVENT 1: Lower Reactor Power.

The crew will be prepared to commence the power reduction following a panel walk down and short briefing on the power reduction. The turnover stated that the “A” Feedwater pump is to be removed from service to allow an inspection that was not performed at the last shutdown. There is no concern that the pump is in imminent danger of failure. The CRS will direct the power reduction using GOP-4B, POWER OPERATION (MODE 1-DESCENDING). The RO will borate in accordance with SOP-106 and monitor Control Rod operation. The BOP will decrease turbine load at the rate directed by the CRS (1/2% per minute).

EVENT 2: LT-459 fails low, Letdown isolates.

- **TRIGGER 2**

  - MAL-PRS002A
    PRESSURIZER LEVEL CHANNEL 459 FAILURE
    FINAL = 0

On cue from the Examiner, LT-459 will fail low. The RO will swap controlling channels to the two operable channels, LT-460 and LT-461. The CRS will enter AOP-401.6, Pressurizer Level Control and Protection Channel Failure. The RO will restore Letdown using Attachment 4 of AOP-401.6. The CRS will refer to Tech Specs 3.3.1, Reactor Trip System Instrumentation, and enter action statement 6 and must place the inoperable channel in a tripped condition within 72 hours. Swapping controlling Pressurizer Level channels without a reactor trip on Pressurizer Level is a critical task.

It took 13 minutes with no operator action to reach the high Pressurizer Level reactor trip of 92%.

EVENT 3: Dropped Rod, F-10.

- **TRIGGER 3**

    - MAL-CRF004F10
      DROPPED ROD F10
      FINAL VALUE = STATIONARY
      DELETE IN = 25 sec

  On cue from the Examiner Control Bank D rod F-10 will fully insert into the core. The CRS will implement AOP-403.6, DROPPED CONTROL ROD. When contacted I&C will inform the CRS that the rod was dropped due to a faulty fuse. The CRS determines that TS 3.1.3.1.d is the only action statement that will be entered. TS 3.1.3.1: All full length (shutdown and control) rods which are inserted in the core shall be OPERABLE and positioned within 12 steps (indicated position) of their group step-counter demand position. 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: 1. The rod is restored to OPERABLE status within the above alignment requirements. Following replacement of the faulty fuse by I&C, the rod is recovered to its original position.

EVENT 4: FT-484 Fails Low, causing "B" SG level to lower.

- **TRIGGER 4**

    - XMT-MS003O
      SG B STEAM FLOW FAIL TO POSN
      Ramp = 30 sec
      Final Value = 0

  On cue from the Examiner, Steam Flow transmitter FT-484 will fail low. "B" SG level will start to lower. The BOP will select the operable steam flow and feed flow channels, FT-485 and FT-486 in accordance with AOP-401.3. The operator may take manual control of the feed regulating valves to control SG level if necessary. Once SG level has stabilized, the CRS will refer to Tech Spec 3.3.1 Item 14, action 6 and Tech Spec 3.3.2, Item 4d, action 24. Both of these action statements require the inoperable channel to be placed in the tripped condition within 72 hours. Swapping controlling steam flow channels without a reactor trip on SG level is a critical task.

  It took two minutes and six seconds to reach 40% SG level. At this point, the crew would be directed to trip the reactor based on Reference page criteria in AOP-401.3 and XCP-624, 3-6, SG LVL HI/LO LIMIT.

EVENT 5: PT-508 fails low, causing Main Feedwater Pumps to speed up.

- **TRIGGER 5**

  - XMT-FW017O
    IPT00508 FW PP DSCHG HDR PRESS PI-508 FAIL TO POSN
    FINAL VALUE = 200 psig
    RAMP = 30 sec

On cue from the Examiner, PT-508 will fail low, causing main feedwater pumps to speed up. The BOP will take manual control of the Main Feedwater Pump Master Controller to manual and lower main feedwater pump speed. The crew will enter AOP-210.3, Feedwater Pump Malfunction. They will restore main feedwater pump D/P to the proper program band in manual.

EVENT 6-10: ATWS followed by a Small Break LOCA including failures after the break.

- **PRE-LOAD,**

  - VLV-SP006F (MVG-3003B fails to open)
    XVG0300B-SP SPR HDRS ISO CIRCUIT B FAIL AS IS

  - PMP-CC003F
    XPP0001CAL CCW PMP C TRAIN A FAIL TO START

  - PMP-CC002F
    CCW PMP B FAIL TO START.

  - PMP-CS006S
    XPP0043B CHRG/SI PMP B SHEARED SHAFT

  - MAL-PCS009AB
    REACTOR TRIP BREAKER A FAILURE (FAIL TO OPEN)
    FAIL TO: BOTH

  - MAL-PCS009BB
    REACTOR TRIP BREAKER B FAILURE (FAIL TO OPEN)
    FAIL TO: BOTH

- **TRIGGER 6**

  - MAL-TUR001
    Inadvertent turbine trip
    DELAY = 5 sec (Delay is to ensure that BST-RC039 goes in before the turbine trips.)

  - BST-RC039
    ISB00408C1 AUTO RODS IN
    FINAL = INHIBITED

- MAL-FWM001A
  MAIN FEEDWATER PUMP A TRIP
- MAL-FWM001B
  MAIN FEEDWATER PUMP B TRIP
- MAL-FWM001C
  MAIN FEEDWATER PUMP C TRIP

- **TRIGGER 7**
  - MAL-RCS006A
    REACTOR COOLANT SYSTEM LEAK COLD LEG (LOOP 1)
    FINAL VALUE = 2500 gpm
- **TRIGGER 12**
  - MAL-PCS009AA
    REACTOR TRIP BREAKER A FAILURE (INADVERTENT OPEN)
- **TRIGGER 13**
  - MAL-PCS009BA
    REACTOR TRIP BREAKER B FAILURE (INADVERTENT OPEN)
- **TRIGGER 14,** X02I102O==1 (Deletes MVG-3003B failure when valve is opened)
  - VLV-SP006F (NEW)
    DELETE IN = 1 sec
- **TRIGGER 15,** X06O013A==1 ("A" CCW Pump trips when "A" RX Trip Breaker opens)
  - PMP-CC001T
    XPP0001AL CCW PMP A TRIP ON COMMAND

On cue from the Examiner, a turbine trip and all three main feedwater pumps will trip leading to an ATWS. The crew will enter into EOP-13.0. The crew will have to insert control rods or emergency borate prior to the reactor being locally tripped. We will trip the reactor three minutes after being sent to locally trip the reactor. They will then exit out of EOP-13.0. At this point we will insert a Small Break LOCA. They will now enter EOP-1.0 (E-0), Reactor Trip/Safety Injection Actuation. Several failures will occur on the trip. "A" CCW pump will trip, "B" CCW pump will not automatically start on the sequencer. MVG-3003B, "B" Train spray header isolation valve will not open automatically when Phase "A" occurs. The "B" Charging pump will experience a sheared shaft and "C" Charging pump breaker cannot be racked up. The crew will transition from EOP-1.0 to EOP-2.0, Loss of Reactor or Secondary Coolant to EOP-2.1, ES-1.2 Post LOCA Cooldown and Depressurization. The Critical Task is to insert negative reactivity before a constant positive SUR occurs causing recriticality. (Occurs at approximately 6.5 minutes)

CRITICAL TASKS:

- Swap controlling steam flow channels without a reactor trip on SG level.
- Swap controlling Pressurizer Level channels without a reactor trip on Pressurizer Level.
- Insert negative reactivity before a constant positive SUR occurs causing recriticality. (Occurs at approximately 6.5 minutes)

TERMINATION:

The scenario may be terminated once the crew has transitioned from EOP-2.0, E-1 Loss of Reactor or Secondary Coolant, to EOP-2.1, ES-1.2 Post LOCA Cooldown and Depressurization, or at the Examiners discretion.

Scenario Attributes		Events
Total Malfunctions (5-8)	10	· LT-459 fails LOW. · Dropped Rod, F-10. · FT-484 (STM FLOW) fails LOW. · PT-508 (FW PP DISCH HDR PRESS) fails LOW. · Small Break LOCA. · "A" CCW pump trips, "C" CCW pump fails to AUTO start. · "B" CCW pump fails to start in AUTO. · MVG-3003B fails to open. · "B" Charging pump sheared shaft. · ATWS
Malfunctions after EOP entry (1-2)	4	· "A" CCW pump trips, "C" CCW pump fails to AUTO start. · "B" CCW pump fails to start in AUTO. · MVG-3003B fails to open. · "B" Charging pump sheared shaft.
Abnormal Events (2-4)	4	· LT-459 fails low. · Dropped Rod, F-10. · FT-484 (STM FLOW) fails LOW. · PT-508 (FW PP DISCH HDR PRESS) fails LOW.
Major Transients (1-2)	2	· Small Break LOCA. · ATWS
EOPs Entered (1-2)	2	· EOP-2.0, E-1 Loss of Reactor or Secondary Coolant. · EOP-13.0, FR-S.1 Response to Abnormal Nuclear Power Generation.
EOP Contingencies (0-2)	1	· EOP-13.0, FR-S.1 Response to Abnormal Nuclear Power Generation.
Critical Tasks (≥ 2)	3	· Swap controlling steam flow channels without a reactor trip on SG level. · Swap controlling Pressurizer Level channels without a reactor trip on Pressurizer Level. · Insert negative reactivity before a constant positive SUR occurs causing recriticality. (Occurs at approximately 6.5 minutes)

SIMULATOR SCENARIO SETUP

INITIAL CONDITIONS:

- IC Set 300
- 75% Power, MOL
- Burnup = 10,033 MWD/MTU
- RCS Boron Concentration = 1076 ppm
- FCV-113 Pot Setting = 4.61
- Rod Position: Group D = 187
- Tavg = 579.8˚F
- Prior to the scenario, the crew should pre-brief conditions and their expectations for the shift.

PRE-EXERCISE:

- Ensure simulator has been checked for hardware problems (DORT, burnt out light bulbs, switch malfunctions, chart recorders, etc.).
- Complete VCS-TQP-0807 Attachment I-A, Unit 1 Booth Instructor Checklist.
- Verify plant aligned for "B1" work week IAW PTP-101.004, Safety Related Train Swap Checklist.
- Verify red hold tag and R&R tag on "B" MDEFW Pump **AND** XFN-0065B RBCU and ensure they are in P-T-L. XFN-65B can't be taken to P-T-L.
- Verify red Placard on "A" CCW Pump and "B" Charging Pump.
- Verify a Caution Tag is on the "C" Circulating Water Pump that reads "System Engineer will monitor pump vibrations while running "C" Circulating Water Pump".
- Verify the Hard Card for Turbine operation is in its proper storage location and cleaned.
- Verify the Hard Card for borating via MVT-8104 is in its proper storage location and cleaned.
- Update EOOS for "B" MDEFW Pump being out of service.
- Verify Rod Bank Update set correctly: 187 steps on Control Bank D and 228 steps on all other Banks.
- Ensure you have the following pre-marked up procedures:
    - GOP-4B, Power Operation (Mode 1 - Descending)
- Ensure you have a turnover sheet for each position.
- Conduct two-minute drill.

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Event Description: Lower Reactor Power

Time	Position	Applicant's Actions or Behavior
	BOOTH OPERATOR:	No TRIGGER for this event.
	Indications Available: N/A	
	EVALUATOR NOTE: The crew will have briefed a power reduction to 65% at 1/2% per minute prior to assuming the watch. Procedure guidance for borating as found in SOP-106, Reactor Makeup Water System is included in this scenario guide beginning at **page 51 of 53**.	
	CRS	Enters GOP-4B, POWER OPERATION (MODE 1 - DESCENDING)

GOP-4B

GOP- 4B 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. Axial Flux Difference, ΔI, should be maintained within limits per V.C. Summer Curve Book, Figure I-4.1 during Reactor Power Operation above 50% per Tech Spec 3.2.1.

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

D. If time allows, all load changes should be discussed with the Load Dispatcher prior to commencing the load change.

E. 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.

REACTOR CONTROL

A. During operation with a positive Moderator Temperature Coefficient:

1) Power and temperature changes should be slow and will require constant operator attention.

2) All power and load changes should be performed in small increments.

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): CHG B

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.

TURBINE CONTROL

A. If during power descension plant stabilization is required, HOLD should be selected on the EHC HMI: Control/Load screen. CHG E

B. To resume power descension select the recommended Load Ramp Rate

C. Turbine Load values are approximate and provided as initial starting points for load changes. When desired Reactor or Turbine parameters are achieved stabilize (if necessary) and proceed as directed. CHG A

D. The load limit "ramp rate" buttons only affect how fast the Load Limit Ref. moves to the new Load Limit Setpoint. Load reductions made using the limiter will always occur at 30% per minute.

E. The load limiter will reduce turbine load if it is set more than 2% below the current Load Reference value. Load will only be shed until the Load Reference value is once again within 2% of Load Limit Ref. CHG B

MSR CONTROL

A. Do not exceed 50°F ΔT between the inlets to the Low Pressure Turbine.

B. When in Manual, do not exceed 25°F per half-hour temperature change rate for the tube side of the Moisture Separator/Reheater.

Op Test No: NRC-ILO-16-01 Scenario # 1 Event # 1 Page: 11 of 53

Event Description: Lower Reactor Power

Time	Position	Applicant's Actions or Behavior	
		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-4B
	BOP	3.2. Reduce Reactor Power to 48% as follows: a. Using the EHC HMI, Control/Load screen, reduce load per SOP-214, Main Turbine And Controls, Section III.D, Turbine Load Reduction/Shutdown, at a rate of 1% per minute or less.	GOP-4B
		EVALUATOR NOTE: SOP-214 for reducing load can be found on **page 12 of 53**.	
		3.2. 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-4B
	BOP	3.2. Reduce Reactor Power to 48% as follows: 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-4B
		NOTE 3.2.c a. When securing Main Feedwater Pumps, it may be desired to perform PTP-125.020, Main Feedwater Pump Timed Trip Test. b. Due to the physical location of the start-up drain, securing Feedwater Booster Pump D last will ensure better cooling flow for the Deaerator.	GOP-4B
	BOP	3.2. Reduce Reactor Power to 48% as follows: c. When Reactor Power is between 60% and 80%, reduce to the following pumps in service: 1. Two Main Feedwater Pumps per SOP-210, Feedwater System, Section III.H, Feedwater Pump Shutdown. 2. Three Feedwater Booster Pumps per SOP-210, Feedwater System, Section III.I, Feedwater Booster Pump Shutdown.	GOP-4B

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Event Description: Lower Reactor Power

Time	Position	Applicant's Actions or Behavior	
	BOP	3.2. Reduce Reactor Power to 48% as follows: d. When Reactor Power is between 60% and 75% perform PTP-102.001, Main Turbine Tests (Power Operated Extraction System Check Valve portion only).	GOP-4B
		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

Op Test No: NRC-ILO-16-01 Scenario # 1 Event # 1 Page: 13 of 53		
Event Description: Lower Reactor Power		
Time	Position	Applicant's Actions or Behavior
	BOOTH OPERATOR:	If called to adjust Blowdown Cooler flow use the following remotes: • LOA-CND044, COND TO S/G BD TC-3062A AUTO-MANUAL MODE SELECTOR - position to MANUAL • LOA-CND045, COND TO S/G BD TC-3062B AUTO-MANUAL MODE SELECTOR - position to MANUAL • LOA-CND046, COND TO S/G BD TC-3062C AUTO-MANUAL MODE SELECTOR - position to MANUAL • LOA-CND-047, COND TO S/G BD TV-3062A MANUAL POSITION – adjust final value to obtain flow as directed. • LOA-CND-048, COND TO S/G BD TV-3062B MANUAL POSITION – adjust final value to obtain flow as directed. • LOA-CND-049, COND TO S/G BD TV-3062C MANUAL POSITION – adjust final value to obtain flow as directed.
EVALUATOR NOTE: The next event may be inserted following completion of the power reduction, or at any time per the discretion of the Lead Examiner.		

Op Test No: NRC-ILO-16-01 Scenario # 1 Event # 2 Page: 14 of 53

Event Description: LT-459 fails LOW

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: LT-459 will fail LOW. Charging flow will increase and actual Pressurizer Level will rise.			
BOOTH OPERATOR:		When directed - Initiate Event 2 (TRIGGER 2).	
Indication Available: XCP-616 1-3, BLCK HTRS ISOL LTDN PZR LCS LO XCP-616 1-5, PZR LCS DEV HI/LO XCP-616 3-1, PZR HTR CNTRL OR BU GRP 1/2 TRIP XCP-616 4-6, SCR OUTPT LOSS XCP-642 4-4, RC LTDN LO RNG RM-L1 TRBL XCP-614 5-1, CHG LINE FLO HI/LO			
	CRS	Enters AOP-401.6, Pressurizer Level Control and Protection Channel Failure.	
IOA **Critical Task**	RO	1. Place PZR LEVEL CNTRL Switch to the position with two operable channels. **(Candidate will select 460+461 on PZR LEVEL CNTRL)**	AOP-401.6
	RO	2. Select an operable channel on PZR LEVEL RCDR. **(460 is already selected, which is an operable channel)**	AOP-401.6
	RO	3. Control the PZR Heaters as necessary to maintain PZR pressure: • CNTRL GRP Heaters. • BU GRP 1 Heaters • BU GRP 2 Heaters.	AOP-401.6
EVALUATOR NOTE: Energizing Pressurizer Heaters is done in accordance with SOP-101, Reactor Coolant System. This can be seen on **page 53 of 53**.			
	RO	4. Verify Letdown is in service. **(NO)**	AOP-401.6
	RO	**Alternative Action Step:** 4. Re-establish Normal Letdown using ATTACHMENT 4, ESTABLISHING NORMAL LETDOWN.	AOP-401.6
EVALUATOR NOTE: Attachment 4 can be seen on **page 16 of 53**.			
	RO	5. Check if FCV-122, CHG FLOW is in AUTO. **(NO)**	AOP-401.6
	RO	**Alternative Action Step:** 5. Place FCV-122, CHG FLOW in AUTO using ATTACHMENT 5, RESTORING AUTOMATIC CHARGING FLOW CONTROL.	AOP-401.6
EVALUATOR NOTE: Attachment 5 can be seen on **page 17 of 53.**			

Op Test No: NRC-ILO-16-01 Scenario # 1 Event # 2 Page: 15 of 53

Event Description: LT-459 fails LOW

Time	Position	Applicant's Actions or Behavior	
	RO	6. Check if the PZR LVL MASTER CONTROLLER is responding appropriately: • Verify Charging flow is normal and responding to PZR level error. • Verify PZR level is stable at or trending to program level.	AOP-401.6
		NOTE – Step 7 Compliance with T.S. requires tripping failed instrument channel bistables within 72 hours of the channel failure. Time should be allowed for troubleshooting of the failed channel prior to tripping the bistables.	AOP-401.6
	CRS	7. Place the failed channel protection bistables in a tripped condition within 72 hours of the channel failure: a. Write an R&R for the failed channel. b. Select the attachment for the failed channel from the back of this procedure. c. Record the R&R number on the attachment. d. Determine the cause of the channel failure. e. Notify the I&C Department to place the identified bistables in trip using the attachment.	AOP-401.6

AOP-401.6
ATTACHMENT 1
PAGE 1 of 1
REVISION 4

LEVEL TRANSMITTER LT-459

TRIPPED BISTABLE STATUS

INSTRUMENT	ASSOCIATED BISTABLE	BISTABLE LOCATION	TRIP STATUS LIGHT
LT-459	LB-459A	C1-442-BS-1	CHAN I PZR LVL HI

R&R#_____

TRIP

APPLICABLE STPS	STP # USED TO TRIP BISTABLE	TRIP STATUS LIGHT ON	TRIPPED BY	VERIFIED BY
302.007				
345.018				
OATC LOG				

RESTORATION

APPLICABLE STP(S) COMPLETED	STP # USED TO RESTORE BISTABLE	TRIP STATUS LIGHT OFF	RESTORED BY	VERIFIED BY

REVIEWED BY:_____ / _____
SHIFT MANAGER DATE

TECH SPECS
TABLE 3.3-1 ITEM 11

AOP-401.6

Op Test No: NRC-ILO-16-01 Scenario # 1 Event # 2 Page: 16 of 53

Event Description: LT-459 fails LOW

Time	Position	Applicant's Actions or Behavior	
	CRS	Enters T.S. 3.3.1, REACTOR TRIP SYSTEM INSTRUMENTATION. Function 11; Pressurizer Water Level—High, 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.	Tech Specs
EVALUATOR NOTE: The next event may be inserted following the CRS assessment of Tech Specs, or at any time per the discretion of the Lead Examiner.			
	RO	1. Establish Normal Letdown: a. Adjust FCV-122, CHG FLOW, to obtain 70 gpm Charging flow. b. Set PCV-145, LO PRESS LTDN, to 70%. c. Open TCV-144, CC TO LTDN HX. d. Open PVT-8152, LTDN LINE ISOL. e. Place TCV-143, LTDN TO VCT OR DEMIN, in VCT position. f. Open both LCV-459 and LCV-460, LTDN LINE ISOL. g. 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). h. Adjust FCV-122, CHG FLOW, to maintain TI-140, REGEN HX OUT TEMP °F, between 250°F and 350°F while maintaining PZR level. i. Adjust PCV-145, LO PRESS LTDN, to maintain PI-145, LO PRESS LTDN PRESS PSIG, between 300 psig and 400 psig. j. Place PCV-145, LO PRESS LTDN, in AUTO. k. Place TCV-144, CC TO LTDN HX, in AUTO. l. WHEN Letdown temperatures are stable, place TCV-143, LTDN TO VCT OR DEMIN, in DEMIN/AUTO.	Attachment 4

Op Test No: NRC-ILO-16-01 Scenario # 1 Event # 2 Page: 17 of 53

Event Description: LT-459 fails LOW

Time	Position	Applicant's Actions or Behavior
		1. Place FCV-122, CHG FLOW in AUTO as follows: a. Place the following in MAN: 1. PZR LEVEL MASTER CONTROL 2. FCV-122, CHG FLOW b. Adjust FCV, CHG FLOW, in MAN to establish Pressurizer level at or near programmed level. c. Establish automatic FCV-122, CHG FLOW, control as follows: 1. Adjust FCV-122, CHG FLOW, to establish 75 gpm flow as indicated on FI-122A, CHG FLOW GPM. 2. Manually adjust the PZR LEVEL MASTER CONTROL to 50% demand. 3. Place FCV-122, CHG FLOW, in AUTO. d. Adjust PZR LEVEL MASTER CONTROL in MAN, as necessary, to maintain Pressurizer level at or near programmed level. e. When Pressurizer level is within 1% and trending toward programmed level, place PZR LEVEL MASTER CONTROL in AUTO.

Attachment 5

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Event Description: Dropped Rod, F-10

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: Control Bank D rod F-10 will fully insert into the core. The CRS will implement AOP-403.6, DROPPED CONTROL ROD.			
BOOTH OPERATOR:		When directed - Initiate Event 3 (TRIGGER 3).	
Indication Available: XCP-620 2-3, CMPTR NIS PR TILTS XCP-620 2-5, CMPTR ROD DEV XCP-620 1-4, PR CHAN DEV XCP-620 1-5, PR UP DET FLUX HI DEV AUTO DEFEAT XCP-620 1-6, PR LOW DET FLUX HI DEV AUTO DEFEAT XCP-621 3-1, ONE ROD ON BOTTOM Rod Bottom light for Bank D rod F-10 is lit.			
EVALUATOR NOTE: IF at any time RCS pressure lowers to less than 2206 PSIG in Mode 1, then T.S. 3.2.5, DNB PARAMETERS must be entered. T.S. 3.2.5, DNB PARAMETERS: With any of the above parameters exceeding its limit, restore the parameter to within its limit within 2 hours or reduce THERMAL POWER to less than 5% of RATED THERMAL POWER within the next 4 hours.			
	CRS	Enters AOP-403.6, Dropped Control Rod	
IOA	RO	1. Verify only one Control Rod has dropped. **(Only F-10 has dropped)**	AOP-403.6
IOA	RO	2. Place ROD CNTRL BANK SEL Switch in MAN.	AOP-403.6
	CREW	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 2230 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-403.6
	RO	5. Initiate GTP-702, Attachments IV.A, IV.B, and IV.C. • ATTACHMENT IV.A - INOPERABLE CONTROL ROD. • ATTACHMENT IV.B - INOPERABLE ROD POSITION DEVIATION MONITOR. • ATTACHMENT IV.C - INOPERABLE ROD INSERTION LIMIT MONITOR.	AOP-403.6

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Event Description: Dropped Rod, F-10

Time	Position	Applicant's Actions or Behavior	
	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
	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
BOOTH OPERATOR:		NOTE: No action is necessary to reset the dropped rod. When contacted as I&C: - Acknowledge request for support. - WAIT 5 minutes and report that a Stationary Gripper fuse is blown. Request permission to replace the blown fuse. - WAIT 1 minute and notify the CRS that the Stationary Gripper Fuse has been replaced. - If called to get permission from the SM, report back "replace the blown fuse".	AOP-403.6

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Event Description: Dropped Rod, F-10

Time	Position	Applicant's Actions or Behavior	
	CRS	Enters Tech Spec 3.1.3, Moveable Control Assemblies, Action 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: 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 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; this reevaluation shall confirm that the previously analyzed results of these accidents remain valid for the duration of operation under these conditions. 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 Fq(z) and $F^{N}_{\Delta H}$ 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 trip setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER. Enters Tech Spec 3.2.4, Quadrant Power Tilt Ratio, Action a. a. With the QUADRANT POWER TILT RATIO determined to exceed 1.02 but less than *or* equal to 1.09: 1. Calculate the QUADRANT POWER TILT RATIO at least once per hour until either: a) The QUADRANT POWER TILT RATIO is reduced to within its limit. or b) THERMAL POWER is reduced to less than 50% of RATED THERMAL POWER	Tech Specs

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Event Description: Dropped Rod, F-10

Time	Position	Applicant's Actions or Behavior	
		Tech Spec 3.2.4, Quadrant Power Tilt Ratio, Action a. Continued 2. Within 2 hours either: a) Reduce the QUADRANT POWER TILT RATIO to within its limit, or b) Reduce THERMAL POWER at least 3% from RATED THERMAL POWER for each 1% of indicated QUADRANT POWER TILT RATIO in excess of 1.0 and similarly reduce the Power Range Neutron Flux-High Trip Setpoints within the next 4 hours. 3. Verify that the QUADRANT POWER TILT RATIO is within its limit within 24 hours after exceeding the limit or reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within the next 2 hours and reduce the Power Range Neutron Flux-High Trip setpoints to less than or equal to 55% of RATED THERMAL POWER within the next 4 hours. 4. Identify and correct the cause of the out of limit condition prior to increasing THERMAL POWER; subsequent POWER OPERATION above 50% of RATED THERMAL power may proceed provided that the QUADRANT POWER TILT RATIO is verified within its limit at least once per hour for 12 hours or until verified acceptable at 95% or greater RATED THERMAL POWER.	
	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
BOOTH OPERATOR:		When contacted as Rx Engineering for this information: - WAIT 2 minutes and notify the CRS "Maintain current power while the rod is being withdrawn. There is no speed limitation on the rate of rod withdrawal during the recovery,"	
	CRS	10. If necessary, reduce Reactor Power to the power level determined in Step 9. REFER TO GOP-4B, POWER OPERATION (MODE 1 - DESCENDING) OR GOP-4C, RAPID POWER REDUCTION.	AOP-403.6

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Event Description: Dropped Rod, F-10

Time	Position	Applicant's Actions or Behavior	
NOTE - Steps 11 through 15 Throughout the following steps, "AFFECTED" refers to any Control Rod Bank which contains a dropped Control Rod.			AOP-403.6
	CRS	11. Record the AFFECTED Bank readings: a. Group Step Counter demands: • AFFECTED Bank: _____. • Group 1 reading: _____. • Group 2 reading: _____. b. Dispatch an operator with Key #91, Rod Control Cabinets, to the Rod Control Cabinet room (IB-463). c. Locally at XCA4-CR, P/A CONVERTER CABINET (IB-463), record the P/A CONVERTER reading for the AFFECTED Bank:	AOP-403.6
BOOTH OPERATOR:		When contacted as AO: - Notify the Control Room that you have Key #91 - Wait 2 minutes and report rod position indicates (the value noted on the MCB by the RO) steps. The P/A converter reading can be found by opening Insight, then opening Th_Rods. Then look at MCRFPA(11 or 12) depending on which group dropped.	AOP-403.6
	RO	12. Rotate ROD CNTRL BANK SEL Switch clockwise to the AFFECTED Bank position.	AOP-403.6

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Event Description: Dropped Rod, F-10

Time	Position	Applicant's Actions or Behavior	
	RO	13. Withdraw the dropped Control Rod: a. Reset the Step Counter for the AFFECTED Group to zero. **(Candidate lifts the step counter window up for Bank D Group 2 rods and depresses the reset switch)** b. 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 dropped Control Rod, to the ROD DISCONNECTED position. (KEY #10) **(Candidate will place switches to the ROD DISCONNECTED Position for the following rods, F06, K10, and K06.)** **NOTE - Step 13.c** **ROD CNTRL SYS FAIL URGENT (XCP-620 5-1), annunciator will alarm when the dropped rod is moved in this step.** c. Move the dropped Control Rod at least six steps out. d. Verify dropped rod movement on the associated Digital Rod Position Indicator. e. Verify ONE ROD ON BOTTOM (XCP-621 3-1), annunciator clears. f. Adjust Main Turbine load to maintain Tavg within 5°F of Tref. g. Using the rate of Control Rod movement determined in Step 9, continue withdrawal of the dropped rod until the demand position recorded in Step 11.a is reached. h. Verify DRPI indicates the dropped rod at the same position as the other Control Rods within the bank.	AOP-403.6
	CRS	14. Locally at XCA4-CR, P/A CONVERTER CABINET (IB-463), reset the P/A CONVERTER as follows: a. Ensure the Bank Position Display Switch is in the AFFECTED Bank position. b. Place MANUAL/AUTOMATIC Switch in MANUAL. c. Depress the DOWN Pushbutton to reset the P/A CONVERTER to the reading recorded in Step 11.c. d. Place MANUAL/AUTOMATIC Switch in AUTOMATIC. e. Place the Bank Position Display Switch in DISPLAY OFF.	AOP-403.6

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Event Description: Dropped Rod, F-10

Time	Position	Applicant's Actions or Behavior	
BOOTH OPERATOR:		When Contacted as field operator to reset the P/A Converter acknowledge request and perform the following: Insert: LOA-CRF005 P/A MAN HEIGHT VALUE **(USE BEFORE SETTING LOA CRF1)** - insert value previously recorded. Insert: LOA-CRF001 P/A MAN BANK SELECT **(USE AFTER SETTING LOA CRF5)** CB "D" - select Control Bank "D". Notify the Control Room that the P/A Converter is reset.	
	RO	15. Restore the Rod Control System to normal alignment: a. Place all Lift Coil Disconnect Switches for the AFFECTED Bank to the ROD CONNECTED position. **(Candidate will place switches to the ROD CONNECTED Position for the following rods, F06, K10, and K06.)** b. Rotate 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. e. Update the control rod bank positions per OAP-107.1, CONTROL OF IPCS FUNCTIONS. f. Notify the I&C Department to perform ICP-500.023, ROD CONTROL TROUBLESHOOTING AND REPAIR, to verify proper Master Cycler setup prior to moving rods. g. COMPLETE STP-106.001, MOVEABLE ROD INSERTION TEST.	AOP-403.6
BOOTH OPERATOR:		When contacted as I&C to perform ICP-500.023, ROD CONTROL TROUBLSHOOTING AND REPAIR report that the Cycler Setup has been completed satisfactorily.	

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Event Description: Dropped Rod, F-10

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: If necessary, the crew will use the procedure steps below to update the control rod bank position on IPCS.			
NOTE 6.2.b Running the Rod Bank Update function will correct the computer and reinstate the normal Rod Deviation Alarm functions.			
	CRS	b. Update the control rod bank positions as follows: 1. Activate RBU. 2. Obtain the correct Group 1 step counter positions from the RO. 3. Verify control rod step counts are correct, and select F3 (bottom left of the display page) to save the data. a. IF no changes were made to the step counts, proceed to 6.2.b 6). 4. The following Main Control Board annunciators should clear after about one minute: a. CMPTR ROD DEV (XCP-620 2-5). b. CMPTR ROD SEQ (XCP-620 2-6). 5. If only one annunciator clears, select F3 again. 6. When both annunciators are clear, press ESC.	OAP-107.1
EVALUATOR NOTE: Rods may remain in MANUAL. The goal is to have the Rod Control System Urgent Alarm clear. The next event may be inserted after recovery of the dropped rod is complete or at any time per the discretion of the Lead Examiner.			

Op Test No: NRC-ILO-16-01 Scenario # 1 Event # 4 Page: 26 of 53

Event Description: FT-484 fails LOW.

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: FT-484 will fail LOW. This will cause "B" SG level to lower.			
BOOTH OPERATOR:		When directed - Initiate Event 4 (TRIGGER 4).	
Indication Available: XCP-624 2-5, SG B LVL DEV. XCP-624 5-4, SG B FWF>STF MISMATCH.			
	CRS	Enters AOP-401.3, Steam Flow-Feedwater Flow Protection Channel Failure.	AOP-401.3

REFERENCE PAGE FOR AOP-401.3

1 LOSS OF MAIN FEEDWATER FLOW

IF Feedwater flow is lost while Reactor Power is GREATER THAN 10%, and cannot be quickly restored from the MCB, THEN Trip the reactor and GO TO EOP-1.0, E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1.

AOP-401.3

2 STEAM GENERATOR LEVEL CONTROL

a. IF Narrow Range Steam Generator Level decreases to LESS THAN 40% in any SG, THEN Trip the reactor and GO TO EOP-1.0, E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1.

b. IF Reactor Power is GREATER THAN 15% and Narrow Range Steam Generator Level exceeds 75% in any SG, THEN Trip the reactor and GO TO EOP-1.0, E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1.

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 **Critical Task**	BOP	2. Select the operable flow channel: • Place FW CONTROL CHANNEL SEL Switch to the operable channel. **(Candidate selects FY485A)** • Place STEAM CONTROL CHANNEL SEL Switch to the operable channel. **(Candidate selects FY486A)**	AOP-401.3

Op Test No: NRC-ILO-16-01 Scenario # 1 Event # 4 Page: 27 of 53

Event Description: FT-484 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. **(YES)**	AOP-401.3
IOA	BOP	4. Verify only one SG is AFFECTED. **(YES)**	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
EVALUATOR NOTE: It is not necessary to manually adjust Feedwater Flow Control Valves at this point, however, it is not wrong if they do take manual control to control SG water level.			
IOA	BOP	6. Check if Feedwater Pump speed control is operating properly: **(YES)** • 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. Perform the following: a. Determine the failed instrument channel. _____ b. Record the time of the channel failure. _____	AOP-401.3

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Event Description: FT-484 fails LOW.

Time	Position	Applicant's Actions or Behavior	
NOTE - Step 10 Compliance with T.S. requires tripping failed instrument channel bistables within 72 hours of the channel failure. Time should be allowed for troubleshooting of the failed channel prior to tripping the bistables.			AOP-401.3
*	CRS	10. Place the failed channel protection bistables in a tripped condition within 72 hours of the channel failure: a. Write an R&R for the failed channel. b. Select the attachment for the failed channel from the back of this procedure. c. Record the R&R number on the attachment. d. Determine the cause of the channel failure. e. Notify the I&C Department to place the identified bistables in trip using the attachment.	AOP-401.3

Op Test No: NRC-ILO-16-01 Scenario # 1 Event # 4 Page: 29 of 53

Event Description: FT-484 fails LOW.

Time	Position	Applicant's Actions or Behavior	
	CRS	Enters T.S. 3.3.1, Reactor Trip System Instrumentation. Function 14; Steam/Feedwater Flow Mismatch and Low Steam Generator Water Level, 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. Enters T.S. 3.3.2, Engineered Safety Feature Actuation System Instrumentation Function 4d. STEAM LINE ISOLATION: Steam Flow in Two Steam Lines—High Coincident with Tavg—Low—Low, 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.	Tech Spec

EVALUATOR NOTE: The next event may be inserted following the CRS assessment of Tech Specs, or at any time per the discretion of the Lead Examiner.

Op Test No: NRC-ILO-16-01 Scenario # 1 Event # 5 Page: 30 of 53

Event Description: PT-508 fails LOW.

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE: PT-508 will fail LOW. This will cause the Main Feedwater Pumps to speed up.		
	BOOTH OPERATOR:	When directed - Initiate Event 3 (TRIGGER 3).
Indication Available: XCP-624 1-5, SG A LVL DEV XCP-624 2-5, SG B LVL DEV XCP-624 3-5, SG C LVL DEV XCP-624 4-4, SG A FWF>STF MISMATCH XCP-624 6-4, SG C FWF>STF MISMATCH PT-508 failing Low		
	CRS	Enters AOP-210.3, Feedwater Pump Malfunction. AOP-210.3

REFERENCE PAGE FOR AOP-210.3

1 MAIN FEEDWATER REGULATING VALVE MANUAL CONTROL

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 LOSS OF MAIN FEEDWATER FLOW

IF Feedwater flow is lost while Reactor Power is GREATER THAN 10%, and cannot be quickly restored from the MCB, THEN Trip the reactor and GO TO EOP-1.0, E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1. AOP-210.3

3 STEAM GENERATOR LEVEL CONTROL

a. IF Narrow Range Steam Generator Level decreases to LESS THAN 40% in any SG, THEN Trip the reactor and GO TO EOP-1.0, E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1.

b. IF Reactor Power is GREATER THAN 15% and Narrow Range Steam Generator Level exceeds 75% in any SG, THEN Trip the reactor and GO TO EOP-1.0, E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1.

4 MAIN FEED PUMP SPEED CONTROL

IF IPT00464 has failed with the Steam Dumps in Steam Pressure Mode, THEN Trip the reactor and GO TO EOP-1.0, E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1.

Op Test No: NRC-ILO-16-01 Scenario # 1 Event # 5 Page: 31 of 53

Event Description: PT-508 fails LOW.

Time	Position	Applicant's Actions or Behavior	
IOA	BOP	1. Verify at least one Feedwater Pump is running.	AOP-210.3
IOA	BOP	2. Check if a Feedwater Pump trip has occurred. **(NO)**	AOP-210.3
IOA	BOP	**Alternative Action Step:** 2. GO TO Step 4.	AOP-210.3
IOA	BOP	4. Check Main Feedwater Pump operation. a. Verify all Main Feedwater Pumps are affected. **(YES)** b. Check if Reactor Power is GREATER THAN 50%. **(YES)** c. Place the MCB MASTER SPEED CNTRL in MAN and adjust to between 50% and 60% demand OR as needed to control Feedwater Flow. d. Verify all Main Feedwater Pump speeds are stable.	AOP-210.3
NOTE - Step 5 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
	BOP	5. Check if Main Feedwater Flow matches Main Steam Flow for each Steam Generator.	AOP-210.3
*	BOP	6. Maintain Narrow Range Steam Generator Level between 60% and 65%.	AOP-210.3
	BOP	7. If necessary, 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 DICH 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
	BOP	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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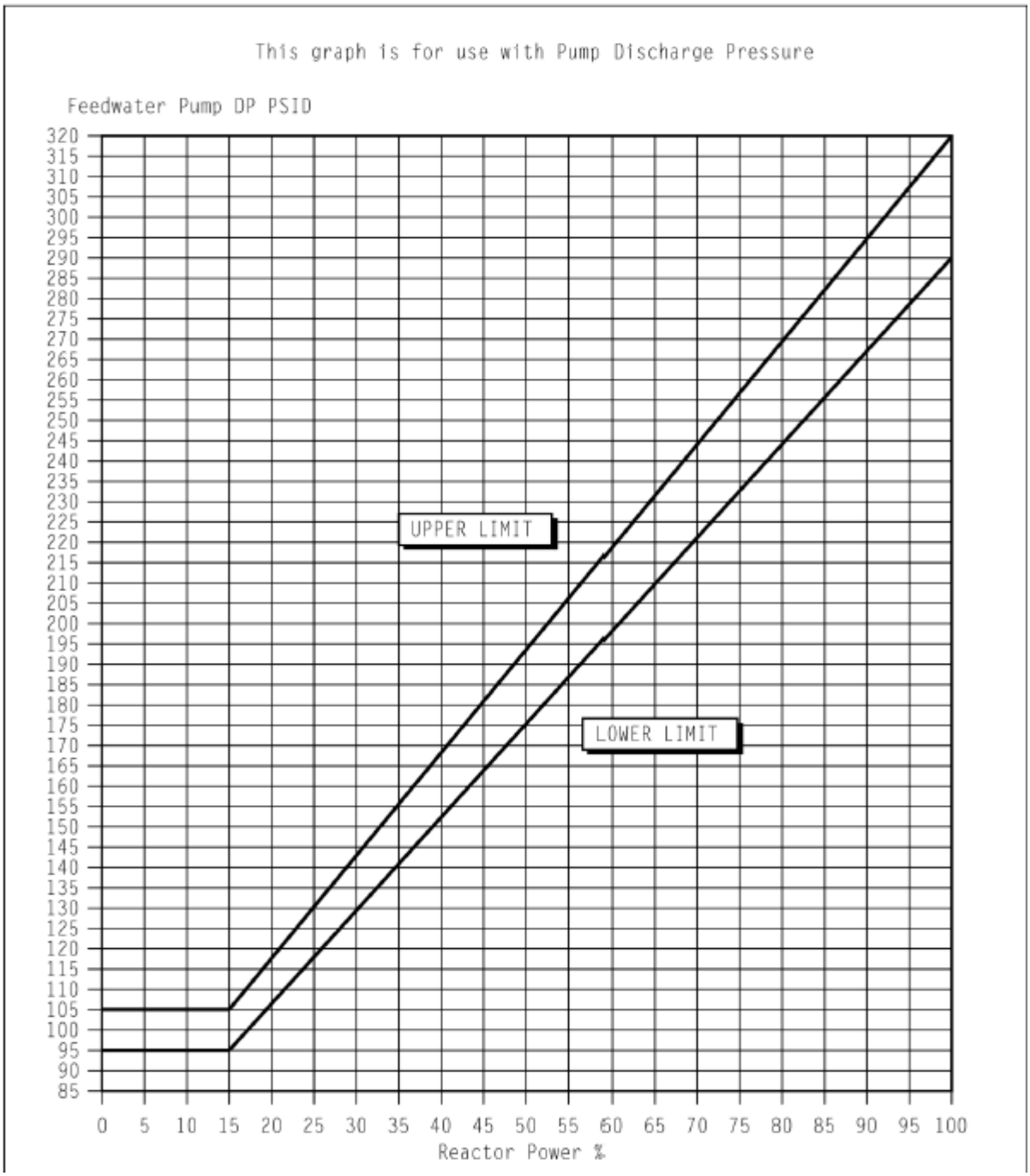
Event Description: PT-508 fails LOW.

Time	Position	Applicant's Actions or Behavior

FEEDWATER PUMP D/P LIMITS



AOP-210.3

Op Test No: NRC-ILO-16-01 Scenario # 1 Event # 5 Page: 33 of 53			
Event Description: PT-508 fails LOW.			
Time	Position	Applicant's Actions or Behavior	
	BOP	9. Determine and correct the cause of the Feedwater Pump speed control malfunction.	AOP-210.3
EVALUATOR NOTE: At this point the crew has done everything they can in this procedure since they will not get PT-508 back. The next event may be inserted at any time per the discretion of the Lead Examiner.			

Op Test No: NRC-ILO-16-01 Scenario # 1 Event # 6 Page: 34 of 53

Event Description: ATWS

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: A turbine trip will occur. The reactor will not trip and the crew will insert negative reactivity with rods and emergency boration. The reactor will be locally tripped. Once the reactor is tripped and the crew has exited EOP-13.0, a small break LOCA will be put in. The "A" CCW pump will trip, "B" and "C" CCW pumps will not start automatically. MVG-3003B, Spray Header Isolation valve will fail to open automatically on the Phase "A" isolation and the "B" Charging pump will experience a sheared shaft.			
BOOTH OPERATOR:		When directed - Initiate Event 6 (TRIGGER 6).	
Indication Available: Pressurizer Level lowering RCS Pressure lowering Charging Flow increasing			
	CRS	Enters EOP-1.0, E-0 Reactor Trip or Safety Injection.	EOP-1.0
IOA	RO	1. Verify Reactor Trip: • Trip the Reactor using either Reactor Trip Switch. • Verify all Reactor Trip and Bypass Breakers are open. **(NO)** • Verify all Rod Bottom Lights are lit. • Verify Reactor Power level is decreasing.	EOP-1.0
IOA	RO	**Alternative Action Step:** 1. Trip the Reactor using both Reactor Trip Switches. If the Reactor will NOT trip OR is NOT subcritical, THEN GO TO EOP-13.0, FR-S.1, RESPONSE TO ABNORMAL NUCLEAR POWER GENERATION, Step 1.	EOP-1.0
	CRS	Enters EOP-13.0, FR-S.1 Response to Abnormal Nuclear Power Generation.	
CAUTION RCPs should NOT be tripped with Reactor power GREATER THAN 5%, to prevent core damage due to low flow.			EOP-13.0
NOTE Steps 1 and 2 are Immediate Operator Actions.			EOP-13.0
NOTE - Step 1 Manual or Automatic Rod Control may be used to perform Alternative Action Step 1, whichever provides the fastest Control Rod insertion rate.			EOP-13.0

Op Test No: NRC-ILO-16-01 Scenario # 1 Event # 6 Page: 35 of 53

Event Description: ATWS

Time	Position	Applicant's Actions or Behavior	
IOA	RO	1. Verify Reactor Trip: • Trip the Reactor using either Reactor Trip Switch. • Verify all Reactor Trip and Bypass Breakers are open. **(NO)** • Verify all Rod Bottom Lights are lit. • Verify Reactor Power level is decreasing.	EOP-13.0
IOA **Critical Task**	CRS/RO	**Alternative Action Step:** 1. IF the Reactor will NOT trip OR is NOT subcritical, THEN insert Control Rods. Trip the Reactor per ATTACHMENT 1, TRIPPING THE REACTOR LOCALLY.	EOP-13.0
EVALUATOR NOTE: The critical task is to insert negative reactivity using rods or emergency boration. (Occurs at approximately 6.5 minutes)			
BOOTH OPERATOR:		When contacted as local operator to manually trip the reactor, acknowledge the request, then insert the following at Chief Examiner's direction: **TRIGGER 12** - Open Reactor Trip Breaker "A" **TRIGGER 13** - Open Reactor Trip Breaker "B" After inserting Trigger 12 and 13 contact the Control Room and report: "I have completed EOP-13.0 Attachment 1, Tripping the Reactor Locally".	EOP-13.0
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-13.0
	BOP	3. 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-13.0

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Event Description: ATWS

Time	Position	Applicant's Actions or Behavior	
CRITICAL TASK	RO	4. Initiate emergency boration of the RCS: a. Ensure at least one Charging Pump is running. b. Verify PZR pressure is LESS THAN 2330 psig. c. Verify SI ACT status light is NOT lit. d. Open MVT-8104, EMERG BORATE. e. Verify XPP-13B, BA XFER PP B, is running. f. Verify GREATER THAN 30 gpm flow on FI-110, EMERG BORATE FLOW GPM.	EOP-13.0
	BOP	5. Verify Containment Ventilation Isolation Valves closed by verifying the following SAFETY INJECTION monitor lights are dim: • XCP-6103 3-4 (POST ACCID HR EXH 6057 & 6067). • XCP-6103 2-1 (POST ACCID HR EXH 6056/6066).	EOP-13.0
CAUTION - Step 6 If an automatic SI exists or occurs, Steps 1 through 8 of EOP-1.0, E-0, REACTOR TRIP OR SAFETY INJECTION, should be performed to verify proper SI actuation, while continuing with this procedure.			EOP-13.0
	BOP	6. Check if all Turbine STM STOP VLVs are closed.	EOP-13.0
*	RO	7. Verify the Reactor is subcritical: a. Power Range channels indicate LESS THAN 5%. b. Intermediate Range channels indicate a negative startup rate. c. GO TO Step 16. Observe the CAUTION prior to Step 16.	EOP-13.0
*	BOP	8. Check SG levels: a. Verify Narrow Range level is GREATER THAN 26% [41%] in at least one SG. b. Control EFW flow to maintain Narrow Range SG levels between 26% [41%] and 60%.	EOP-13.0
	CRS	Recognizes reactor trip breakers are now open and goes to Step 16.	
CAUTION - Step 16 Boration should be continued to obtain adequate shutdown margin during subsequent actions.			EOP-13.0
	CRS	16. RETURN TO the Procedure and Step in effect.	EOP-13.0
EVALUATOR NOTE: The crew will transition back to EOP-1.0 now. The Small Break LOCA should be inserted at this point.			

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Event Description: Small Break LOCA with failures. (Major)

Time	Position	Applicant's Actions or Behavior	
BOOTH OPERATOR:		When directed - Initiate Event 7 (TRIGGER 7).	
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
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 onXCP-626 top row. b. Actuate SI using either SI ACTUATION Switch. c. GO TO Step 6.	EOP-1.0

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Event Description: Small Break LOCA with failures. (Major)

Time	Position	Applicant's Actions or Behavior

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.

EOP-1.0

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.

4 RUPTURED STEAM GENERATOR

IF a RUPTURED Steam Generator has been positively identified, THEN throttle EFW to the RUPTURED Steam Generator WHEN its Narrow Range Level is GREATER THAN 26%[41%].

5 FAULTED STEAM GENERATOR

- IF a FAULTED Steam Generator has been positively identified, THEN isolate EFW to the faulted Steam Generator as soon as possible UNLESS all three Steam Generators are FAULTED.
- IF all three Steam Generators are FAULTED, THEN throttle EFW flow to all three Steam Generators to 50 gpm.

Op Test No: NRC-ILO-16-01 Scenario # 1 Event # 7-10 Page: 39 of 53

Event Description: Small Break LOCA with failures. (Major)

Time	Position	Applicant's Actions or Behavior	
	BOP	6. Initiate ATTACHMENT 3, SI EQUIPMENT VERIFICATION.	EOP-1.0
EVALUATOR NOTE: Attachment 3 can be found on **page 48 of 53**.			
	CRS	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
BOOTH OPERATOR:		When called to rack up the breaker for the "C" Charging pump, Wait 2 minutes and tell them you are standing by to rack up the breaker for "C" Charging pump. When told to rack up the breaker for "C" Charging Pump, Wait 1 minute, and inform them that the breaker for "C" is mechanically bound and cannot be racked up.	
BOOTH OPERATOR:		If called to look at "B" Charging pump, wait 2 minutes and report back that it has a sheared shaft.	
EVALUATOR NOTE: RB Pressure will reach 12 psig, however, it will be later in the scenario in which case the crew will come back to this step.			
EVALUATOR NOTE: The crew may recognize that there are no CCW pumps running and decide to send out an operator to locally monitor Charging pump temperatures IAW AOP-118.1, Att 5. The CCW pumps should be manually started using Att 3 of EOP-1.0 at step 8 on **page 49 of 53**.			

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Event Description: Small Break LOCA with failures. (Major)

Time	Position	Applicant's Actions or Behavior	
*	RO	**Alternative Action Step:** 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. For any valve status light on XCP-6105 that is NOT bright, ensure its associated valve is closed. 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). **Candidates will have to manually open MVG-3003B.** d. Ensure both RB Spray Pumps are running. IF any RB Spray Pump will not start OR trips, THEN close MVG-3003A(B), SPRAY HDR ISOL LOOP A(B) for the AFFECTED RB Spray Pump. 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.	EOP-1.0

Op Test No: NRC-ILO-16-01 Scenario # 1 Event # 7-10 Page: 41 of 53

Event Description: Small Break LOCA with failures. (Major)

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. **(NO)** OR • With no RCP running, RCS Tcold is stable at OR trending to 557°F.	EOP-1.0
*	RO	**Alternative Action Step:** 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 26% [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 26% [41%] in at least one SG, THEN control EFW flow as necessary to stabilize RCS temperature at 557°F. c. Initiate ATTACHMENT 6, STEAM VALVE ISOLATION, while continuing with this procedure. 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. Ensure one of the following Block Valves is open unless it was closed to isolate an open PZR PORV: • MVG-8000A, RELIEF 445 A ISOL. • MVG-8000B, RELIEF 444 B ISOL.	EOP-1.0

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Event Description: Small Break LOCA with failures. (Major)

Time	Position	Applicant's Actions or Behavior	
		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
	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. **(NO)** c. RB pressure is LESS THAN 1.5 psig. **(NO)** 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
	RO	**Alternative Action Step:** 14. GO TO EOP-2.0, E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.	EOP-1.0
EVALUATOR NOTE: Crew will transition to EOP-2.0, E-1 Loss of Reactor or Secondary Coolant based on Sump levels or RB Pressure.			

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Event Description: Small Break LOCA with failures. (Major)

Time	Position	Applicant's Actions or Behavior	
	CRS	Transition to EOP-2.0, LOSS OF REACTOR OR SECONDARY COOLANT	EOP-2.0

REFERENCE PAGE FOR 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.

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.** EOP-2.0

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.**

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Event Description: Small Break LOCA with failures. (Major)

Time	Position	Applicant's Actions or Behavior	
NOTE Seal Injection flow should be maintained to all RCPs.			
	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
	BOP	2. Verify no SG is FAULTED: • No SG pressure is decreasing in an uncontrolled manner. • No SG is completely depressurized.	EOP-2.0
*	BOP	3. Check INTACT SG levels: a. Verify Narrow Range level in INTACT SGs is GREATER THAN 26% [41%]. b. Control EFW flow to maintain Narrow Range level in each INTACT SG between 26% [41%] 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
	BOP	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

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Event Description: Small Break LOCA with failures. (Major)

Time	Position	Applicant's Actions or Behavior	
*	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. **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.** b. Verify all PZR PORVs are closed. c. Verify at least one PZR PORV Block Valve is open.	EOP-2.0
	BOP	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. Verify PI-8342, INSTR AIR HDR PRESS PSIG, indicates GREATER THAN 60 psig. c. Open PVA-2659, INST AIR TO RB AIR SERV. d. Open PVT-2660, AIR SPLY TO RB.	EOP-2.0

Op Test No: NRC-ILO-16-01 Scenario # 1 Event # 7-10 Page: 46 of 53

Event Description: Small Break LOCA with failures. (Major)

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 [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 26% [41%] in at least one INTACT SG. c. RCS pressure is stable OR increasing. **NOTE - Step 10.d** **If PZR level is LESS THAN 10% [28%], the PZR should refill from SI flow after pressure is stabilized.** d. PZR level is GREATER THAN 10% [28%]. e. GO TO EOP-1.2, ES-1.1, SAFETY INJECTION TERMINATION, Step 1.	EOP-2.0
*	RO	11. Check if RB Spray should be stopped: a. Check if any RB Spray Pumps are running. b. Verify RB pressure is LESS THAN 11 psig. c. Depress both RESET TRAIN A(B) RB SPRAY. **NOTE - Step 11.d** • **RB Spray must run for a minimum of four hours.** • **Anytime RB Spray Pumps are stopped, MVG-3003A(B), SPRAY HDR ISOL LOOP A(B), should be closed for containment isolation.** d. Consult with TSC personnel concerning RB Spray System operation.	EOP-2.0

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Event Description: Small Break LOCA with failures. (Major)				
Time	Position	Applicant's Actions or Behavior		
CAUTION - Step 12 RCS pressure should be monitored. If RCS pressure decreases in an uncontrolled manner to LESS THAN 325 psig, the RHR Pumps must be manually restarted to supply water to the RCS.				EOP-2.0
*	RO	12. Check if RHR Pumps should be stopped: a. Check RCS pressure: 1. RCS pressure is GREATER THAN 325 psig. **(YES)** 2. RCS pressure is stable OR increasing. **(YES)** b. Check if any RHR Pump is running with suction aligned to the RWST. **(YES)** c. Stop any RHR Pump which is running with suction aligned to the RWST and place in Standby. **(YES)**		EOP-2.0
EVALUATOR NOTE: The scenario may be terminated when the crew secures both RHR Pumps.				

Op Test No: NRC-ILO-16-01 Scenario # 1 Event # N/A Page: 48 of 53

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. **The crew will secure the "B" Charging Pump and place it in P-T-L because of a sheared shaft.**	Attachment 3
EVALUATOR NOTE: The crew may send someone out to rack up the "C" Charging pump breaker on the "B" train. If they do so, the booth has a cue to tell them that the breaker is mechanically bound and cannot be racked up.			
	BOP	6. Ensure two RBCU Fans are running in slow speed (one per train).	Attachment 3

Op Test No: NRC-ILO-16-01 Scenario # 1 Event # N/A Page: 49 of 53

Event Description: EOP-1.0, 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 Service Water Booster Pump A is stopped. **(NO)** **Alternative Action Step:** b. GO TO Step 7.e. 7e. Verify that Service Water Booster Pump B is stopped. **(NO)** **Alternative Action Step:** e. GO TO Step 7.h. 7h. 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. **Candidates will manually start the "B" and "C" CCW pumps.**	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

Op Test No: NRC-ILO-16-01 Scenario # 1 Event # N/A Page: 50 of 53

Event Description: EOP-1.0, Attachment 3

Time	Position	Applicant's Actions or Behavior	
	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
	BOP	Report completion of Attachment 3.	Attachment 3
EVALUATOR NOTE: ATTACHMENT 3 is complete.			

Op Test No: NRC-ILO-16-01 Scenario # 1 Event # N/A Page: 51 of 53

Event Description: SOP-106, 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
	RO	2.1. Ensure at least one Reactor Coolant Pump is running.	SOP-106
	RO	2.2. Place RX COOL SYS MU switch to STOP.	SOP-106
	RO	2.3. Place RX COOL SYS MU MODE SELECT switch to BOR. **(Peer ✓)**	SOP-106
	RO	2.4. Adjust FCV-113 A&B, BA FLOW SET PT, for desired flow rate. **(Peer ✓)**	SOP-106
	RO	2.5. Set FIS-113, BA TO BLNDR FLOW, batch integrator to the desired volume. **(Peer ✓)**	SOP-106
	RO	2.6. Place RX COOL SYS MU switch to START.	SOP-106
		NOTE 2.7 Step 2.7 may be omitted when borating less than 10 gallons.	SOP-106
	RO	2.7. Place FCV-113 A&B, BA FLOW, controller in AUTO.	SOP-106
		NOTE 2.8 The AUTO setpoint dial for FCV-113A&B, BA FLOW, controller may be adjusted slowly to obtain the desired flow rate.	SOP-106
	RO	2.8. Verify the desired Boric Acid flow rate on FR-113, BA TO BLNDR GPM (F-113).	SOP-106
	RO	2.9. 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
	RO	2.10. Place RX COOL SYS MU switch to STOP.	SOP-106

Op Test No: NRC-ILO-16-01 Scenario # 1 Event # N/A Page: 52 of 53

Event Description: SOP-106, Borate Operations

Time	Position	Applicant's Actions or Behavior	
		NOTE 2.11 a. If plant conditions require repeated borations, Step 2.11 may be omitted. b. The volume in the piping between the blender and the VCT outlet is approximately 3.8 gallons.	SOP-106
		2.11. 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.**(Peer ✓)** b. Adjust FCV-168, TOTAL MU FLOW SET PT, to desired flow rate. **(Peer ✓)** c. Set FIS-168, TOTAL MU FLOW, batch integrator to desired volume. **(Peer ✓)** 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
		2.12. Place RX COOL SYS MU MODE SELECT switch to AUTO. **(Peer ✓)**	SOP-106
		2.13. Adjust FCV-168, TOTAL MU FLOW SET PT, to 7.5 (120 gpm). **(Peer ✓)**	SOP-106
		2.14. 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
		2.15. Adjust FCV-113 A & B, BA FLOW, SET PT per one of the following: a. OAP-100.6, Attachment IA, Reactivity Control Parameters. b. Desired position to ensure proper boric acid addition based on current RCS conditions.	SOP-106
		2.16. Place RX COOL SYS MU switch to START. **(Peer ✓)**	SOP-106
		2.17. 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

Op Test No: NRC-ILO-16-01	Scenario # 1	Event # N/A	Page: 53 of 53	
Event Description: SOP-101, Reactor Coolant System				
Time	Position	Applicant's Actions or Behavior		
NOTE 2.2 Operation of Pressurizer Back Up Heaters for a long period of time may result in a large integral signal built into the demand of the Pressurizer Master Pressure Controller while in automatic. In order to clear this signal, the Pressurizer Master Pressure Controller should be place in MAN and then back to AUTO.				SOP-101
	RO	2.2. Energize a set of Pressurizer Back Up Heaters. a. Place the BU GRP to be energized in the After Close position. b. Monitor RCS Pressure for proper Pressurizer Master Pressure Controller response. c. When the Pressurizer Back Up Heater Group is no longer needed, Place the BU GRP in the After Trip position.		SOP-101

Turnover Notes
Mode 1 // 75% Power // Work Week B1 // 2 Trains VU // EOOS: Green // Grid Risk: Green // FEP Risk: Red A reactor shutdown was in progress because of high vibrations on “C” CW Pump. Maintenance determined a fix and the shutdown was stopped. The Turbine is at Set Load and reactor power has been at 75% for the last 48 hours while maintenance fixed the "C" CW pump vibrations. Repair attempts have been successful. During the repairs of the “C” CW pump, Engineering noticed that a required inspection of the “A” Feedwater pump was missed during the last shutdown and is to be performed next shift. There is no concern with pump reliability but management has directed the pump be taken off line and the inspection performed. Power is to be lowered to 65% at ½% per minute IAW GOP-4B, step 3.2, to allow for an inspection on the “A” Feedwater Pump. Reactivity Plan is attached. The “B” Motor Driven EFW pump is tagged out for preventive maintenance. TS 3.7.1.2 Action a. was entered 6 hours ago when the pump was made inoperable. The maintenance activity is expected to complete 6 hours from now. The inoperability of “B” MDEFP is the cause of the FEP Risk Red. XFN-0065B-AH, REACTOR BLDG COOLING UNIT 2B EMERG FAN, was tagged out because of Breaker maintenance 2 hours ago. The maintenance is expected to take approximately 10 hours. The "C" Circulating Water Pump has a Caution Tag on it that reads "System Engineer will monitor pump vibrations while running “C” Circulating Water Pump.” Current RCS Boron concentration by chemistry is 1076 pm.

CONTROL ROOM SUPERVISOR RELIEF CHECKLIST

DATE/TIME: Today/Now

RELIEF SECTION

Turnover Notes
Mode 1 // 75% Power // Work Week B1 // 2 Trains VU // EOOS: Green // Grid Risk: Green // FEP Risk: Red
"B" MDEFP was made inoperable 6 hours ago for scheduled PM's and is expected to be returned to OPS in 6 hours.
XFN-0065B RBCU was tagged out for breaker maintenance 2 hours ago. The RBCU is expected to be returned in 10 hours.
A reactor shutdown was in progress because of high vibrations on “C” CW Pump. Maintenance determined a fix and the shutdown was stopped. The Turbine is at Set Load and reactor power has been at 75% for the last 48 hours while maintenance fixed the "C" CW pump vibrations. Repair attempts have been successful.
During the repairs of the “C” CW pump, Engineering noticed that a required inspection of the “A” Feedwater pump was missed during the last shutdown and is to be performed next shift. There is no concern with pump reliability but management has directed the pump be taken off line and the inspection performed.
Power is to be lowered to 65% at 1/2% per minute IAW GOP-4B, step 3.2, to allow for an inspection on the "A" Feedwater Pump. There is no concern with pump reliability but management has directed the pump be taken off line and the inspection performed.
The "C" Circulating Water Pump has a Caution Tag on it that reads "System Engineer will monitor pump vibrations while running “C” Circulating Water Pump".
Current RCS Boron Concentration by chemistry sample is 1076 ppm.

Offgoing Control Room Supervisor		
	Operations in progress (GOPs, SOPs, load changes, etc.):	
	Operations scheduled for oncoming shifts: (GTP-702/Tech Spec actions due - Time _____Date _____INIT____	
	GTP-702, Attachment VI.OO-1, for FEP Risk being RED. The 72 hour time limit expires in 66 hours, shift briefing is complete.	
	Plant safeguard systems in degraded status:	
	"B" MDEFP is tagged out for maintenance.	
	XFN-0065B RBCU is tagged out for maintenance.	
		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

CHG B

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	
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 Manager review	

CHG
C

REACTOR OPERATOR RELIEF CHECKLIST

DATE/TIME: Today/Now

LOG SECTION

Date	Entry

RELIEF SECTION

Turnover Notes
Evolutions and Procedures in progress:
Mode 1 // 75% Power // Work Week B1 // 2 Trains VU // EOOS: Green // Grid Risk: Green // FEP Risk: Red
"B" MDEFP was made inoperable 6 hours ago for scheduled PM's and is expected to be returned to OPS in 6 hours.
XFN-0065B RBCU was tagged out for breaker maintenance 2 hours ago. The RBCU is expected to be returned in 10 hours.
Power is to be lowered to 65% at 1/2% per minute IAW GOP-4B to allow for an inspection on the "A" Feedwater Pump. There is no concern with pump reliability but management has directed the pump be taken off line and the inspection performed.
The "C" Circulating Water Pump has a Caution Tag on it that reads "System Engineer will monitor pump vibrations while running “C” Circulating Water Pump".
Current RCS Boron Concentration by chemistry sample is 1076 ppm.

CHG E

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
Timer set for GTP-702 or other actions:	
Review of HVAC Panel.	
Review of Station Log.	
Review of Removal & Restoration Log.	
Review of Main Control Board Panels.	
Review of Generic Logs in Progress:	

CHG B

CHG E

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					"B" MDEFP tagged out for PM's
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 Manager review	

CHG C

BALANCE OF PLANT RELIEF CHECKLIST

DATE/TIME: _____

LOG SECTION

Date	Entry

RELIEF SECTION

Turnover Notes	
Evolutions and Procedures in progress:	CHG E
Mode 1 // 75% Power // Work Week B1 // 2 Trains VU // EOOS: Green // Grid Risk: Green // FEP Risk: Red	
"B" MDEFP was made inoperable 6 hours ago for scheduled PM's and is expected to be returned to OPS in 6 hours.	
Power is to be lowered to 65% at 1/2% per minute IAW GOP-4B to allow for an inspection on the "A" Feedwater	
Pump. There is no concern with pump reliability but management has directed the pump be taken off line and the	
inspection performed. The “C” Circulating Water Pump has a Caution Tag that says “System Engineer will monitor pump	
vibrations while running “C” Circulating Water Pump”. XFN-0065B RBCU was tagged out for breaker maintenance 2	
hours ago. The RBCU is expected to be returned in 10 hours.	
Current RCS Boron Concentration by chemistry sample is 1076 ppm.	

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

Oncoming Balance Of Plant	Initials	
Timer set for GTP-702 or other actions		CHG B
Review of Main Control Room Panels.		
Review of Station Log.		
Review of Removal & Restoration Log.		
Test annunciator lights (with Offgoing operator concurrence).		
Review of Generic Logs in Progress		CHG E

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 Manager review	CHG C

REACTIVITY MANAGEMENT PLAN VERIFICATION

CYCLE 24 PLAN # 2018-4 TITLE 10000 MWD/MTU 75-65%

BEACON Filenames:

Model Input:	10K_02_1076.bcn
Summary Results:	sim_10K-75-65.ls
Calibration:	nocal-ni-kbias_7K+
Power Profile:	sim_10K-75-65.lf

Initial Conditions and Assumptions

Reactor is at 75% RTP, Burnup is approximately 10000 MWD/MTU, RCS Boron is approximately 1076 ppm, D Bank is approximately 187 steps.

Transient Assumptions

Change power per Attachment II schedule

Prediction Constraints

Use control bank D and boron for reactivity compensation.
Maintain Control Bank D position at least 15 steps above RIL.

NOTE: See attached predictive trends.
BEACON predicted xenon will NOT match the xenon displayed on the plant computer.

Contact the following if there are questions about this guidance:

Reactor Engineering	**Office**	**Home/Cell**
Damon Bryson	54814	733-7618
Mike Strickland	54625	251-5767

Step Number	**Signature**	**Date**
7.40 Verify 9.0 Criteria	Signature 1	Today
7.41 RxE Verifier	Signature 2	Today
7.42 Operations Reviewer	OPS Signature	Today

COMMENTS:

REACTIVITY MANAGEMENT PLAN INPUTS

CYCLE 24 PLAN # 2018-4 TITLE 10000 MWD/MTU 75-65%

PROPOSED POWER MANEUVER

Time (hrs)	Reactor Power	Comments (e.g. control rod or boron issues, activities to be performed, holds, etc.)
Now	75%	Begin down Power
Now+30 min	65%	Complete reduction to 65%

COMMENTS - list power plateau activities, unusual operational restraints, contingency plans, alternate power history variations to address, time periods to avoid boration, etc.

Cycle 24 Simulator 10000 MWD/MTU 75-65%

Hours After Start	Rx Power	D Bank Pos	Boron PPM	Boron (gal)	Water (gal)	Total Boron (gal)	Total Water (gal)	Delta-I (%)	RAOC Band Low	RAOC Band High	Xenon Worth (pcm)	RIL Limit (steps)
0.00	75%	187	1076.0	0	0	0	0	0.42	-15.00	14.00	-2641	143
0.25	71%	182	1078.5	36	0	36	0	0.35	-16.17	15.00	-2665	135
0.50	65%	176	1081.2	63	0	99	0	0.32	-17.33	16.00	-2793	125
0.75	65%	176	1082.0	10	0	109	0	0.27	-17.33	16.00	-2752	125
1.00	65%	176	1080.3	0	135	109	135	0.29	-17.33	16.00	-2762	125
1.25	65%	176	1078.2	0	101	109	236	0.34	-17.33	16.00	-2771	125
1.50	65%	176	1076.0	0	65	109	301	0.54	-17.33	16.00	-2782	125
1.75	65%	176	1073.2	0	148	109	449	0.62	-17.33	16.00	-2786	125
2.00	65%	176	1073.8	10	0	119	449	0.67	-17.33	16.00	-2792	125
2.25	65%	176	1074.2	14	0	123	449	0.64	-17.33	16.00	-2798	125
2.50	65%	176	1074.5	11	0	134	449	0.60	-17.33	16.00	-2802	125
2.75	65%	176	1075.4	25	0	159	449	0.54	-17.33	16.00	-2806	125
3.00	65%	176	1075.9	28	0	187	449	0.49	-17.33	16.00	-2786	125
3.25	65%	176	1076.9	21	0	208	449	0.47	-17.33	16.00	-2774	125
3.50	65%	176	1076.0	14	0	222	449	0.44	-17.33	16.00	-2765	125
3.75	65%	176	1075.6	12	0	234	449	0.41	-17.33	16.00	-2747	125
4.00	65%	176	1075.0	28	0	261	449	0.38	-17.33	16.00	-2732	125

Tech Spec Ref: N/A

Procedure Ref: REP-102.001

Figure Ref: N/A

Facility: VC SUMMER U1 Scenario No: 2 Op Test No: NRC-ILO-16-01

Examiners: _____ Operators: CRS: _____

_____ RO: _____

_____ BOP: _____

Initial Conditions:
- The Reactor is at 100% power
- "B" train work week.
- "B" MDEFW pump is OOS.
- XFN-0065B RBCU is OOS.
- "C" Circulating Water Caution Tag

Turnover:
- Perform stroke test of PZR Block valves.

Critical Tasks:
- Establish EFW flow before Wide Range levels in two Steam Generators go less than 12% while in EOP-15.0, Response to Loss of Secondary Heat Sink.
- Take manual control of Pressurizer Heaters and Spray before an automatic Reactor trip/Safety Injection occur due to a PORV sticking open.

Event	Malf No.	Event Type*	Event Description
1	N/A	N-BOP, CRS	STP-127.001, PZR PORV Block valve stroke test.
2#	OVR-CW020B MAL-TUR002A MAL-TUR002B MAL-TUR002C MAL-TUR002D MAL-TUR002E	I-BOP CRS	TLO TCV-4211 Fails Open in AUTO with increased turbine vibration.
3#	MAL- FWM001B	C-BOP, CRS R-RO	Main Feedwater Pump "B" Trip
4	MAL-PRS001A VLV-RC004F	I-RO, CRS TS-CRS	PT-444 Fails low, heaters turn on, RCS pressure rises. If PORV 445A opens, it will fail open.
5#	MAL- RCS002A	C-RO, CRS TS-CRS	SG "A" Tube Leak

6	MAL- RCS002A	M-ALL	SG “A” tube leak becomes a Tube Rupture.
	MAL-EPS013 OVR-EG020B OVR-EG021B		Main Generator and Voltage Regulator Breakers fail to trip.
	PMP-EF001F		“A” Motor Driven EFW pump fails to auto start, can be started manually
	MAL-FWM003C		Turbine Driven EFW pump trips.
	PMP-AH022F PMP-AH025F PMP-AH023F		Control Room emergency Ventilation fails to start.
	VLV-FW025P VLV-FW026P VLV-FW027P		All three Feedwater isolations valves go shut.
7	MAL- MSS004A	M-ALL	SG “A” becomes faulted
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Used on previous two NRC Exams. Event 2 used on the 2016 exam, scenario 2 and event 3 was used on the 2017 exam, scenario 2. Event 5 was used on the 2017 exam, scenario 1.

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

IOA designates Immediate Operator Action steps.

***** designates Continuous Action steps.

TURNOVER:

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 “B” Motor Driven EFW pump will be inoperable for scheduled preventive maintenance. Tech Spec 3.7.1.2, Emergency Feedwater System action a (restore “B” pump within 72 hours) has been in effect for 6 hours with pump return to service is expected 6 hours from now. Train “B” RBCU, XFN-0065B is tagged out for breaker maintenance and is to be returned to service next shift. The “C” Circulating Water Pump has a Caution Tag that says “The “C” Circulating Water Pump is experiencing higher than normal vibrations, System Engineer is monitoring”. The crew will be instructed to perform STP-127.001, Pressurizer Block Valve Operability Test as soon as they take the shift.

- **PRE-LOAD**

  - OVR-AH022A
    CS-AH280 RBCU FAN 65B FAST SPEED GREEN L
    FINAL = OFF

  - OVR-AH023A
    CS-AH279 RBCU FAN 65B SLOW SPEED GREEN L
    FINAL = OFF

  - OVR-EF010A
    CS-EF02 MOTOR DRIVEN EMERG FW PP B(XPP-
    FINAL = OFF

EVENT 1: Perform Stroke test of Pressurizer Block Valves.

The crew will be prepared to take the shift and commence STP-127.001, Pressurizer Block Valve Operability Test. They will perform the test and record the appropriate data for all three Pressurizer Block valves. Once this is complete, the next event may be inserted.

EVENT 2: Failure of automatic Turbine Lube Oil Temperature Control.

- **TRIGGER 2**

  - OVR-CW020B
    TC-4211 TURBINE ROOM CLOSE CYCLE HX POT SIGNAL
    FINAL = 0

  - MAL-TUR002A
    TURBINE VIBRATION (BEARING 1)
    SEVERITY = 3.1
    RAMP = 120 sec

  - MAL-TUR002B
    TURBINE VIBRATION (BEARING 3)
    SEVERITY = 5.9
    RAMP = 120 sec

  - MAL-TUR002C
    TURBINE VIBRATION (BEARING 5)
    SEVERITY = 6.1
    RAMP = 120 sec

  - MAL-TUR002D
    TURBINE VIBRATION (BEARING 7)
    SEVERITY = 4.9
    RAMP = 120 sec

- MAL-TUR002E
  TURBINE VIBRATION (BEARING 9)
  SEVERITY = 5.2
  RAMP = 120 sec

NOTE: Trigger 13: Causes turbine bearing vibrations to lower once temperature controller is in manual and oil temperature has been raised to greater than or equal to 100°F.

- **TRIGGER 13** x11o064m==1 & x11d016m>=100

  - MAL-TUR002A
    TURBINE VIBRATION (BEARING 1)
    SEVERITY = 1.32
    RAMP = 180

  - MAL-TUR002B
    TURBINE VIBRATION (BEARING 3)
    SEVERITY = 4
    RAMP = 180

  - MAL-TUR002C
    TURBINE VIBRATION (BEARING 5)
    SEVERITY = 3.2
    RAMP = 180

  - MAL-TUR002D
    TURBINE VIBRATION (BEARING 7)
    SEVERITY = 2.9
    RAMP = 180

  - MAL-TUR002E
    TURBINE VIBRATION (BEARING 9)
    SEVERITY = 2.9
    RAMP = 180

- **TRIGGER 19** (Resets the Generator Aux Panel Alarm)

  - LOA-TUR005
    GEN AUX PNL XPN-7201 ALARM RESET

  On cue from the Examiner the Main Turbine Lube Oil control valve that automatically controls lube oil temperature will fully open. The Main Turbine lube oil temperature will lower as a result of the open control valve and Main Turbine vibrations will rise. The BOP will take manual control of the Turbine Lube Oil controller and will lower cooling flow which will raise oil temp and cause vibrations to lower.

EVENT 3: Feedwater Pump "B" trips, power reduction.

- **TRIGGER 3**

  - MAL- FWM001B
    MAIN FEEDWATER PUMP B TRIP

On cue from the Examiner, the "B" Main Feedwater pump will trip. This failure will result in 2 Main Feedwater Pumps and 4 Feedwater Booster pumps in service at 100% power. The crew will perform immediate actions of AOP-210.3, Feedwater Pump Malfunction. The procedures will require a reduction of Reactor Power to less than 91%. The CRS will implement GOP-4C, Rapid Power Reduction to direct actions needed to accomplish the power reduction. The RO and BOP will perform actions necessary to reduce power from 100% to 90%.

EVENT 4: PT-444 Fails low, heaters turn on, RCS pressure rises.

- **TRIGGER 4**

  - MAL-PRS001A
    PRESSURIZER PRESSURE CHANNEL 444 FAILURE
    FINAL = 1700

- **TRIGGER 21** X05O386R ==1 (Fails PORV 445A partially open IF it opens)

  - VLV-RC004F
    PCV00445A-RC PZR PWR REL VLV FAIL AS IS

On cue from the Examiner, PI-444 will fail low. This will cause all Pressurizer heaters to turn on and increase pressure. Pressure will continue to increase until the PORVs open or the operator takes manual control of Pressurizer heaters and spray. If the PORVs open, PCV-445A will not close. The crew must close its block valve or risk tripping the plant. The CRS will enter AOP-401.5, Pressurizer Pressure Control Channel Failure. The CRS will apply TS 3.4.4, Relief Valves, Action a, for PCV-444B being inoperable. They will need to close the associated block valve and maintain power to the block valve within 1 hour.

It took six minutes and 28 seconds until PCV-445A and PCV-445B, Pressurizer PORVs, lifted.

EVENT 5: "A" Steam Generator Tube Leak.

- **TRIGGER 5**

  - MAL- RCS002A
    STEAM GENERATOR A TUBE LEAK
    FINAL VALUE = 120 gpm
    RAMP = 30 sec

- **TRIGGER 20**

  - LOA-CND145
    MN&AUX COND VAC PP CHAR EXH DISCH VALVE – 110
    FINAL = 1

  - LOA-CND144
    MN&AUX COND VAC PUMP ATMOS DISCH VALVE – 109
    FINAL = 0
    Delay = 30 sec

On cue from the Examiner, “A” Steam Generator will develop a tube leak. The crew will enter into AOP-112.2, Steam Generator Tube Leak Not Requiring SI. The crew will isolate Letdown and stabilize Pressurizer level. The CRS will enter Tech Spec 3.6.2, Reactor Coolant System Operational Leakage, Action a. Action “a” says With any PRESSURE BOUNDARY LEAKAGE or with primary-to-secondary leakage not within limit, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours. Once the CRS has addressed Tech Specs a Tube Rupture will go in and they will then meet conditions to trip the reactor and actuate Safety Injection.

EVENT 6: "A" Steam Generator Tube Rupture.

- **PRE-LOAD**
  - MAL-EPS013
    GENERATOR BREAKER FAILS TO TRIP
  - OVR-EG020B
    CS-XE01 MAIN FIELD BREAKER CLOSE
    FINAL = TRUE
  - PMP-EF001F
    XPP0021A MOTOR DRIVEN EFW PMP A FAIL TO START
  - MAL-FWM003C
    EMERGENCY FEEDWATER PUMP C TRIP
  - PMP-AH022F
    XFN0030A CNTRL ROOM EMERG FAN A FAIL TO START
  - PMP-AH025F
    XFN0032B CNTRL ROOM VENT FAN B FAIL TO START
  - PMP-AH023F
    XFN0030B CNTRL ROOM EMERG FAN B FAIL TO START
- **TRIGGER 6**
  - MAL- RCS002A
    STEAM GENERATOR A TUBE LEAK
    FINAL VALUE = 600 gpm
    RAMP = 120 sec
  - MAL- RCS002A (new)
    STEAM GENERATOR A TUBE LEAK
    FINAL VALUE = 120 gpm
    DELETE = 24 sec
- **TRIGGER 14 (Allows CR EMERG Fan "A" to start)**
  - PMP-AH022F
    XFN0030A CNTRL ROOM EMERG FAN A FAIL TO START
    DELETE = 1 sec
    X16I036T==1

- **TRIGGER 15 (Allows XFN-32B CR EMERG Fan "B" to start)**

  - PMP-AH025F
    XFN0032B CNTRL ROOM VENT FAN B FAIL TO START
    DELETE = 1 sec
    X16I037T==1

- **TRIGGER 16 (Allows XFN-30B CR EMERG Fan "B" to start)**

  - PMP-AH023F
    XFN0030B CNTRL ROOM EMERG FAN B FAIL TO START
    DELETE = 1 sec
    X16I038T==1

- **TRIGGER 17 (Allows the Generator Breaker to be opened)**

  - MAL-EPS013(NEW)
    GENERATOR BREAKER FAILS TO TRIP
    DELETE = 1 sec
    X12I072T == 1

- **TRIGGER 18 (Starts the Diesel Air Compressor.)**

  - LOA-AUX130
    DIESEL AIR COMPRESSOR LOCAL CONTROL
    FINAL = START

On cue from the Examiner, "A" Steam Generator will develop a tube leak. The crew will enter into AOP-112.2, Steam Generator Tube Leak Not Requiring SI. The crew will attempt to control Pressurizer level and then meet conditions to trip the reactor and actuate Safety Injection. Once the crew starts the second Charging pump or says they are going to trip the reactor, a Feed Water Isolation will occur driving SG water levels less than 26% causing a red path on heatsink. The crew will make their way through EOP-1.0, E-0 Reactor Trip or Safety Injection. The Main Generator and Voltage Regulator breakers will not trip and they must manually trip them. The "A" Motor Driven Emergency Feedwater Pump will fail to auto start and will need to be manually started. The Turbine Driven Emergency Feedwater Pump will trip. The crew will then transition to EOP-4.0, E-3 Steam Generator Tube Rupture.

.

EVENT 7: Steam Generator "A" becomes faulted outside containment.

- **TRIGGER 7** X10I019R == 1(Automatically puts in the SG "A" Fault when they cooldown)

  - MAL- MSS004A
    STEAM GENERATOR A Fault(outside containment)
    FINAL VALUE = 140,000 lbm/hr

- **TRIGGER 22**

  - VLV-FW025P
    XVG01611A-FW FEEDWTR ISO VLV A FAIL POSITION
    FINAL = 0

  - VLV-FW026P
    XVG01611B-FW FEEDWTR ISO VLV B FAIL POSITION
    FINAL = 0

  - VLV-FW027P
    XVG01611C-FW FEEDWTR ISO VLV C FAIL POSITION
    FINAL = 0

  Once the crew starts their cooldown in EOP-4.0, "A" SG will automatically become faulted. After the cooldown, the crew will analyze the faulted Steam Generators pressure and see it is within 250 psig of the intact Steam Generators. The crew will transition to EOP-4.2, ECA-3.1 SGTR With Loss of Reactor Coolant Subcooled Recovery Desired at this point.

CRITICAL TASKS:

- Establish EFW flow before Wide Range levels in two Steam Generators go less than 12% while in EOP-15.0, Response to Loss of Secondary Heat Sink.
- Take manual control of Pressurizer Heaters and Spray before an automatic Reactor trip/Safety Injection occur due to a PORV sticking open.

TERMINATION:

The scenario may be terminated once the crew has depressurized and refilled the Pressurizer in EOP-4.2, ECA-3.1 SGTR With Loss of Reactor Coolant Subcooled Recovery Desired.

Scenario Attributes		Events
Total Malfunctions (5-8)	10	· PT-444 Fails low. · TLO TCV-4211 Fails Open in AUTO · “B” Main Feedwater Pump trip. · SG “A” develops a tube leak. · SG “A” develops a tube rupture. · Main Generator and Voltage Regulator Breakers fail to trip. · Motor Driven EFW Pump “A” shaft shear. · Turbine Driven EFW pump fails to auto start. · SG “A” becomes faulted. · Control Room Emergency Ventilation doesn't start automatically.
Malfunctions after EOP entry (1-2)	4	· Main Generator and Voltage Regulator Breakers fail to trip. · “A” Motor Driven EFW pump develops a sheared shaft. · Turbine Driven EFW pump fails to auto start. · Control Room Emergency Ventilation doesn't start automatically.
Abnormal Events (2-4)	4	· PT-444 Fails low. · TLO TCV-4211 Fails Open in AUTO · “B” Main Feedwater Pump trip. · SG “A” tube leak.
Major Transients (1-2)	2	· SG “A” tube leak that becomes ruptured. · SG “A” becomes faulted.
EOPs Entered (1-2)	2	· EOP-4.0, E-3 Steam Generator Tube Rupture. · EOP-4.2, ECA-3.1 SGTR With Loss of Reactor Coolant Subcooled Recovery Desired.
EOP Contingencies (0-2)	1	· EOP-4.2, ECA-3.1 SGTR With Loss of Reactor Coolant Subcooled Recovery Desired.
Critical Tasks (2-3)	2	· Establish EFW flow before Wide Range levels in two Steam Generators go less than 12% while in EOP-15.0, Response to Loss of Secondary Heat Sink. · Take manual control of Pressurizer Heaters and Spray before an automatic Reactor trip/Safety Injection occur due to a PORV sticking open.

SIMULATOR SCENARIO SETUP

INITIAL CONDITIONS:

- IC Set 301
- 100% Power, MOL
- Burnup = 10,030 MWD/MTU
- RCS Boron Concentration = 993 ppm
- FCV-113 Pot Setting = 4.28
- Rod Position: Group D = 228
- Tavg = 587.4˚F
- Prior to the scenario, the crew should pre-brief conditions and their expectations for the shift.

PRE-EXERCISE:

- Ensure simulator has been checked for hardware problems (DORT, burnt out light bulbs, switch malfunctions, chart recorders, etc.).
- Complete VCS-TQP-0807 Attachment I-A, Unit 1 Booth Instructor Checklist.
- Verify plant aligned for "B1" work week IAW PTP-101.004, Safety Related Train Swap Checklist.
- Verify red Placard on “A” CCW Pump and “B” Charging Pump.
- Verify red hold tag and R&R tag on "B" MDEFW Pump **AND** XFN-0065B RBCU and ensure they are in P-T-L. XFN-65B Fast speed can’t be taken to P-T-L.
- Verify a Caution Tag is on the “C” Circulating Water Pump that reads “The “C” Circulating Water Pump is experiencing higher than normal vibrations, System Engineer is monitoring”.
- Verify the Hard Card for Turbine operation is in its proper storage location and cleaned.
- Verify the Hard Card for borating via MVT-8104 is in its proper storage location and cleaned.
- Verify Rod Bank Update set correctly: 228 steps on all Banks.
- Update EOOS for “B” MDEFW Pump being out of service.
- Ensure you have the following procedure:
    - STP-127.001, PRESSURIZER BLOCK VALVE OPERABILITY TEST
- Ensure you have a turnover sheet for each position.
- Conduct two-minute drill.

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 1 Page: 12 of 60

Event Description: Perform STP-127.001, Pressurizer Block Valve Operability Test.

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: The crew will have briefed the stroke test of the Pressurizer Block Valves prior to assuming the watch.			
BOOTH OPERATOR:		No TRIGGERS for this event.	
Indications Available: N/A			
NOTE 6.3, 6.4, 6.5 To prevent preconditioning, the Block Valves open and closed exercises may be performed out of sequence.			STP-127.001
	BOP	6.3. Stroke test XVG08000A-RC, PRZ PWR OPER RELIEF INLET ISOL VLV, as follows: a. Verify PCV-445A, PWR RELIEF, is closed. **(PEER ✓)** b. Close MVG-8000A, RELIEF 445A ISOL, and measure the stroke time to the nearest 0.1 second, from switch actuation until the closed light is lit and the open light goes out. *c. Record the stroke time for XVG08000A-RC, PRZ PWR OPER RELIEF INLET ISOL VLV, on Attachment I. d. Open MVG-8000A, RELIEF 445A ISOL, and measure the stroke time to the nearest 0.1 second, from switch actuation until the open light is lit and the closed light goes out. *e. Record the stroke time for XVG08000A-RC, PRZ PWR OPER RELIEF INLET ISOL VLV, on Attachment I.	STP-127.001
	BOP	6.4. Stroke test XVG08000B-RC, PRZ PWR OPER RELIEF INLET ISOL VLV, as follows: a. Verify PCV-444B, PWR RELIEF, is closed. **(PEER ✓)** b. Close MVG-8000B, RELIEF 444B ISOL, and measure the stroke time to the nearest 0.1 second, from switch actuation until the closed light is lit and the open light goes out. *c. Record the stroke time for XVG08000B-RC, PRZ PWR OPER RELIEF INLET ISOL VLV, on Attachment I. d. Open MVG-8000B, RELIEF 444B ISOL, and measure the stroke time to the nearest 0.1 second, from switch actuation until the open light is lit and the closed light goes out. *e. Record the stroke time for XVG08000B-RC, PRZ PWR OPER RELIEF INLET ISOL VLV, on Attachment I.	STP-127.001

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 1 Page: 13 of 60

Event Description: Perform STP-127.001, Pressurizer Block Valve Operability Test.

Time	Position	Applicant's Actions or Behavior	
	BOP	6.5. Stroke test XVG08000C-RC, PRZ PWR OPER RELIEF INLET ISOL VLV, as follows: a. Verify PCV-445B, PWR RELIEF, is closed. **(PEER ✓)** b. Close MVG-8000C, RELIEF 445B ISOL, and measure the stroke time to the nearest 0.1 second, from switch actuation until the closed light is lit and the open light goes out. *c. Record the stroke time for XVG08000C-RC, PRZ PWR OPER RELIEF INLET ISOL VLV, on Attachment I. d. Open MVG-8000C, RELIEF 445B ISOL, and measure the stroke time to the nearest 0.1 second, from switch actuation until the open light is lit and the closed light goes out. *e. Record the stroke time for XVG08000C-RC, PRZ PWR OPER RELIEF INLET ISOL VLV, on Attachment I.	STP-127.001
	BOP	*6.6. Perform a REQUIRED OPERABLE POSITION equipment lineup per Attachment II.	STP-127.001
	RO	*6.7. Perform a REQUIRED OPERABLE POSITION equipment lineup independent verification per Attachment II.	STP-127.001

EVALUATOR NOTE: The next event may be inserted following completion of the PORV Block Valve test, or at any time per the discretion of the Lead Examiner.

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 2 Page: 14 of 60

Event Description: Failure of automatic Turbine Lube Oil Temperature Control.

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: The automatic temperature controller for the Main Turbine lube oil control valve will fail causing the flow control valve to fully open. The Main Turbine lube oil temperature will lower as a result of the open control valve and Main Turbine vibrations will rise. The BOP will take manual control of the Turbine Lube Oil controller and will lower cooling flow which will raise oil temp and cause vibrations to lower. Once the event is put in, it takes approximately 2 minutes until you get the first alarm.			
BOOTH OPERATOR:		When directed - Initiate Event 2 (TRIGGER 2).	
Available Indications: XCP-632, 1-4, TURB SUPERVISORY INSTR. XCP-632, 4-2, MN TURB VIB HI.			
	BOP	Respond to ANNUNCIATOR XCP-632, 4-2, MN TURB VIB HI.	
	BOP	1. Evacuate all unnecessary personnel from the Turbine Building.	XCP-632, 4-2
	BOP	2. Monitor Main Turbine vibration levels: a. At the HMI: Select Monitor and as applicable: 1. LP Hoods TEMP 2. Lube – Hyd Oil. 3. Vibration. 4. Prox. b. IPCS, type in TURBRG.	XCP-632, 4-2
	BOP	SPEED / TRIP IMMEDIATELY IF JOURNAL 1-8 VIBRATION EXCEEDS / TRIP IMMEDIATELY IF JOURNAL 9-10 VIBRATION EXCEEDS LESS THAN 800 RPM: 8 MILS / 8 MILS 800-1800 RPM: 11 MILS / 9 MILS 3. If any of the above vibration trip conditions are exceeded, perform the following: a. Trip the Main Turbine. b. Implement AOP-214.1 while monitoring for indications of imminent Turbine damage per Step 4.	XCP-632, 4-2

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 2 Page: 15 of 60

Event Description: Failure of automatic Turbine Lube Oil Temperature Control.

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: The highest bearing vibration is Bearing 5 at 6.1 mils per the scenario design. The lowest vibration level that calls for turbine trip is 9 mils on bearing 9 or 10.			
	BOP	5. If a Turbine trip is **NOT** required perform the following: a. Monitor TI-4211, TURB OIL CLR TEMP °F, to determine if Turbine oil temperature is in the normal operating range between 100°F and 120°F. b. If required, change Turbine load per SOP-214 to reduce vibration levels. c. Dispatch an operator to verify oil flow to Turbine bearings. d. Monitor IPCS Group Display (TSI). e. On the Turbine HMI, select Monitor/LP Hoods and monitor Exhaust Hood A/B Temperature. f. Verify proper MSR operation per SOP-204.	XCP-632, 4-2
	BOP	Supplemental Actions: 2. Refer to SOP-215 for abnormal oil temperature control.	XCP-632, 4-2
BOOTH OPERATOR:		• Call up the TURBRG screen in SIPCS and be prepared to report back Bearing Oil temperatures as displayed when called. • When contacted to check Main Turbine oil cooler conditions wait 2 minutes and report as an AO; "All bearing oil temperatures are reading (as displayed) °F"	XCP-632, 4-2
BOOTH OPERATOR:		If called to reset the GEN AUX PNL alarm, insert TRIGGER 19 and report back that the GEN AUX PNL alarm has been reset.	

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Event Description: Failure of automatic Turbine Lube Oil Temperature Control.

Time	Position	Applicant's Actions or Behavior	
	BOP	2.2. If TI-4211, TURB OIL CLR TEMP °F, reads less than 100°F, perform the following: a. Verify temperature on the following (TB-436): 1. ITI15633, MN TB LUBE OIL CLR LO INLET TEMP IND. 2. ITI15634, MN TB LUBE OIL CLR LO OUT TEMP IND. 3. ITI04197, MAIN TURB OIL CLR A TC OUTLET TEMP IND. 4. ITI04207, MAIN TURB OIL CLR B TC OUTLET TEMP IND. b. Verify the position of ITV04211-TC, TURBINE OIL CLR TC OUTLET TEMP CONT VLV, and perform the following as necessary (TB-412): 1. If the valve is not fully closed, take manual control of the valve and restore temperature to normal.	SOP-215
BOOTH OPERATOR:		When contacted about ITV-4211 position, wait 2 minutes and report as an AO: "Valve appears to be fully open with no obvious problem with the operator".	
EVALUATOR NOTE: After the BOP takes manual control of the TLO Temp Controller and restores TLO temp (control in manual with Lube Oil temp > 100°F) high turbine vibrations will ramp back to normal. The next Event may be inserted after Turbine Lube Oil Temperature control has been re-established or at any time per the discretion of the Lead Examiner.			

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 3 Page: 17 of 60

Event Description: Main Feedwater Pump "B" Trip, down power to 90%.

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: The "B" Main Feedwater pump will trip. This failure will result in 2 Main Feedwater Pumps and 4 Feedwater Booster pumps in service at 100% power. The crew will refer to XCP-625 2-1, which will require a reduction of Reactor Power to less than 91%.			
BOOTH OPERATOR:		When directed - Initiate Event 3 (TRIGGER 3).	
Indications Available: XCP-625 2-1, FWP A/B/C TRIP XCP-624 1-5, SG A LVL DEV XCP-624 2-5, SG A LVL DEV XCP-624 3-5, SG A LVL DEV			
	CRS	Enters ARP-001- XCP-625 2-1.	XCP-625 2-1
	CRS	CORRECTIVE ACTIONS: 1. Reduce Reactor power per GOP-4C, Rapid Power Reduction, below the following limits: a. With 2 Feedwater Pumps in operation, 91% Reactor power. 2. Go to AOP-210.3, Feedwater Pump Malfunction.	XCP-625 2-1
			XCP-625 2-1

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 3 Page: 18 of 60

Event Description: Main Feedwater Pump "B" Trip, down power to 90%.

Time	Position	Applicant's Actions or Behavior

REFERENCE PAGE FOR AOP-210.3

1 MAIN FEEDWATER REGULATING VALVE MANUAL CONTROL

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 LOSS OF MAIN FEEDWATER FLOW

IF Feedwater flow is lost while Reactor Power is GREATER THAN 10%, and cannot be quickly restored from the MCB, THEN Trip the reactor and GO TO EOP-1.0, E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1.

3 STEAM GENERATOR LEVEL CONTROL

a. IF Narrow Range Steam Generator Level decreases to LESS THAN 40% in any SG, THEN Trip the reactor and GO TO EOP-1.0, E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1.

b. IF Reactor Power is GREATER THAN 15% and Narrow Range Steam Generator Level exceeds 75% in any SG, THEN Trip the reactor and GO TO EOP-1.0, E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1.

4 MAIN FEED PUMP SPEED CONTROL

IF IPT00464 has failed with the Steam Dumps in Steam Pressure Mode, THEN Trip the reactor and GO TO EOP-1.0, E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1.

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 3 Page: 19 of 60

Event Description: Main Feedwater Pump "B" Trip, down power to 90%.

Time	Position	Applicant's Actions or Behavior	
IOA	BOP	1. Verify at least one Feedwater Pump is running.	AOP-210.3
IOA	BOP	2. Check if a Feedwater Pump trip has occurred.	AOP-210.3
IOA	BOP	3. GO TO Step 14.	AOP-210.3
BOOTH OPERATOR:		When called to check out "B" Main Feedwater Pump, wait 2 minutes and report back "The pump is tripped with no visible problems".	
*	BOP	14. Verify Narrow Range Steam Generator Level in all Steam Generators is GREATER THAN 40%.	AOP-210.3
	BOP	15. Verify two Feedwater Pumps are running.	AOP-210.3
	CRS	16. Reduce Reactor Power to LESS THAN 91% Reactor Power at a maximum rate of 3%/minute. REFER TO GOP-4C, RAPID POWER REDUCTION.	AOP-210.3
*	BOP	17. Verify Narrow Range Steam Generator Levels are stable at or trending to 60%.	AOP-210.3
	BOP	18. Verify the high pressure and low pressure stop valves close on the AFFECTED Feedwater Pump (GRAPHIC 310 SCREEN).	AOP-210.3
	BOP	19. Verify proper operation of the AFFECTED Feedwater Pump Turning Gear: a. Check if the Feedwater Pump Turbine is stopped. b. Ensure the Feedwater Pump Turning Gear is engaged and running.	AOP-210.3
	BOP	20. Place Main Feed Regulating valves in AUTO.	AOP-210.3
	BOP	21. Restore Main Feedwater System to pre-event conditions. a. Determine and correct the cause of the Feedwater Pump trip. b. Start the AFFECTED Feedwater Pump.	AOP-210.3
	CRS	Enters GOP-4C, RAPID POWER REDUCTION.	

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 3 Page: 20 of 60

Event Description: Main Feedwater Pump "B" Trip, down power to 90%.

Time	Position	Applicant's Actions or Behavior	
		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.	GOP-4C
		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
EVALUATOR NOTE: The boration volume required will be in accordance with Reactivity Plans provided at turnover. The crew may use MVT-8104 and Emergency Borate. Procedure guidance for emergency borating is found in SOP-106, **page 57 of 60**. If the crew uses SOP-106 to borate, procedure guidance for borating is found in SOP-106, Reactor Makeup Water System is included in this scenario guide beginning at **page 53 of 60**.			

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 3 Page: 21 of 60

Event Description: Main Feedwater Pump "B" Trip, down power to 90%.

Time	Position	Applicant's Actions or Behavior	
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	3.1. Commence rapid Plant Shutdown as follows: 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	3.1. Commence rapid Plant Shutdown as follows: 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
	BOP	3.2. Continue Rapid Plant Shutdown as follows: a. Adjust Megavars using GEN FIELD VOLT ADJ to maintain less than 300 MVARS.	GOP-4C

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 3 Page: 22 of 60

Event Description: Main Feedwater Pump "B" Trip, down power to 90%.

Time	Position	Applicant's Actions or Behavior	
BOOTH OPERATOR:		If called to adjust Blowdown Cooler flow use the following remotes: • LOA-CND044, COND TO S/G BD TC-3062A AUTO-MANUAL MODE SELECTOR - position to MANUAL • LOA-CND045, COND TO S/G BD TC-3062B AUTO-MANUAL MODE SELECTOR - position to MANUAL • LOA-CND046, COND TO S/G BD TC-3062C AUTO-MANUAL MODE SELECTOR - position to MANUAL • LOA-CND-047, COND TO S/G BD TV-3062A MANUAL POSITION – adjust final value to obtain flow as directed. • LOA-CND-048, COND TO S/G BD TV-3062B MANUAL POSITION – adjust final value to obtain flow as directed. • LOA-CND-049, COND TO S/G BD TV-3062C MANUAL POSITION – adjust final value to obtain flow as directed.	GOP-4C
	BOP	3.2. Continue Rapid Plant Shutdown as follows: b. When Reactor Power is less than 90% reduce to two operating Feedwater Pumps by placing the desired FWP A(B)(C) TRIP/RESET switch in TRIP (MCB).	GOP-4C
NOTE 3.2.c It is preferred to maintain D FWBP in operator for better Start-Up drain flow.			GOP-4C
	BOP	3.2. Continue Rapid Plant Shutdown as follows: c. When only two Main Feedwater Pumps are operating reduce to three Feedwater Booster Pumps.	GOP-4C
	BOP	3.2. Continue Rapid Plant Shutdown as follows: d. Perform one of the following: 1. Adjust ITV-3062A(B)(C), BD COOLER A(B)(C) CDSTE OUT TEMP to raise total Blowdown heat exchanger flow to between 1000 gpm and 1100 gpm (AB-436'). OR 2. Secure Steam Generator Blowdown per SOP-212.	GOP-4C
	BOP	3.2. Continue Rapid Plant Shutdown as follows: e. Adjust FC-3136, FLOW TO DEAERATOR setpoint, to maintain DA level between 2.5 and 5.0 feet narrow range level (raising potentiometer set point raises DA level).	GOP-4C
EVALUATOR NOTE: The next event may be inserted following completion of the power reduction, or at any time per the discretion of the Lead Examiner.			

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 4 Page: 23 of 60

Event Description: PT-444 failing LOW.

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: PT-444 will fail LOW causing Pressurizer Heaters to turn on and RCS pressure to rise.			
BOOTH OPERATOR:		When directed - Initiate Event 4 (TRIGGER 4).	
Indications Available: XCP-616, 3-6, PZR PCS LO BU HTRS ON			
	CRS	Enters AOP-401.5, Pressurizer Pressure Control Channel Failure.	AOP-401.5
NOTE Throughout this procedure, "AFFECTED" refers to any PZR PORV that is controlled by the failed instrument.			AOP-401.5
IOA	RO	1. Verify the PZR PORVs are closed: • PCV-445A, PWR RELIEF. • PCV-445B, PWR RELIEF. • **PCV-444B, PWR RELIEF. (AFFECTED PORV)**	AOP-401.5
IOA	RO	2. Check if PI-444, CNTRL CHAN PRESS PSIG, indication is NORMAL. **(NO)**	AOP-401.5
IOA CRITICAL TASK	RO	**Alternative Action Step:** 2. IF PT-444 is failed, THEN perform the following: a. Place both PZR Spray Valves in MAN and closed: • PCV-444C, PZR SPRAY. • PCV-444D, PZR SPRAY. b. Place the PZR PRESS MASTER CONTROL in MAN. c. Operate the PZR Heaters and Spray Valves in manual to control RCS pressure between 2220 psig and 2250 psig.	AOP-401.5
EVALUATOR NOTE: Crews may control spray valves in manual independently or may place them in Auto and control them using the Master Pressure Controller in Manual.			
	RO	3. Ensure ROD CNTRL BANK SEL Switch is in AUTO.	AOP-401.5
	RO	4. Place the switch for the AFFECTED PZR PORV(s) in CLOSE: • PCV-445A, PWR RELIEF. • PCV-445B, PWR RELIEF. • **PCV-444B, PWR RELIEF. (AFFECTED PORV)**	AOP-401.5
NOTE - Step 5 Operations management decision is to conservatively declare the AFFECTED PORV(s) inoperable.			AOP-401.5

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 4 Page: 24 of 60

Event Description: PT-444 failing LOW.

Time	Position	Applicant's Actions or Behavior	
	RO	5. Within one hour of the instrument failure, close the affected PORV Block Valve: • MVG-8000A, RELIEF 445 A ISOL. • MVG-8000C, RELIEF 445 B ISOL. • **MVG-8000B, RELIEF 444 B ISOL. (AFFECTED PORV BLOCK Valve)**	AOP-401.5
	RO	6. If plant conditions allow, place the PZR Spray Valves in AUTO: • PCV-444C, PZR SPRAY. • PCV-444D, PZR SPRAY.	AOP-401.5
*	RO	7. Maintain RCS pressure between 2220 psig and 2250 psig.	AOP-401.5
	CRS	8. Notify the I&C Department to determine and correct the cause of the channel failure.	AOP-401.5
	CRS	9. WHEN the failed channel has been returned to service, THEN continue with this procedure.	AOP-401.5
	CRS	Enters T.S. 3.4.4, Relief Valves, Action a: With one or more PORV(s) inoperable and capable of being manually cycled, within 1 hour: 1. restore the PORV(s) to OPERABLE status or 2. close the associated block valve(s) and maintain power to the block valve; Otherwise, be in at least HOT STANDBY Within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.	Tech Specs
EVALUATOR NOTE: The next event may be inserted following the CRS assessment of Tech Specs, or at any time per the discretion of the Lead Examiner.			

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 5 Page: 25 of 60

Event Description: Tube Leak on SG "A"

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: "A" SG will develop a tube leak.			
BOOTH OPERATOR:		When directed - Initiate Event 5 (TRIGGER 5).	
Available Indications: XCP-646 2-1, MN STM LINE RM-G19 HI RAD XCP-646 3-1, MN STM LINE RM-G19A TRBL			
	CRS	Enters AOP-112.2, Steam Generator Tube Leak Not Requiring SI.	
		NOTE • Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN. • Due to N-16 gamma radiation effects, RM-G19A(B)(C), STMLN HI RNG GAMMA, will display elevated readings and should not be used for classification of EAL while the Reactor is critical.	AOP-112.2
*	RO	1. Check if PZR level can be maintained: a. Fully open FCV-122, CHG FLOW. b. Verify PZR level is STABLE OR INCREASING. **(NO)** c. Control FCV-122, CHG FLOW, as necessary to maintain PZR level.	AOP-112.2
*	RO	**Alternative Action Step:** 1. Check if PZR level can be maintained: b. Perform the following: 1. Isolate Letdown as follows: a. Close PVT-8149A(B)(C), LTDN ORIFICE A(B)(C) ISOL. 2. IF PZR level continues to decrease, THEN perform the following: a. Start a second CCW pump. b. Start a second Charging Pump. **Once the Tube Rupture goes in, the crew will come back to step 1 and will start a second CCW pump and a second Charging pump.**	AOP-112.2
BOOTH OPERATOR:		If called to align Condenser Exhaust Gas to Aux Building Charcoal Exhaust, Wait 2 minutes, insert TRIGGER 20 and report back that "Condenser Exhaust Gas is aligned to Aux Building Charcoal Exhaust".	

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Event Description: Tube Leak on SG "A"

Time	Position	Applicant's Actions or Behavior	
*	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 isolated. OR • PZR level is approaching 8%. OR • PZR pressure is approaching 1870 psig.	AOP-112.2
*	RO	3. Verify VCT level is being maintained between 20% and 40%.	AOP-112.2
	CRS	4. IF Steam Generator primary to secondary tube leakage has not been determined, THEN perform the following: a. Estimate the RCS leak rate. Refer to IPCS CHGNET. b. Calculate the RCS leak rate. REFER TO STP-114.002, OPERATIONAL LEAK TEST. c. Comply with the applicable Tech Spec 3.4.6.2 action statement.	AOP-112.2
	CRS	Enters Tech Spec 3.6.2. RCS Operational Leakage, Action a: With any PRESSURE BOUNDARY LEAKAGE or with primary-to-secondary leakage not within limit, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.	Tech Specs
	CRS	5. Notify Chemistry to sample all SG secondary sides for activity.	AOP-112.2
	BOP	6. Check if RM-A9 is available.	AOP-112.2
	CRS	7. GO TO Step 12.	AOP-112.2
	CRS	12. Check if Steam Generator Tube Leakage is GREATER THAN OR EQUAL TO 75 gpd (0.05 gpm) using one of the following: • UR1019, S/G LEAKAGE FROM RMA9 (in gpd). OR • RM-A9, using the RM-A9 Total Count Rate vs. Calculated Primary to Secondary Leakrate graph.	AOP-112.2
*		13. Evaluate plant shutdown requirements per ATTACHMENT 3, PLANT SHUTDOWN REQUIREMENTS BASED ON RMA-9 EVALUATION.	AOP-112.2

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 5 Page: 27 of 60

Event Description: Tube Leak on SG "A"

Time	Position	Applicant's Actions or Behavior

PLANT SHUTDOWN REQUIREMENTS BASED ON RMA-9 EVALUATION

IPCS METHOD (Preferred)

Steam Generator primary to secondary tube leakage rate, and rate of increase, is represented by the following IPCS Computer points:

- UR1019, S/G LEAKAGE FROM RMA9 (in GPD)
- UR1019-R, S/G LEAKAGE FROM RMA9-RATE (in GPD/HR)

1. Obtain the Steam Generator Tube Leakage rate of change from the IPCS.
2. Determine the shutdown requirements using Steam Generator Tube Leakage rate of change to the flow chart and table on page 2.

RM-A9 METER (IPCS not available)

1. Obtain the RM-A9 Total Count Rate vs. Calculated Primary to Secondary Leakrate graph from the RAD MON SETPOINTS AND VALVE LOCATIONS book in the Control Room.
2. Record initial RM-A9 reading: _____ CPM.
3. Using the RM-A9 Total Count Rate vs. Calculated Primary to Secondary Leakrate graph, convert the RM-A9 initial reading to the initial Leakrate: _____ GPD.
4. Wait 15 minutes.
5. Record 15 minute RM-A9 reading: _____ CPM.
6. Using the RM-A9 Total Count Rate vs. Calculated Primary to Secondary Leakrate graph, convert the RM-A9 15 minute reading to the 15 minute Leakrate: _____ GPD.
7. Determine the Steam Generator Tube Leakage rate of change in GPD/HR:

   a. Calculate the rate of Steam Generator Tube Leakage change in a 15 minute period:

   _____ - _____ =_____ GPD/15 min.
   (15 minute Leakrate - initial Leakrate) = GPD/15 min.

   b. Multiply the GPD/15 min. leakrate change by 4:

   _____ * 4 =_____ GPD/HR.
   GPD/15 min. * 4 = GPD/HR

8. Determine the shutdown requirements using Steam Generator Tube Leakage rate of change to the flow chart and table on page 2.

AOP-112.2, Attachment 3

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 5 Page: 28 of 60

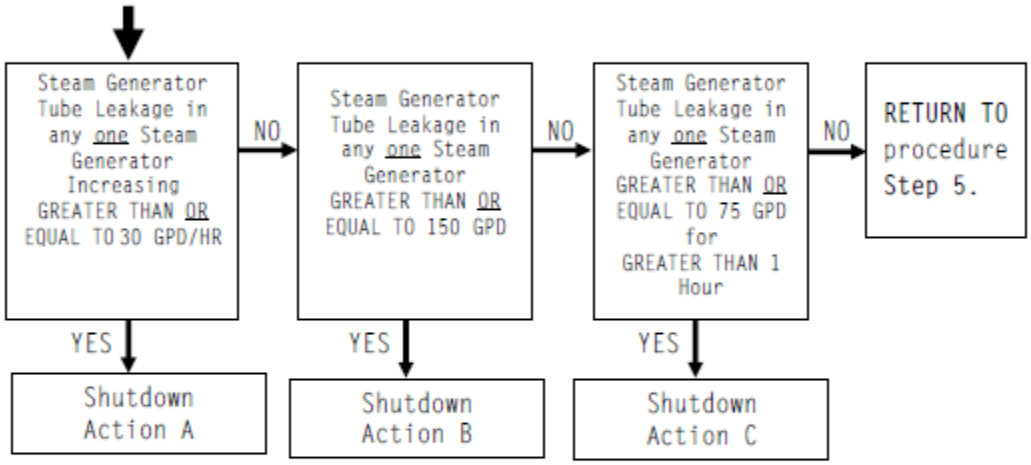
Event Description: Tube Leak on SG "A"

Time	Position	Applicant's Actions or Behavior

PLANT SHUTDOWN REQUIREMENTS BASED ON RMA-9 EVALUATION

NOTE: If unable to determine leakage from individual steam generators, the total leakage is assumed to be coming from one steam generator.

Start Here:



AOP-112.2, Attachment 3

Shutdown Action	Requirement:
A	Be ≤ 50% power within one hour at 1% or 3% per minute and be in Mode 3 within the next two hours. (Total of three hours)
B	Be in Mode 3 within six hours at 1/2% or 1% per minute.
C	Be in Mode 3 within 23 hours at 1/2% or 1% per minute. (Total of 24 hours after exceeding 75 GPD)

EVALUATOR NOTE: The next event may be initiated once the CRS has addressed Tech Specs or at any time per the discretion of the Lead Evaluator.

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 6 Page: 29 of 60

Event Description: SG Tube Rupture on "A" SG.

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: "A" SG will develop a tube rupture.			
BOOTH OPERATOR:		When directed - Initiate Event 6 (TRIGGER 6).	
Available Indications: Pressurizer Level/Pressure lowering. "A" SG level rising uncontrollably.			
*	CRS/RO	Applies continuous action step 1 of AOP-112.2: 1. Check if PZR level can be maintained: a. Fully open FCV-122, CHG FLOW. b. Verify PZR level is STABLE OR INCREASING. **(NO)**	AOP-112.2
*	RO	**Alternative Action step:** b. Perform the following: 1. Isolate Letdown as follows: a. Close PVT-8149A(B)(C), LTDN ORIFICE A(B)(C) ISOL. 2. IF PZR level continues to decrease, THEN perform the following: a. Start a second CCW pump. b. Start a second Charging Pump. **Once the Tube Rupture goes in, the crew will come back to step 1 and will start a second CCW pump and a second Charging pump.**	AOP-112.2
*	CRS	Applies continuous action step 2 of AOP-112.2: 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 isolated. OR • PZR level is approaching 8%. OR • PZR pressure is approaching 1870 psig.	AOP-112.2

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 6 Page: 30 of 60

Event Description: SG Tube Rupture on "A" SG.

Time	Position	Applicant's Actions or Behavior	
	CRS	Step 2 continued: b. Perform the following: 1. Trip the Reactor. 2. GO TO EOP-1.0, E-0, REACTOR TRIP OR SAFETY INJECTION. WHEN EOP-1.0, E-0, REACTOR TRIP OR SAFETY INJECTION Immediate Actions are complete, THEN actuate SI.	AOP-112.2
	CRS	Enters EOP-1.0, E-0 Reactor Trip or Safety Injection	EOP-1.0
NOTE Steps 1 through 5 are Immediate Operator Actions.			EOP-1.0
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. **(NO)** 2. Ensure the GEN FIELD BKR is open. **(NO)** 3. Ensure the EXC FIELD CNTRL is tripped. **(NO)** **Candidates will have to manually open the GEN BKR and the GEN FIELD BKR. The EXC FIELD CONTRL breaker will open when the GEN FIELD BKR is opened.**	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-1.0
EVALUATOR NOTE: Candidates may transition out of EOP-1.0 at Step 4 if they do not manually SI based on the tube rupture that is in. They will have a red path on Heat Sink and transition to EOP-15.0. EOP-15.0 can be found on **page 59 of 60.**			

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 6 Page: 31 of 60

Event Description: SG Tube Rupture on "A" SG.

Time	Position	Applicant's Actions or Behavior

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.

EOP-1.0

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.

4 RUPTURED STEAM GENERATOR

IF a RUPTURED Steam Generator has been positively identified, THEN throttle EFW to the RUPTURED Steam Generator WHEN its Narrow Range Level is GREATER THAN 26%[41%].

5 FAULTED STEAM GENERATOR

- IF a FAULTED Steam Generator has been positively identified, THEN isolate EFW to the faulted Steam Generator as soon as possible UNLESS all three Steam Generators are FAULTED.
- IF all three Steam Generators are FAULTED, THEN throttle EFW flow to all three Steam Generators to 50 gpm.

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 6 Page: 32 of 60

Event Description: SG Tube Rupture on "A" SG.

Time	Position	Applicant's Actions or Behavior	
	BOP	6. Initiate ATTACHMENT 3, SI EQUIPMENT VERIFICATION.	EOP-1.0
EVALUATOR NOTE: EOP-1.0, Attachment 3 can be found on **page 50 of 60.**			
	CRS	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. **(NO)** OR • With no RCP running, RCS Tcold is stable at OR trending to 557°F.	EOP-1.0
*	RO	**Alternative Action Step:** 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 26% [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 26% [41%] in at least one SG, THEN control EFW flow as necessary to stabilize RCS temperature at 557°F. c. Initiate ATTACHMENT 6, STEAM VALVE ISOLATION, while continuing with this procedure. 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

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 6 Page: 33 of 60

Event Description: SG Tube Rupture on "A" SG.

Time	Position	Applicant's Actions or Behavior	
	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. Ensure one of the following Block Valves is open unless it was closed to isolate an open PZR PORV: • MVG-8000A, RELIEF 445 A ISOL. • MVG-8000B, RELIEF 444 B ISOL.	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
	RO	12. Verify no SG is FAULTED: • No SG pressure is decreasing in an uncontrolled manner. • No SG is completely depressurized.	EOP-1.0

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 6 Page: 34 of 60

Event Description: SG Tube Rupture on "A" SG.

Time	Position	Applicant's Actions or Behavior	
	RO	13. Verify Secondary radiation levels indicate SG tubes are NOT RUPTURED: • RM-G19A(B)(C), STMLN HI RNG GAMMA. **(NO)** • 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
	CRS	**Alternative Action Step:** 13. GO TO EOP-4.0, E-3 STEAM GENERATOR TUBE RUPTURE, Step 1.	EOP-1.0
	CRS	Enters EOP-4.0, E-3 STEAM GENERATOR TUBE RUPTURE.	

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 6 Page: 35 of 60

Event Description: SG Tube Rupture on "A" SG.

Time	Position	Applicant's Actions or Behavior

REFERENCE PAGE FOR EOP-4.0

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, can NOT be maintained GREATER THAN 52.5°F [67.5°F].

OR

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

IF SI Reinitiation occurs after procedure Step 28, THEN GO TO EOP-4.2, ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED, Step 1.

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, E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1, unless it is needed for RCS cooldown.

EOP-4.0

3 COLD LEG RECIRCULATION TRANSITION CRITERION

IF RWST level decreases to LESS THAN 18%, THEN GO TO EOP-2.2, ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4 MULTIPLE TUBE RUPTURE CRITERIA

IF any INTACT SG level increases in an uncontrolled manner OR any INTACT SG has abnormal radiation, THEN stop any cooldown or depressurization in progress and RETURN TO EOP-4.0, E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

5 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.

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 6 Page: 36 of 60

Event Description: SG Tube Rupture on "A" SG.

Time	Position	Applicant's Actions or Behavior	
NOTE Seal Injection flow should be maintained to all RCPs.			EOP-4.0
	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. **(NO)**	EOP-4.0
	CRS	**Alternative Action Step:** a. GO TO Step 2. Observe the NOTE prior to Step 2.	EOP-4.0
NOTE - Step 2 Cycling of multiple PZR PORVs should be minimized to conserve operating air.			EOP-4.0
	RO	2. Perform the following: a. Check if both of the following are available: • PCV-445A, PWR RELIEF. • PCV-444B, PWR RELIEF. b. Close one of the following: • PCV-445A, PWR RELIEF. • PCV-444B, PWR RELIEF.	EOP-4.0

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 6 Page: 37 of 60

Event Description: SG Tube Rupture on "A" SG.

Time	Position	Applicant's Actions or Behavior	
CAUTION - Step 3 Radiation levels may have increased in steamlines. Proper radiological precautions must be taken when obtaining samples to minimize personnel exposure.			EOP-4.0
	BOP	3. Identify the RUPTURED SG(s): • Narrow Range level in any SG increasing in an uncontrolled manner. OR • High Radiation on any of the following: a. RM-G19A(B)(C), STMLN HI RNG GAMMA. b. Local hand held radiation monitor readings taken by Health Physics on the blowdown lines at the following penetrations: • XRP0326, SG A Blowdown Line (AB-412 West Pen). • XRP0224, SG B Blowdown Line (IB-412 East Pen). • XRP0219, SG C Blowdown Line(IB-412 East Pen). OR • As determined by Chemistry sample analysis for abnormal activity using a frisker.	EOP-4.0
	BOP	4. For each RUPTURED SG, initiate the appropriate isolation attachment: • ATTACHMENT 1A, ISOLATION OF A STEAM GENERATOR	EOP-4.0
EVALAUTOR NOTE: Attachment 1A can be found on **page 58 of 60.**			
	CRS	5. Locally, start XAC0014, Diesel Driven Air Compressor. REFER TO SOP-220, STATION AND BACKUP INSTRUMENT AIR SYSTEMS (YD-436).	EOP-4.0
BOOTH OPERATOR:		When requested to locally start the Diesel Driven Air Compressor, Wait 2 minutes, Insert **TRIGGER 18** and report back that the Diesel Driven Air Compressor is running.	
CAUTION - Step 6 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-4.0
NOTE - Step 6 If the TD EFW Pump is tripped, it should be reset as time permits.			EOP-4.0

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 6 Page: 38 of 60

Event Description: SG Tube Rupture on "A" SG.

Time	Position	Applicant's Actions or Behavior	
	CRS	6. IF SG B OR SG C is RUPTURED, THEN perform the following: a. IF at least one MD EFW Pump is running, THEN isolate the TD EFW Pump by placing PVG-2030, STM SPLY TO TD EFP TRN A(B), to CLOSE. b. Notify local Operators to perform Alternative Action Step 6, while continuing with this procedure.	EOP-4.0
		CAUTION - Step 7 If any RUPTURED SG is FAULTED, feed flow to that SG should remain isolated during subsequent recovery actions unless needed for RCS cooldown, to prevent excessive cooldown due to the FAULT.	EOP-4.0
	BOP	7. Check level in each RUPTURED SG: a. Verify Narrow Range level in each RUPTURED SG is GREATER THAN 26%[41%]. b. Stop EFW flow to each RUPTURED SG: 1. Close FCV-3531(3541)(3551), MD EFP TO SG A(B)(C). 2. Close FCV-3536(3546)(3556), TD EFP TO SG A(B)(C). 3. Maintain Narrow Range level in each RUPTURED SG GREATER THAN 26%[41%].	EOP-4.0
		CAUTION - Step 8 The major flowpaths from each RUPTURED SG (MSIV, TD EFW Pump, and PORV) must be isolated before performing Step 8, to minimize radiological releases and ensure RCS subcooling is maintained.	EOP-4.0
	BOP	8. Verify each RUPTURED SG pressure is GREATER THAN 460 psig.	EOP-4.0
	CRS	9. Determine the required core exit TC temperature for RCS cooldown from the table below:	EOP-4.0

LOWEST RUPTURED SG PRESS (PSIG)	CORE EXIT TC TEMP (°F)	CONTROLLER SETPOINT
1101-1200	494 [478]	4.9
1001-1100	482 [466]	4.4
901-1000	469 [453]	3.8
801-900	455 [439]	3.4
701-800	439 [423]	2.8
601-700	421 [405]	2.3
460-600	392 [376]	1.6

	RO	10. Check if any RCP is running.	EOP-4.0

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 7 Page: 39 of 60

Event Description: SG Tube Rupture on "A" SG that becomes faulted during the cooldown.

Time	Position	Applicant's Actions or Behavior	
		NOTE - Step 11 Before the Low Steamline Pressure SI signal is blocked, Main Steam Isolation will occur if the Low Steam Pressure rate setpoint is exceeded.	EOP-4.0
	BOP	11. Dump steam from each INTACT SG: a. WHEN RCS Tavg is LESS THAN P-12 (552°F), THEN: • Place both STM DUMP INTERLOCK Switches to BYP INTLK. • Place both STMLN SI TRAIN A(B) Switches to BLOCK. b. Dump steam from each INTACT SG to the Condenser: 1. Verify PERMISV C-9 status light is bright on XCP-6114 1-3. 2. Perform the following: • Verify the MS Isolation Valves, PVM-2801A(B)(C), are open for the INTACT SGs. OR • IF the RUPTURED SG(s) MSIV is closed, THEN open MS Isolation Bypass Valves : a. Depress both MAIN STEAM ISOL VALVES RESET TRAIN A(B). b. Open MS Isolation Bypass Valves, PVM-2869A(B)(C), for only the INTACT SGs. 3. Place the STM DUMP CNTRL Controller in MAN and closed. 4. Place the STM DUMP MODESELECT Switch in STM PRESS. 5. Adjust the STM DUMP CNTRL Controller to fully open the Bank 1 Steam Dump Valves, (Approximately 14% Demand).	EOP-4.0
		NOTE - Step 12 Steps 14 through 20 should be performed as time permits, while the cooldown is in progress.	EOP-4.0
	RO	12. Verify core exit TC temperature is LESS THAN the value determined in Step 9. **(NO)**	EOP-4.0

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 7 Page: 40 of 60

Event Description: SG Tube Rupture on "A" SG that becomes faulted during the cooldown.

Time	Position	Applicant's Actions or Behavior	
	CRS	**Alternative Action Step:** 12. WHEN core exit TC temperature is LESS THAN the value determined in Step 9, THEN COMPLETE Step 13. Observe the NOTE prior to Step 13. CONTINUE WITH Step 14.	EOP-4.0
EVALUATOR NOTE: Once the cooldown has started, the failure for the faulted SG will automatically go in. This will allow them to transition out to EOP-4.2 when the ruptured SG pressure decreases to less than 250 psig above the intact SG(s) used for cooldown.			
	BOP	14. Check INTACT SG levels: a. Verify Narrow Range level in INTACT SGs is GREATER THAN 26% [41%]. b. Control EFW flow to maintain Narrow Range level in INTACT SGs between 40% and 60%.	EOP-4.0
	RO	15. 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. **CAUTION - Step 15.b** **If any PZR PORV opens because of high PZR pressure, Step 15.b should be repeated after pressure decreases to LESS THAN 2330 psig, to ensure the PORV recloses.** b. Verify all PZR PORVs are closed. c. Check if PCV-445A, PWR RELIEF switch is in close. d. Ensure MVG-8000A, RELIEF 445 A ISOL, is Open e. GO TO Step 16.	EOP-4.0
	RO	16. Reset both SI RESET TRAIN A(B) Switches.	EOP-4.0
	RO	17. Reset Containment Isolation: • RESET PHASE A - TRAIN A(B) CNTMT ISOL. • RESET PHASE B - TRAIN A(B) CNTMT ISOL.	EOP-4.0
	RO	18. Establish Instrument Air to the RB: a. Open PVA-2659, INST AIR TO RB AIR SERV. b. Open PVT-2660, AIR SPLY TO RB.	EOP-4.0

Op Test No: NRC-ILO-16-01 Scenario # 2 Event # 7 Page: 41 of 60

Event Description: SG Tube Rupture on "A" SG that becomes faulted during the cooldown.

Time	Position	Applicant's Actions or Behavior	
		CAUTION - Step 19 RCS pressure should be monitored. If RCS pressure decreases in an uncontrolled manner to LESS THAN 325 psig, the RHR Pumps must be manually restarted to supply water to the RCS.	EOP-4.0
*	RO	19. Check if RHR Pumps should be stopped: a. Check if any RHR Pump is running with suction aligned to the RWST. b. Verify RCS pressure is GREATER THAN 325 psig. c. Stop any RHR Pump which is running with suction aligned to the RWST and place in Standby.	EOP-4.0
	BOP	20. Verify core exit TC temperature is LESS THAN the value determined in Step 9.	EOP-4.0
	BOP	21. Stop the RCS cooldown: a. Stop the RCS cooldown to the Condenser: 1. Adjust the STM DUMP CNTRL Controller to closed. 2. Adjust the setpoint to maintain core exit TC temperature LESS THAN the required temperature per Step 9. 3. Place the STM DUMP CNTRL Controller in AUTO. **NOTE - Step 21.b** **With no RCPs running, it may be necessary to manually open steam dumps or Steamline PORVs to maintain desired TC temperature.** b. Adjust controller setpoints as necessary to maintain core exit TC temperature LESS THAN the required temperature per Step 9.	EOP-4.0
	BOP	22. Verify each RUPTURED SG pressure is stable OR increasing. **(NO)**	EOP-4.0
	BOP	**Alternative Action Step:** 22. Monitor SG pressures. IF any RUPTURED SG pressure decreases to LESS THAN 250 psi above the INTACT SG(s) used for cooldown, THEN GO TO EOP-4.2, ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED, Step 1.	EOP-4.0
EVALUATOR NOTE: The crew may not diagnose the faulted SG at this point, If this happens, they will continue on in EOP-4.0 and eventually be redirected back to step 8. Steps 23-27 are included in case this happens. If they do transition to EOP-4.2 here, go to **page 44 of 60.**			

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Event Description: SG Tube Rupture on "A" SG that becomes faulted during the cooldown.

Time	Position	Applicant's Actions or Behavior	
		NOTE - Step 23 Subcooling may have been temporarily lost during the RCS cooldown, but should quickly increase when the cooldown is complete. If subcooling increases sufficiently after stopping the cooldown, the transition to EOP-4.2, ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED, is NOT required.	EOP-4.0
	RO	23. Verify RCS subcooling on TI-499A(B), A(B) TEMP °F, is GREATER THAN 72.5°F [87.5°F].	EOP-4.0
	RO	24. Depressurize the RCS using Normal PZR Spray at the maximum rate: a. Establish Normal PZR Spray: • Using RCP A: 1. Open PCV-444D, PZR SPRAY. 2. Close PCV-444C, PZR SPRAY, if RCP C is NOT running. • Using RCPs B and C: 1. Open PCV-444C, PZR SPRAY. 2. Close PCV-444D, PZR SPRAY, if RCP A is NOT running. b. Use maximum available spray until any one of the following criteria is met: • RCS pressure is LESS THAN RUPTURED SG(s) pressure AND PZR level is GREATER THAN 10% [28%]. OR • RCS pressure is WITHIN 300 psig of RUPTURED SG(s) pressure AND PZR level is GREATER THAN 40% [50%]. OR • PZR level is GREATER THAN 76% [69%]. OR • RCS subcooling on TI-499A(B), A(B) TEMP °F, is LESS THAN 52.5°F [67.5°F]. c. Stop RCS depressurization: 1. Close both PCV-444C(D), PZR SPRAY. 2. Close PVT-8145, PZR SPRAY FR CVCS. d. GO TO Step 27. Observe the CAUTION prior to Step 27.	EOP-4.0

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Event Description: SG Tube Rupture on "A" SG that becomes faulted during the cooldown.

Time	Position	Applicant's Actions or Behavior	
CAUTION - Step 27 When SI termination criteria are met, SI must be terminated to prevent overfilling the RUPTURED SG(s).			EOP-4.0
	RO	27. Check if SI flow should be terminated: a. RCS subcooling on TI-499A(B), A(B) TEMP °F, is GREATER THAN 52.5°F [67.5°F]. **(YES)** b. Secondary Heat Sink is adequate: • Total EFW flow available to INTACT SGs is GREATER THAN 450 gpm. **(YES)** OR • Narrow Range SG level is GREATER THAN 26% [41%] in at least one INTACT SG. **(YES)** c. RCS pressure is stable OR increasing. **(YES)** d. PZR level is GREATER THAN 10% [28%]. **(NO)**	EOP-4.0
	CRS	**Alternative Action Step:** 27.d. RETURN TO Step 8. Observe the CAUTION prior to Step 8.	EOP-4.0

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Event Description: SG Tube Rupture on "A" SG that becomes faulted during the cooldown.

Time	Position	Applicant's Actions or Behavior	
		REFERENCE PAGE FOR EOP-4.2 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]. 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, E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1, unless it is needed for RCS cooldown. 3 COLD LEG RECIRCULATION TRANSITION CRITERION IF RWST level decreases to LESS THAN 18%, THEN GO TO EOP-2.2, ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1. 4 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-4.2
	CRS	Enters EOP-4.2, ECA-3.1 SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED.	EOP-4.2
	RO	1. Reset both SI RESET TRAIN A(B) Switches.	EOP-4.2
	RO	2. Reset Containment Isolation: • RESET PHASE A - TRAIN A(B) CNTMT ISOL. • RESET PHASE B - TRAIN A(B) CNTMT ISOL.	EOP-4.2
	BOP	3. Place both ESF LOADING SEQ A(B) RESETS to: a. NON-ESF LCKOUTS. b. AUTO-START BLOCKS.	EOP-4.2

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Event Description: SG Tube Rupture on "A" SG that becomes faulted during the cooldown.

Time	Position	Applicant's Actions or Behavior	
	RO	4. Establish Instrument Air to the RB: a. Start one Instrument Air Compressor and place the other in Standby. b. Verify PI-8342, INSTR AIR HDR PRESS PSIG, indicates GREATER THAN 60 psig. c. Open PVA-2659, INST AIR TO RB AIR SERV. d. Open PVT-2660, AIR SPLY TO RB.	EOP-4.2
*	BOP	5. Verify all AC buses are energized by offsite power: • ESF AC buses. • BOP AC buses.	EOP-4.2
CAUTION - Step 6 PZR Heaters should NOT be energized until PZR water level is GREATER THAN the minimum level recommended by TSC personnel to ensure the heaters are covered.			EOP-4.2
	RO	6. Deenergize PZR Heaters: a. Place both BU GRP 1(2) Switches in PULL TO LK NON-A. b. Secure the CNTRL GRP Heaters. c. Consult TSC personnel for a minimum indicated PZR water level that will ensure heaters are covered.	EOP-4.2
*	RO	7. Check if RB Spray should be stopped: a. Check if any RB Spray Pumps are running. **(NO)**	EOP-4.2
	CRS	**Alternative Action Step:** 7.a. GO TO Step 8. Observe the CAUTION prior to Step 8.	
CAUTION - Step 8 If any RUPTURED SG is FAULTED, feed flow to that SG should remain isolated during subsequent recovery actions unless needed for RCS cooldown, to prevent excessive cooldown due to the FAULT.			EOP-4.2
*	BOP	8. Check level in each RUPTURED SG: a. Verify Narrow Range level in each RUPTURED SG is GREATER THAN 26% [41%]. b. Stop EFW flow to each RUPTURED SG: 1. Close FCV-3531(3541)(3551), MD EFP TO SG A(B)(C). 2. Close FCV-3536(3546)(3556), TD EFP TO SG A(B)(C). 3. Maintain Narrow Range level in each RUPTURED SG GREATER THAN 26% [41%].	EOP-4.2

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Event Description: SG Tube Rupture on "A" SG that becomes faulted during the cooldown.

Time	Position	Applicant's Actions or Behavior	
		CAUTION - Step 9 RCS pressure should be monitored. If RCS pressure decreases in an uncontrolled manner to LESS THAN 325 psig, the RHR Pumps must be manually restarted to supply water to the RCS.	EOP-4.2
*	RO	9. Check if RHR Pumps should be stopped: a. Check if any RHR Pump is running with suction aligned to the RWST. b. Check RCS pressure: • RCS pressure is GREATER THAN 325 psig. • RCS pressure is stable OR increasing. c. Stop any RHR Pump which is running with suction aligned to the RWST and place in Standby.	EOP-4.2
	CRS	10. Verify radiation levels are normal outside the RB: a. Check the Radiation Monitoring System. b. Notify Health Physics to survey for activity levels and for radioactive leakage.	EOP-4.2
	RO/CRS	11. Obtain necessary Chemistry samples: a. Ensure all the following sample valves are in AUTO: • SVX-9364B and SVX-9365B, RCS LP B SMPL ISOL. • SVX-9364C and SVX-9365C, RCS LP C SMPL ISOL. • SVX-9398A(B)(C), SG A(B)(C) SMPL ISOL. b. Notify Chemistry to sample the following: • RCS. • All SGs for isotopic activity.	EOP-4.2
	CRS	12. Consult with TSC personnel to determine what additional equipment will be required for cooldown.	EOP-4.2
	BOP	13. Verify no SG is FAULTED: • No SG pressure is decreasing in an uncontrolled manner. **(NO)** • No SG is completely depressurized.	EOP-4.2
	BOP	**Alternative Action Step:** Verify each FAULTED SG has been isolated unless needed for RCS cooldown. IF any FAULTED SG has NOT been isolated, THEN GO TO EOP-3.0, E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.	EOP-4.2

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Event Description: SG Tube Rupture on "A" SG that becomes faulted during the cooldown.

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: Crew may transition to EOP-3.0, E-2 Faulted Steam Generator Isolation; however, it is not necessary since this steam generator has already been isolated. If the crew does transition, EOP-3.0 can be found on **page 55 of 60.**			
*	BOP	14. Check INTACT SG levels: a. Verify Narrow Range level in INTACT SGs is GREATER THAN 26% [41%]. b. Control EFW flow to maintain Narrow Range level in INTACT SGs between 40% [41%] and 60%.	EOP-4.2

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Event Description: SG Tube Rupture on "A" SG that becomes faulted during the cooldown.

Time	Position	Applicant's Actions or Behavior	
		NOTE - Step 15 • Before the Low Steamline Pressure SI signal is blocked, Main Steam Isolation will occur if the Low Steam Pressure rate setpoint is exceeded. • Shutdown margin should be monitored during RCS cooldown.	EOP-4.2
	BOP	15. Initiate RCS cooldown to Cold Shutdown: a. Maintain the cooldown rate in the RCS Cold Legs LESS THAN 100°F/hr. b. Use the RHR System if it is in service. REFER TO SOP-115, RESIDUAL HEAT REMOVAL. c. WHEN RCS Tavg is LESS THAN P-12 (552°F), THEN: • Place both STM DUMP INTERLOCK Switches to BYP INTLK. • Place both STMLN SI TRAIN A(B) Switches to BLOCK. **NOTE - Step 15.d** **If no INTACT SG is available, TSC personnel should be consulted to determine a release rate prior to using a RUPTURED SG.** d. Dump steam from each INTACT SG to the Condenser: 1. Verify PERMISV C-9 status light is bright on XCP-6114 1-3. 2. Perform the following: • Verify the MS Isolation Valves, PVM-2801A(B)(C), are open for the INTACT SGs. OR • Open MS Isolation Bypass Valves: a. Depress both MAIN STEAM ISOL VALVES RESET TRAIN A(B). b. Open MS Isolation Bypass Valves, PVM-2869A(B)(C), for only the INTACT SGs. 3. Place the STM DUMP CNTRL Controller in MAN and closed. 4. Place the STM DUMP MODE SELECT Switch in STM PRESS. 5. Adjust the STM DUMP CNTRL Controller to establish the desired cooldown rate.	EOP-4.2

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Event Description: SG Tube Rupture on "A" SG that becomes faulted during the cooldown.

Time	Position	Applicant's Actions or Behavior	
*	RO/BOP	16. Check if a subcooled recovery is appropriate: a. Verify RWST level is GREATER THAN 59%. b. Verify Narrow Range level in each RUPTURED SG is LESS THAN 90% [83%].	EOP-4.2
	RO	17. Verify RCS subcooling on TI-499A(B), A(B) TEMP °F, is GREATER THAN 52.5°F [67.5°F].	EOP-4.2
		18. Check if the SI System is in service: • Any Charging Pump is running with flow indicated on FI-943, CHG LOOP B CLD/HOT LG FLOW GPM. OR • Any RHR pump running in the SI Mode with flow indicated on: • FI-605A, RHR DISCHARGE PUMP A FLOW GPM. • FI-605B, RHR DISCHARGE PUMP B FLOW GPM.	EOP-4.2
NOTE - Step 19 If no RCP is running, the Reactor Vessel Head Upper Plenum may void during depressurization resulting in a rapidly increasing PZR level.			EOP-4.2
		19. Depressurize the RCS to refill the PZR: a. Establish Normal PZR Spray: • Using RCP A: 1. Open PCV-444D, PZR SPRAY. 2. Close PCV-444C, PZR SPRAY. OR • Using RCPs B and C: 1. Open PCV-444C, PZR SPRAY. 2. Close PCV-444D, PZR SPRAY. b. Verify PZR level is GREATERTHAN 22% [39%]. c. Stop RCS depressurization.	EOP-4.2
EVALUATOR NOTE: The scenario may be terminated at any point after they have refilled the Pressurizer.			

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Event Description: EOP 1.0, Attachment 3

Time	Position	Applicant's Actions or Behavior	
CRITICAL TASK	BOP	1. Ensure EFW Pumps are running: a. Ensure both MD EFW Pumps are running. **(NO)** b. Verify the TD EFW Pump is running if necessary to maintain SG levels. **Candidates will have to manually actuate "A" MDEFW Pump because it will not start automatically as expected. The candidates will also recognize that the Turbine Driven EFW pump has tripped.**	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

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Event Description: EOP 1.0, 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 Service Water Booster Pump A is stopped. **(NO)** **Alternative Action Step:** b. GO TO Step 7.e. 7e. Verify that Service Water Booster Pump B is stopped. **(NO)** **Alternative Action Step:** e. GO TO Step 7.h. 7h. 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. **Candidates will recognize that Control Room Emergency Ventilation did not start and have to manually start it. They will manually start XFN-30A, XFN-32B and XFN-30B.**	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

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Event Description: EOP 1.0, Attachment 3

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

EVALUATOR NOTE: ATTACHMENT 3 is complete.

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Event Description: SOP-106, Reactor Makeup Water System.

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
	RO	2.1. Ensure at least one Reactor Coolant Pump is running.	SOP-106
	RO	2.2. Place RX COOL SYS MU switch to STOP.	SOP-106
	RO	2.3. Place RX COOL SYS MU MODE SELECT switch to BOR. **(Peer ✓)**	SOP-106
	RO	2.4. Adjust FCV-113 A&B, BA FLOW SET PT, for desired flow rate. **(Peer ✓)**	SOP-106
	RO	2.5. Set FIS-113, BA TO BLNDR FLOW, batch integrator to the desired volume. **(Peer ✓)**	SOP-106
	RO	2.6. Place RX COOL SYS MU switch to START.	SOP-106
NOTE 2.7 Step 2.7 may be omitted when borating less than 10 gallons.			SOP-106
	RO	2.7. Verify desired flow rate on FR-113, TOTAL MU GPM (F-168).	SOP-106
NOTE 2.8 The AUTO setpoint dial for FCV-113A&B, BA FLOW, controller may be adjusted slowly to obtain the desired flow rate.			
	RO	2.8. Verify the desired Boric Acid flow rate on FR-113, BA TO BLNDR GPM (F-113).	SOP-106
	RO	2.9. 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
	RO	2.10. Place RX COOL SYS MU switch to STOP.	SOP-106
NOTE 2.11 a. If plant conditions require repeated borations, Step 2.11 may be omitted. b. The volume in the piping between the blender and the VCT outlet is approximately 3.8 gallons.			SOP-206

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Event Description: SOP-106, Reactor Makeup Water System.

Time	Position	Applicant's Actions or Behavior	
	RO	2.11. 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. **(Peer ✓)** b. Adjust FCV-168, TOTAL MU FLOW SET PT, to desired flow rate. **(Peer ✓)** c. Set FIS-168, TOTAL MU FLOW, batch integrator to desired volume. **(Peer ✓)** 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
	RO	2.12. Place RX COOL SYS MU MODE SELECT switch to AUTO. **(Peer ✓)**	SOP-106
	RO	2.13. Adjust FCV-168, TOTAL MU FLOW SET PT, to 7.5 (120 gpm). **(Peer ✓)**	SOP-106
	RO	2.14. 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
	RO	2.15. Adjust FCV-113 A & B, BA FLOW, SET PT per one of the following: a. OAP-100.6, Attachment IA, Reactivity Control Parameters. b. Desired position to ensure proper boric acid addition based on current RCS conditions.	SOP-106
	RO	2.16. Place RX COOL SYS MU switch to START. **(Peer ✓)**	SOP-106
	RO	2.17. 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

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Event Description: EOP-3.0, E-2 Faulted Steam Generator Isolation

Time	Position	Applicant's Actions or Behavior	
		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
	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
	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(488)(498). • FW Isolation, PVG-1611A(B)(C). • SG Blowdown, PVG-503A(B)(C). • FW Flow Control Bypass, FCV-3321(3331)(3341).	EOP-3.0
	BOP	5. Complete the isolation of each FAULTED SG: a. Close SG Chemical Feed Isolation, MVK-1633A(B)(C). b. Close MS Drain Isolation, PVT-2843A(B)(C). c. Close MS Drain Isolation, PVT-2877A for SG A, PVT-2877B for SG C. d. Place the Steamline PWR RELIEF A(B)(C) SETPT Controller(s) in MAN and closed. e. Place the Steamline Power Relief A(B)(C) Mode Switch(s) in PWR RLF. f. Close FCV-3531(3541)(3551), MD EFP TO SG A(B)(C). g. Close FCV-3536(3546)(3556), TD EFP TO SG A(B)(C). h. Locally unlock and close XVGO1017A(B)(C)-EF, SG A(B)(C) MTR DR EF PUMP SUPPLY HEADER VALVE (IB-423). i. Locally unlock and close XVG01018A(B)(C)-EF. SG A(B)(C) TURB DR EF PUMP SUPPLY HDR VALVE (IB-423).	EOP-3.0

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Event Description: EOP-3.0, E-2 Faulted Steam Generator Isolation

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
	BOP	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. **(NO)** • RM-L3, STEAM GENERATOR BLOWDOWN LIQUID MONITOR. • RM-L10, SG BLOWDOWN CW DISCHARGE LIQUID MONITOR. • RM-A9, CNDSR EXHAUST GAS ATMOS MONITOR. b. Notify Chemistry to sample all SG secondary sides, and screen samples for abnormal activity using a frisker.	EOP-3.0
	CRS	**Alternative Action Step:** 6. GO TO EOP-4.0, E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.	EOP-3.0

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Event Description: SOP-106, Emergency Boration

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
	RO	2.1. Open MVT-8104, EMERG BORATE. **(Peer ✓)**	SOP-106
	RO	2.2. Ensure XPP-13A(B), BA XFER PP A(B), is running.	SOP-106
	RO	2.3. Verify greater than 30 gpm flow on FI-110, EMERG BORATE FLOW GPM.	SOP-106
	RO	2.4. When boration is no longer required, perform the following: a. Close MVT-8104, EMERG BORATE. **(Peer ✓)** b. Verify no flow on FI-110, EMERG BORATE FLOW GPM.	SOP-106

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Event Description: EOP-4.0, Attachment 1A, Isolation of "A" Steam Generator

Time	Position	Applicant's Actions or Behavior	
	BOP	1. Isolate flow from each RUPTURED SG: a. Place the PWR RELIEF A SETPT Controller in MAN and closed. b. Adjust the PWR RELIEF A SETPT Controller to 8.85 (1150 psig). c. Place the A Steamline Power Relief Mode Switch in PWR RLF. d. Place the PWR RELIEF A SETPT Controller in AUTO. e. WHEN RCS Tavg is LESS THAN P-12 (552°F), THEN place both STM DUMP INTERLOCK Switches to BYP INTLK. f. Verify the A Steamline PORV closed. g. Close the following for each RUPTURED SG: • SG Blowdown, PVG-503A, A ISOL. • MS Drain Isolation, PVT-2843A, A DRN ISOL. • MS Drain Isolation, PVT-2877A, A DRN ISOL. h. Close the following for each RUPTURED SG: • MS Isolation Valve, PVM-2801A, A ISOL VLV. • MS Isolation Bypass Valve, PVM-2869A, A BYP VLV.	EOP-4.0, Attachment 1A

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Event Description: EOP-15.0, Response to Loss of Secondary Heat Sink

Time	Position	Applicant's Actions or Behavior	
	CRS	Enters 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
	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
	BOP	2. Check if LESS THAN two Steam Generators are FAULTED.	EOP-15.0
	RO	3. 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	4. 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 5 through 17 If Wide Range level in any two SGs is LESS THAN 12% [20%] OR PZR pressure is GREATER THAN 2330 psig due to loss of secondary heat sink, Steps 18 through 25 should be immediately initiated for bleed and feed cooling.			EOP-15.0
	RO	5. Ensure the following valves are closed: • SG Blowdown, PVG-503A(B)(C). • SG Sample, SVX-9398A(B)(C).	EOP-15.0
NOTE - Step 6 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: EOP-15.0, Response to Loss of Secondary Heat Sink

Time	Position	Applicant's Actions or Behavior	
	BOP	6. 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. **CAUTION - Step 6.a.4)** • **EFW valves should NOT be opened to SGs with Wide Range level LESS THAN 12% [20%].** • **If Wide Range level in all SGs is LESS THAN 12% [20%], EFW valves should be open to only one SG, until RCS temperatures are decreasing, to limit any failure to one SG.** 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). b. Try to restore any EFW flow. **Candidate will start the "A" Motor Driven EFW Pump.** c. Check total EFW flow to SGs GREATER THAN 450 gpm. **(YES)**	EOP-15.0
	CRS	7. RETURN TO the Procedure and Step in effect.	EOP-15.0

Turnover Notes
Mode 1 // 100% Power // Work Week B1 // 2 Trains VU // EOOS: Green // Grid Risk: Green // FEP Risk: Red
The “B” Motor Driven EFW pump is tagged out for preventive maintenance. TS 3.7.1.2 Action a. was entered 6 hours ago when the pump was made inoperable. The maintenance activity is expected to complete 6 hours from now. The inoperability of “B” MDEFP is the cause of the FEP Risk Red.
XFN-0065B-AH, REACTOR BLDG COOLING UNIT 2B EMERG FAN, was tagged out for breaker maintenance 2 hours ago. The maintenance is expected to take approximately 10 hours.
The BOP is to perform STP-127.001, Pressurizer Block Valve Operability Test once you have taken the shift.
The “C” Circulating Water Pump has a Caution Tag that says “The “C” Circulating Water Pump is experiencing higher than normal vibrations, System Engineer is monitoring”.
Current RCS Boron concentration by chemistry is 993 ppm.

CONTROL ROOM SUPERVISOR RELIEF CHECKLIST

DATE/TIME: Today/Now

RELIEF SECTION

Turnover Notes
Mode 1 // 100% Power // Work Week B1 // 2 Trains VU // EOOS: Green // Grid Risk: Green // FEP Risk: Red
"B" MDEFP was made inoperable 6 hours ago for scheduled PM's and is expected to be returned to OPS in 6 hours.
XFN-0065B RBCU was tagged out for breaker maintenance 2 hours ago. The RBCU is expected to be returned in 10 hours.
The BOP is to perform STP-127.001, Pressurizer Block Valve Operability Test once you have taken the shift.
The “C” Circulating Water Pump has a Caution Tag that says “The “C” Circulating Water Pump is experiencing higher than normal vibrations, System Engineer is monitoring”.
Current RCS Boron Concentration by chemistry sample is 993 ppm.

Offgoing Control Room Supervisor		
	Operations in progress (GOPs, SOPs, load changes, etc.):	
	Operations scheduled for oncoming shifts: (GTP-702/Tech Spec actions due - Time _____Date _____INIT____	
	GTP-702, Attachment VI.OO-1, for FEP Risk being RED. The 72 hour time limit expires in 66 hours, shift briefing is complete.	
	Plant safeguard systems in degraded status:	
	"B" MDEFP is tagged out for maintenance.	
	XFN-0065B RBCU is tagged out for maintenance.	
		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

CHG B

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	
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 Manager review	

CHG
C

REACTOR OPERATOR RELIEF CHECKLIST

DATE/TIME: Today/Now

LOG SECTION

Date	Entry

RELIEF SECTION

Turnover Notes
Evolutions and Procedures in progress:
Mode 1 // 100% Power // Work Week B1 // 2 Trains VU // EOOS: Green // Grid Risk: Green // FEP Risk: Red
"B" MDEFP was made inoperable 6 hours ago for scheduled PM's and is expected to be returned to OPS in 6 hours.
XFN-0065B RBCU was tagged out for breaker maintenance 2 hours ago. The RBCU is expected to be returned in 10 hours.
The BOP is to perform STP-127.001, Pressurizer Block Valve Operability Test once you have taken the shift.
The “C” Circulating Water Pump has a Caution Tag that says “The “C” Circulating Water Pump is experiencing higher than normal vibrations, System Engineer is monitoring”.
Current RCS Boron Concentration by chemistry sample is 993 ppm.

CHG E

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
Timer set for GTP-702 or other actions:	
Review of HVAC Panel.	
Review of Station Log.	
Review of Removal & Restoration Log.	
Review of Main Control Board Panels.	
Review of Generic Logs in Progress:	

CHG B

CHG E

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					"B" MDEFP tagged out for PM's
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 Manager review	

CHG C

BALANCE OF PLANT RELIEF CHECKLIST

DATE/TIME: Today/Now

LOG SECTION

Date	Entry

RELIEF SECTION

Turnover Notes	
Evolutions and Procedures in progress:	CHG E
Mode 1 // 100% Power // Work Week B1 // 2 Trains VU // EOOS: Green // Grid Risk: Green // FEP Risk: Red	
"B" MDEFP was made inoperable 6 hours ago for scheduled PM's and is expected to be returned to OPS in 6 hours.	
XFN-0065B RBCU was tagged out for breaker maintenance 2 hours ago. The RBCU is expected to be returned in 10 hours.	
The "C" Circulating Water Pump has a Caution Tag that says "The "C" Circulating Water Pump is experiencing higher than normal vibrations, System Engineer is monitoring".	
You are to perform STP-127.001, Pressurizer Block Valve Operability Test once you have taken the shift.	
Current RCS Boron Concentration by chemistry sample is 993 ppm.	

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

Oncoming Balance Of Plant	Initials	
Timer set for GTP-702 or other actions		CHG B
Review of Main Control Room Panels.		
Review of Station Log.		
Review of Removal & Restoration Log.		
Test annunciator lights (with Offgoing operator concurrence).		
Review of Generic Logs in Progress		CHG E

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 Manager review	CHG C

Facility: VC SUMMER U1 Scenario No: 3 Op Test No: NRC-ILO-16-01

Examiners: _____ Operators: CRS: _____

_____ RO: _____

_____ BOP: _____

Initial Conditions:
- The Reactor power is 10^{-3}%.
- "B" train work week.
- XFN-0065B RBCU is OOS.
- Caution Tag on "C" Circulating Water Pump

Turnover:
- Increase reactor power to between 1% and 3% in accordance with GOP-3, Reactor Startup From Hot Standby to Startup (MODE 3 to MODE 2).

Critical Tasks:
- Manually trip the reactor when it fails to AUTO trip with three faulted Steam Generators before SG WR <12%.
- Control the EFW flowrate (minimum of 50 gpm to each s/g < 26% [41%] level) and terminate SI, in order to minimize the RCS cooldown rate before a severe (orange-path) challenge develops to the integrity CSF.

Event	Malf No.	Event Type*	Event Description
1	N/A	N-BOP, CRS	Restore "B" MDEFW Pump to service.
2	N/A	R-RO, N-CRS	Raise Power to between 1% and 3%.
3	ANN-ES001	C-BOP, CRS TS-CRS	Elevated temperatures on XTF-31, transfer power to alternate source.
4#	MAL-AUX014A PMP-IA002F	C-RO, CRS	Instrument Air Compressor "A" trips, "B" Fails to auto start.
5	MAL-FWM012	I-BOP, CRS	Condensate Flow to the Deaerator goes high due to a failure of controller SC-3136 to control in auto.
6	MAL-CVC016A	I-RO, CRS	FCV-122 fails closed in AUTO, isolating charging flow.

7	ANN-FW018	TS-CRS	Feedwater Isolation Valve Accumulator low pressure alarm.
8	MAL-AUX009BA MAL-AUX009BB MAL-AUX009BC	M-ALL	Earthquake
	MAL-MSS004A MAL-MSS004B MAL-MSS004C		Three Faulted Steam Generators
	MAL-PCS005A MAL-PCS005B OVR-SI009(FALSE)		SI doesn't auto initiate, must be actuated from BOP side.
	MAL-PCS009AB MAL-PCS009BB		Reactor fails to automatically trip, must be tripped manually.
	VLV-CS051F VLV-CS042F		Phase "A" valves don't close, 8100 and 8112.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Used on previous two NRC Exams. Event 4 was used on the 2017 NRC Exam.

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

IOA designates Immediate Operator Action steps.

***** designates Continuous Action steps.

TURNOVER:

The crew will assume the watch having been pre-briefed on the Initial Conditions, the plan for this shift and any related operating procedures. Train "B" RBCU, XFN-0065B is tagged out for breaker maintenance and is to be returned to service next shift. The "C" Circulating Water pump has a Caution Tag on it that reads "The "C" CW pump is experiencing higher than normal vibrations, For Emergency Use Only". The crew will take the shift and start the "B" MDEFW Pump.

EVENT 1: Start "B" MDEFW Pump from service.

The crew will be turned over to start "B" MDEFW pump in accordance with SOP-211, Emergency Feedwater System, section III.A, step 2.1. The BOP will start the pump and commence feeding the Steam Generators with both "A" and "B" Motor Driven Emergency Feedwater pumps.

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

The crew will be prepared to commence a power ascension following a panel walk down and short briefing on the power ascension. The turnover stated that the crew will raise power to between 1% and 3% in accordance with GOP-3, Reactor Startup From Hot Standby to Startup (MODE 3 to MODE 2).

EVENT 3: Elevated temperatures on XTF-31, transfer power to alternate source.

- **TRIGGER 3**
  - ANN-ES001
    EMERG AUX XFMR XTF-31 TRBL
    FINAL = ON
- **TRIGGER 12** X13I071N == 1 (Clears the alarm 2 minutes after 1DB is put on its alt power source based on the bus 1DB XFER INIT switch going to N-E.)
  - ANN-ES001 (NEW)
    EMERG AUX XFMR XTF-31 TRBL
    DELETE = 120 sec

On cue from the Examiner, annunciator XCP 633, 1-4, EMERG AUX XFMR XTF-31 TRBL, will alarm. The crew will respond to this annunciator and send an AO out to investigate. The report from the field will be that several fans are not running and oil temperatures read 93°C and increasing. The crew will transfer loads from XTF-31 to 1DX in accordance with SOP-304, 115KV/7.2KV Operations. The CRS will refer to Tech Spec 3.8.1, AC Source and will apply Action “a” which is to Demonstrate the OPERABILITY of the remaining offsite AC. sources by performing Surveillance Requirement 4.8.1.1.1 within 1 hour and at least once per 8 hours thereafter, and If either EDG has not been successfully tested within the past 24 hours, demonstrate its OPERABILITY by performing Surveillance Requirement 4.8.1.1.2.a.3 separately for each such EDG within 24 hours unless the diesel is already operating, and Restore the offsite circuit to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours.

EVENT 4: Instrument Air Compressor "A" trips, "B" Fails to auto start.

- **TRIGGER 4**

  - MAL-AUX014A
    INSTRUMENT AIR COMPRESSOR A TRIP

- **PRE-LOAD**

  - PMP-IA002F(NEW)
    XAC0003B INST AIR COMP B FAIL TO START

- **TRIGGER 11** X02I072S == 1 (Allows Instrument Air Compressor "B" to be started)

  - PMP-IA002F(NEW)
    XAC0003B INST AIR COMP B FAIL TO START
    DELETE = 1 sec

  On cue from the Examiner, Instrument Air Compressor "A" will trip. XCP-606 2-1, INSTR AIR CMPR A TRBL, will alarm. Once Instrument Air Header pressure gets below 90 psig, the "B" Instrument Air Compressor will fail to auto start. The candidate will respond with the alarm response procedure and start the "B" Instrument Air Compressor.

EVENT 5: Condensate flow to the Deaerator fails High.

- **TRIGGER 5**

  - MAL- FWM012
    CONDENSATE FLOW TO DEAERATOR FLOW CONTROLLER (SC-3136) FAILURE
    FINAL VALUE = 15%

  On cue from the Examiner, the flow controller for Condensate to the Deaerator will fail high in automatic. As flow rises, level in the Deaerator will rise. The BOP will take action in accordance with OAP-100.5 guidance for equipment not responding properly in automatic, and the OP CRIT alarm which will indicate Deaerator level rising. The BOP will place the flow control in manual and lower condensate flow as necessary to maintain Deaerator level.

EVENT 6: FCV-122 fails closed in AUTO, isolating charging flow.

- **TRIGGER 6**

  - MAL-CVC016A
    CHARGING FLOW CONTROL VALVE FAILURE (AUTO ONLY)
    FINAL VALUE = 0

  On cue from the Examiner, FCV-122 will fail closed. XCP-614, 5-1, CHG LINE FLO HI/LO will alarm. The RO will take manual control of FCV-122 and maintain TI-140, REGEN HX OUT TEMP °F, between 250°F and 350°F while maintaining Pressurizer level.

EVENT 7: Feedwater Isolation Valve Accumulator low pressure alarm.

- **TRIGGER 7**

  - ANN-FW018
    FIV A/B/C ACCUM PRESS LO
    FINAL VALUE = ON

  On cue from the Examiner, XCP-625, 3-3, FIV A/B/C ACCUM PRESS LO, will alarm. The crew will send an AO out to look at pressure for the accumulators. The report from the field will be that accumulator pressure for PVG-1611A, A ISOL, is 0 psig. The CRS will refer to Tech Spec 3.7.1.6, Feedwater Isolation Valves, and apply the action for MODE 2 and 3, With one feedwater isolation valve inoperable, subsequent operation in MODES 2 or 3 may proceed provided: a. The isolation valve is maintained closed. b. The provisions of Specification 3.0.4. are not applicable. Otherwise be in HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

EVENT 8: Earthquake leading to all three Steam Generators being faulted and an ATWS.

- **PRE-LOADS:**

  - MAL-PCS009AB
    REACTOR TRIP BREAKER A FAILURE (FAIL TO OPEN)
    FINAL = AUTO

  - MAL-PCS009BB
    REACTOR TRIP BREAKER B FAILURE (FAIL TO OPEN)
    FINAL = AUTO

  - MAL-PCS005A
    SAFETY INJECTION FAILURE TRAIN A
    FINAL = TOTAL FAILURE

  - MAL-PCS005B
    SAFETY INJECTION FAILURE TRAIN B
    FINAL = TOTAL FAILURE

- VLV-CS042F
  XVT08100-CS RCP SEAL WTR ISO VLV FAIL AS IS

- VLV-CS051F
  XVT08112-CS RCP SEAL WTR ISO VLV FAIL AS IS

- **TRIGGER 8**

  - MAL-AUX009BA
    SEISMIC EVENT EARTHQUAKE FULL O.B.E.(NORTH/SOUTH HORIZONTAL)
    FINAL VALUE = 25.4

  - MAL-AUX009BB
    SEISMIC EVENT EARTHQUAKE FULL O.B.E.(UP/DOWN VERTICAL)
    FINAL VALUE = 25.4

  - MAL-AUX009BC
    SEISMIC EVENT EARTHQUAKE FULL O.B.E.(EAST/WEST HORIZONTAL)
    FINAL VALUE = 25.4

  - MAL-MSS004A
    STEAMLINE S/G A BREAK OUTSIDE CONTAINMENT
    RAMP = 15 sec
    FINAL = 5.15E5 lbm/hr

  - MAL-MSS004B
    STEAMLINE S/G B BREAK OUTSIDE CONTAINMENT
    RAMP = 15 sec
    FINAL = 5.15E5 lbm/hr

  - MAL-MSS004C
    STEAMLINE S/G C BREAK OUTSIDE CONTAINMENT
    RAMP = 15 sec
    FINAL = 5.15E5 lbm/hr

- **TRIGGER 14** X09I073A==1 (Allows SI to be manually actuated from the BOP side)

  - MAL-PCS005A (NEW)
    SAFETY INJECTION FAILURE TRAIN A
    FINAL = TOTAL FAILURE
    DELETE = 1 sec

  - MAL-PCS005B (NEW)
    SAFETY INJECTION FAILURE TRAIN B
    FINAL = TOTAL FAILURE
    DELETE = 1 sec

- **TRIGGER 15** X04I101C==1 (Allows 8112 to be manually closed)

  - VLV-CS051F (NEW)
    XVT08112-CS RCP SEAL WTR ISO VLV FAIL AS IS
    DELETE = 1 sec

  On cue from the Examiner, an earthquake will occur followed by all three steam generators being faulted. The reactor will not trip automatically. The crew should manually trip the reactor and enter EOP-1.0, E-0 Reactor Trip or Safety Injection. The crew will transition out to EOP-3.0, E-2 Faulted Steam Generator Isolation. They will then transition to EOP-3.1, ECA-2.1 Uncontrolled Depressurization of all Steam Generators.

  It took twenty two minutes to reach <12% Wide Range in all Steam Generators with the reactor failing to auto trip and the RO not inserting rods. During this time, power peaked at approximately 22%.

  It took forty six minutes to get to <250F in the Cold legs presenting an orange path on Integrity.

TERMINATION:

The scenario may be terminated once the crew has terminated Safety Injection in accordance with EOP-3.1, ECA-2.1 Uncontrolled Depressurization of all Steam Generators.

PRE-LOADS:

- OVR-AH023A
  CS-AH279 RBCU FAN 65B SLOW SPEED GREEN L
  FINAL = OFF

- OVR-AH022A
  CS-AH280 RBCU FAN 65B FAST SPEED GREEN L
  FINAL = OFF

Scenario Attributes		Events
Total Malfunctions (5-8)	10	• Elevated temperatures on XTF-31, transfer power to alternate source. • Instrument Air Compressor “A” trips, “B” Fails to auto start. • DA Level controller fails high. • FCV-122 fails closed in AUTO, isolating charging flow. • Feedwater Isolation Valve Accumulator low pressure alarm. • Earthquake. • Three Faulted Steam Generators. • SI doesn’t auto initiate, must be actuated from BOP side. • Reactor fails to automatically trip, can be manually tripped. • Containment Isolation Valves fail to close.
Malfunctions after EOP entry (1-2)	3	• SI doesn’t auto initiate, must be actuated from BOP side. • Reactor fails to automatically trip, can be manually tripped. • Containment Isolation Valves fail to close.
Abnormal Events (2-4)	5	• Instrument Air Compressor “A” trips, “B” Fails to auto start. • Elevated temperatures on XTF-31, transfer power to alternate source. • DA Level controller fails high. • FCV-122 fails closed in AUTO, isolating charging flow. • Feedwater Isolation Valve Accumulator low pressure alarm.
Major Transients (1-2)	1	• Three Faulted Steam Generators.
EOPs Entered (1-2)	1	• EOP-3.1, ECA-2.1 Uncontrolled Depressurization of all Steam Generators.
EOP Contingencies (0-2)	1	• EOP-3.1, ECA-2.1 Uncontrolled Depressurization of all Steam Generators.
Critical Tasks (2-3)	2	• Manually trip the reactor when it fails to AUTO trip with three faulted Steam Generators before SG WR <12%. • Control the EFW flowrate (minimum of 50 gpm to each s/g < 26% [41%] level) and terminate SI, in order to minimize the RCS cooldown rate before a severe (orange-path) challenge develops to the integrity CSF.

SIMULATOR SCENARIO SETUP

INITIAL CONDITIONS: (Example below)

- IC Set 302
- 10^{-3}% Power, MOL
- Burnup = 10,025 MWD/MTU
- RCS Boron Concentration = 1481 ppm
- FCV-113 Pot Setting = 6.35
- Rod Position: Group D = 100
- Tavg = 558.3˚F
- Prior to the scenario, the crew should pre-brief conditions and their expectations for the shift.

PRE-EXERCISE: (Example below)

- Ensure simulator has been checked for hardware problems (DORT, burnt out light bulbs, switch malfunctions, chart recorders, etc.).
- Complete VCS-TQP-0807 Attachment I-A, Unit 1 Booth Instructor Checklist.
- Verify plant aligned for "B1" work week IAW PTP-101.004, Safety Related Train Swap Checklist.
- Verify red hold tag and R&R tag on XFN-0065B RBCU and ensure they are in P-T-L. XFN-65B can't be taken to P-T-L.
- Verify red Placard on "A" CCW Pump and "B" Charging Pump.
- Verify the "C" Circulating Water pump has a Caution Tag that reads ""C" CW pump is in Normal After Stop because of higher than normal vibrations, For Emergency Use Only".
- Verify the Hard Card for Turbine operation is in its proper storage location and cleaned.
- Verify the Hard Card for borating via MVT-8104 is in its proper storage location and cleaned.
- Set RO SIPCS station to ZZREAC.
- Verify Rod Bank Update set correctly: 100 steps on Control Bank D and 228 steps on all other Banks.
- Verify NR-45 is set to One Intermediate Range and One Source Range channel and is set to fast speed.
- Reset Digital Reactivity on SIPCS (disable calc, select N35 and N36, re-enable and calculate)
- Ensure no NI's are removed from service, on SIPCS type in "add/omit" to verify.
- Ensure 115kV & 230kV setpoints are set to appropriate values for the shutdown condition IAW SOP-304, Enclosure B.
- Ensure you have the following pre-marked up procedures:
    - GOP-3, Reactor Startup From Hot Standby To Startup (Mode 3 To Mode 2)
    - GOP-4A, Power Operation (Mode 1 - Ascending)
- Ensure you have a turnover sheet for each position.

- Conduct two-minute drill.

PRE-LOAD: (These are traditionally the pre-loads from the initial IC)

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 Isol Vlv Loss of Power

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Event Description: Restore "B" MDEFW Pump to service.

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: The crew will be turned over to start "B" Motor Driven EFW pump in accordance with SOP-211, Emergency Feedwater System.			
BOOTH OPERATOR:		No TRIGGERS for this event.	
Available Indications: N/A			
	CRS	2.1. Contact the Primary Chemist to place SS-SS24B, SG EMERG FW BYPASS SWITCH, to BYPASS at XPN0036 (CB-412).	SOP-211
BOOTH OPERATOR:		When called to place SS-SS24B in BYPASS, wait 2 minutes and report back that SS-SS24B is in BYPASS. If called to look at the pump for start, wait 2 minutes and report back that the pump looks good for start.	
	BOP	2.2. Momentarily place PVG-503ABC, A,B&C ISOL, to OPEN/BYPASS.	SOP-211
	BOP	2.3. Momentarily place the following control switches, to OPEN/BYPASS: a. PVG-503A, A ISOL. b. PVG-503B, B ISOL. c. PVG-503C, C ISOL.	SOP-211
	BOP	2.4. Hold the MD EFP RESET Switch in RESET for at least one second and then release.	SOP-211
	BOP	2.5. To operate flow control valves using hand controllers, place the following switches, in MAN: a. FCV-3531, MD EFP TO SG A. b. FCV-3541, MD EFP TO SG B. c. FCV-3551, MD EFP TO SG C.	SOP-211
	BOP	2.6. Close the following flow control valves using hand controllers: a. IFV-3531, MD EFP TO SG A. b. IFV-3541, MD EFP TO SG B. c. IFV-3551, MD EFP TO SG C.	SOP-211
EVALUATOR NOTE: Step 2.6 was marked N/A prior to the start of this procedure since this step is not necessary to restore the "B" MDEFW pump.			
NOTE 2.7 and 2.8 XVM01072A(B)-EF, MTR DRIVEN EF PUMP A(B) RECIRC CV, maintains recirculation line flow between 110 gpm and 140 gpm when flow to the Steam Generators is isolated. If total pump flow is <110 gpm, a computer generated low EFW Pump flow alarm will occur.			SOP-211

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # 1 Page: 12 of 37

Event Description: Restore "B" MDEFW Pump to service.

Time	Position	Applicant's Actions or Behavior	
	BOP	2.8. Start Motor Driven Emergency Feedwater Pump B as follows: a. Place PUMP B switch, to START. **PEER** ✓ b. Verify starting current decays to less than 49 amps.	
NOTE 2.9 Enclosure B, Guidance To Prevent Cavitating Flow Vs. Steam Generator Pressure During Normal Operations, should be referenced when throttling flow.			SOP-211
	BOP	2.9. Adjust the following flow control valves to control Steam Generator levels: a. IFV-3531, MD EFP TO SG A. b. IFV-3541, MD EFP TO SG B. c. IFV-3551, MD EFP TO SG C.	SOP-211
NOTE 2.10 a. Steam Generator cavitating venturies should limit flow to each Steam Generator to ≤ 380 gpm at normal operating pressure. b. If the running EFW Pump total flow is greater than 190 gpm and recirculation line flow is >5 gpm, a computer generated alarm will occur indicating the failure of the recirculation valve to properly close.			SOP-211
	BOP	2.10. Monitor flow on the following indicators: a. FI-3561, TO SG A FLOW GPM. b. FI-3571, TO SG B FLOW GPM. c. FI-3581, TO SG C FLOW GPM.	SOP-211
EVALUATOR NOTE: The next event may be inserted once "B" MDEFW Pump is restored to service.			

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # 2 Page: 13 of 37

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

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: The crew will increase reactor power to between 1% and 3%.			
BOOTH OPERATOR:		No TRIGGERS for this event.	
Available Indications: Reactor Power			
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.			GOP-3
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
	CRS	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
BOOTH OPERATOR:		IF called at any time to look at feedwater heaters because of the feedwater heater dump valve not being closed, wait 2 minutes and report back "no issues, everything is operating correctly".	GOP-3
EVALUATOR NOTE: The next event may be inserted following completion of the power ascension, or at any time per the discretion of the Lead Examiner.			GOP-3

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # 2 Page: 14 of 37

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

Time	Position	Applicant's Actions or Behavior

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 Manager 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.

GOP-3

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # 3 Page: 15 of 37

Event Description: High Temperature on XTF-31, transfer loads to alt power source.

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: XTF-31 will have elevated temperatures causing the crew to unload the transformer.			
BOOTH OPERATOR:		When directed - Initiate Event 3 (TRIGGER 3).	
Available Indications: XCP 633, 1-4, EMERG AUX XFMR XTF-31 TRBL Reports from the field			
	CRS	Enters XCP-633, 1-4, EMERG AUX XFMR XTF-31 TRBL	XCP-633, 1-4
	BOP	**Corrective Actions:** 1. Dispatch an Operator to XTF0031, EMERGENCY AUXILIARY Transformer #1, to determine the cause of the alarm. 2. If sudden pressure is the cause, refer to XFMR XTF31 LCKOUT 86T31 (XCP-639 4-2). 3. If necessary, contact PSE/Substation Maintenance for assistance.	XCP-633, 1-4
BOOTH OPERATOR:		When dispatched to XTF-31, wait 2 minutes and report "Multiple fans are off and oil temperatures are 93°C and slowly rising". If asked about winding temperatures, report "Winding temperatures are 115°C and slowly rising".	
	BOP	**Supplemental Actions:** 1. If oil temperatures exceed 92°C or winding temperatures exceed 125°C transfer loads from XTF0031, EMERGENCY AUXILIARY TRANSFORMER #1, per SOP-304, 115KV/7.2KV Operations.	XCP-633, 1-4
	CRS	Enters SOP-304, 115KV/7.2KV OPERATIONS, Section IV.C.	SOP-304
	CRS	2.1. Notify the System Controller of the applicable bus voltage limits from Enclosure B.	SOP-304
BOOTH OPERATOR:		If called again to report oil temperatures or winding temperatures, report: "Oil temperatures are 94°C and slowly rising" "Winding temperatures are 116°C and slowly rising".	
	BOP	2.2. If required, adjust the 115KV and/or 230KV alarm setpoints per Attachment VA and/or Attachment VB for the current lineup.	SOP-304
EVALUATOR NOTE: Step 2.3 is not applicable since 1DA is not affected.			

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # 3 Page: 16 of 37

Event Description: High Temperature on XTF-31, transfer loads to alt power source.

Time	Position	Applicant's Actions or Behavior	
	BOP	2.4. Manually transfer BUS 1DB to alternate feed as follows: a. Ensure the following annunciators on Panel XCP-638 are clear: 1. 1-5, XTF4 OPC. 2. 1-6, XTF4 OPIS TRBL. 3. 2-5, XTF5 OPC. 4. 2-6, XTF5 OPIS TRBL. **CAUTION 2.4.b** **BUS 1DB XFER INIT Switch operation trips the Supplemental Instrument Air Compressor, due to an electrical perturbation caused by a momentary power interruption.** **NOTE 2.4.b** **If the Integrated Fire System computer is being powered from Train B, there will be a momentary power interruption to the computer.** b. Turn and hold BUS 1DB XFER INIT Switch to the N-E position. **(PEER ✓)** c. Verify the following: 1. BUS 1DB potential lights remain lit. 2. BUS 1DB ALT FEED breaker closes. 3. BUS 1DB NORM FEED breaker opens. d. Release BUS 1DB XFER INIT Switch and verify spring return to OFF. e. Match flags for the BUS 1DB ALT FEED and BUS 1DB NORM FEED breakers.	SOP-304
BOOTH OPERATOR:		If called again to report oil temperatures or winding temperatures after they have taken 1DB off the transformer, report: "Oil temperatures are 92°C and slowly lowering" "Winding temperatures are 114°C and slowly lowering".	

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # 3 Page: 17 of 37

Event Description: High Temperature on XTF-31, transfer loads to alt power source.

Time	Position	Applicant's Actions or Behavior	
	CRS	Enters Tech Spec 3.8.1, A.C. Sources Operating, Action a: a. With one offsite circuit of 3.8.1.1.a inoperable: 1. Demonstrate the OPERABILITY of the remaining offsite AC. sources by performing Surveillance Requirement 4.8.1.1.1 within 1 hour and at least once per 8 hours thereafter, and 2. If either EDG has not been successfully tested within the past 24 hours, demonstrate its OPERABILITY by performing Surveillance Requirement 4.8.1.1.2.a.3 separately for each such EDG within 24 hours unless the diesel is already operating, and 3. Restore the offsite circuit to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours.	Tech Specs
EVALUATOR NOTE: When the CRS says they need to perform Surveillance Requirement 4.8.1.1.1 within 1 hour and at least once per 8 hours thereafter, inform them you would like to see them perform this surveillance. Attachments I and VI of STP-125.001 are required to meet surveillance requirements. The candidates may perform the other attachments to prove that the rest of the A.C. sources are operable or inoperable.			
BOOTH OPERATOR:		If the CRS calls and asks for a copy of the Electric Power System Weekly Test or STP-125.001, inform them you will bring them a copy.	
EVALUATOR NOTE: The next event may be inserted following the CRS assessment of Tech Specs, or at any time per the discretion of the Lead Examiner.			

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # 4 Page: 18 of 37

Event Description: Instrument Air Compressor "A" trips, "B" Fails to auto start.

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: Instrument Air Compressor "A" trips, "B" Fails to auto start.			
BOOTH OPERATOR:		When directed - Initiate Event 4 (TRIGGER 4).	
Available Indications: XCP-606 2-1, INSTR AIR CMPR ATRBL			
	RO	Corrective Actions 1. If Instrument Air Compressor A trips, ensure the standby air compressor starts. 2. Dispatch an operator to Instrument Air Compressor A to determine the cause of the alarm. **The candidate will manually start the "B" IA Compressor.**	XCP-606, 2-1
BOOTH OPERATOR:		If contacted as an operator to check the air compressors, wait 2 minutes and report "No obvious problem detected on "A" compressor" and if asked to check status on standby compressor report "The "B" compressor is properly aligned for auto start and is ready for start". If asked, the "B" Compressor looks good after start.	XCP-606, 2-1
EVALUATOR NOTE: The crew will continue on with the power escalation immediately following the completion of this event.			XCP-606, 2-1

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # 5 Page: 19 of 37

Event Description: Condensate Flow to Deaerator fails HIGH.

Time	Position	Applicant's Actions or Behavior	
EVALAUTOR NOTE: Flow controller for Condensate to the Deaerator will fail high in automatic. As flow rises, level in the Deaerator will rise.			
BOOTH OPERATOR:		When directed - Initiate Event 5 (TRIGGER 5).	
Available Indications: XCP 632, 4-5, IPCS OPCRIT ALARM XCP 627, 4-1, DEAER STOR TK LVL HI/HI-HI Rising level on Deaerator Storage Tank Level Indicator LI-3135.			
	CRS	Enters XCP 627, 4-1, DEAER STOR TK LVL HI/HI-HI	XCP 627, 4-1
	BOP	1. Place FLOW TO DEAERATOR in MAN and reduce flow to the DA Storage Tank as necessary. 2. Take manual control of LCV03235, DEAER START UP DRAIN CNTRL, and lower the level.	XCP 627, 4-1
EVALUATOR NOTE: The BOP/CRS may take action as soon as they get the OPCRIT alarm in accordance with OAP-100.5 for equipment not responding properly in Automatic control.			
EVALUATOR NOTE: The next event may be initiated after the candidate has stabilized DA level or at any time at the discretion of the Lead Examiner.			

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # 6 Page: 20 of 37

Event Description: FCV-122 fails closed in AUTO.

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: FCV-122 fails closed in AUTO, isolating charging flow.			
BOOTH OPERATOR:		When directed - Initiate Event 6 (TRIGGER 6).	
Available Indications: XCP-614 5-1, CHG LINE FLO HI/LO. XCP-613 1-4, REGEN HX LTDN OUT TEMP HI. FI-122A, CHG FLOW GPM - no flow. PI-121, CHG PRESS PSIG - lowering value.			
	CRS	Enters XCP-614, 5-1, CHG LINE FLO HI/LO.	XCP-614 5-1
EVALUATOR NOTE: The following six steps are the "Corrective Actions" of the alarm response procedure.			
	CRS	1. If the running Charging Pump suction flowpath has become isolated, secure the Charging Pump and go to AOP-102.2, Loss of Charging.	XCP-614 5-1
	CRS	2. If the PUMP A(B) or PUMP C TRAIN A(B) ammeter indication is abnormal for the running Charging Pump and the pump must be tripped, go to AOP-102.2, Loss of Charging.	XCP-614 5-1
	RO	3. Monitor LT-112A and LT-115, % LEVEL, to verify proper VCT level.	XCP-614 5-1
	RO	4. Monitor FI-122A, CHG FLOW GPM.	XCP-614 5-1
	RO	5. Verify the Charging header valve lineup: a. Verify the following valves are open: 1. FCV-122, CHG FLOW. 2. MVG-8107, CHG LINE ISOL. 3. MVG-8108, CHG LINE ISOL. 4. Either of the following: a. PVT-8146, NORM CHG TO RCS LP B. b. PVT-8147, ALT CHG TO RCS LP A. b. If the Charging header has isolated go to AOP-102.2, Loss of Charging.	XCP-614 5-1

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # 6 Page: 21 of 37

Event Description: FCV-122 fails closed in AUTO.

Time	Position	Applicant's Actions or Behavior	
	RO	6. If Charging flow has NOT been lost but a loss of automatic control of FCV-122, CHG FLOW, is suspected perform the following: a. Place FCV-122, CHG FLOW, in MAN and adjust, as required, to maintain TI-140, REGEN HX OUT TEMP °F, between 250°F and 350°F while maintaining Pressurizer level. b. If FCV-122, CHG FLOW, fails to respond in MAN, perform SOP-102, Off Normal, Response To Malfunction Of FCV-122, to bypass FCV00122-CS, CHARGING HEADER FLOW CONTROL VALVE (AB-412 West Pen).	XCP-614 5-1

EVALUATOR NOTE: The next event may be initiated while the RO is re-establishing manual Pressurizer Level and Regenative Heat Exchanger Outlet temperature, or at any time at the discretion of the Lead Examiner.

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # 7 Page: 22 of 37

Event Description: Feedwater Isolation Valve Accumulator low pressure alarm.

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: The Feedwater Isolation Valve Accumulator low pressure alarm will come in and be evaluated for Tech Specs.			
BOOTH OPERATOR:		When directed - Initiate Event 7 (TRIGGER 7).	
Available Indications: XCP-625, 3-3 FIV A/B/C ACCUM PRESS LO			
	CRS	Enters XCP-625, 3-3 FIV A/B/C ACCUM PRESS LO**,** alarm response procedure.	XCP-625, 3-3
NOTE 1 a. If the affected valve is open, that valve will be inoperable if pressure decreases to less than 500 psi. b. If the affected valve is closed, that valve will be inoperable if pressure decreases to less than 75 psi.			XCP-625, 3-3
	CRS	1. Verify pressure on XPN 7301 (AB 436 West Penetration) and XPN 7302 (IB 436 East Penetration).	XCP-625, 3-3
BOOTH OPERATOR:		When called as Unit 6 to verify pressure on XPN 7301, wait 2 minutes and report back "accumulator pressure for PVG-1611A, A ISOL, is 0 psig". When called as Unit 7 to verify pressure on XPN 7302, wait 2 minutes and report back "accumulator pressure on "B" and "C" accumulators are both at 590 psig".	
	CRS	2. Refer to V.C. Summer Tech. Spec. 3.7.1.6.	XCP-625, 3-3
	CRS	Enters Tech Spec 3.7.1.6, Feedwater Isolation Valves, Action for MODE 2: With one feedwater isolation valve inoperable, subsequent operation in MODES 2 or 3 may proceed provided: a. The isolation valve is maintained closed. b. The provisions of Specification 3.0.4 are not applicable. Otherwise, be in HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.	Tech Specs
EVALUATOR NOTE: Operator may take the switch to the closed position to match indications, however, this is not a required action.			
EVALUATOR NOTE: The next event may be inserted following the CRS assessment of Tech Specs, or at any time per the discretion of the Lead Examiner.			

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # 8 Page: 23 of 37

Event Description: Earthquake, followed by three faulted Steam Generators and an ATWS.

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: An Earthquake will occur, this will cause the faulted Steam Generators and an ATWS.			
BOOTH OPERATOR:		When directed - Initiate Event 8 (TRIGGER 8).	
Available Indications: XCP-638, 4-5 RB FOUND SEIS SWITCH OBE EXCEED XCP-638, 4-6 SEIS RCDR SYS START/ PWR LOSS XCP-638, 5-6 SEIS RESPNS SPECTRUM ANNUN TRBL Both Reactor Trip breakers – RED light **lit** and GREEN light **dim**.			
	CRS	Directs RO and BOP to perform immediate actions of EOP-1.0, REACTOR TRIP OR SAFETY INJECTION.	
	CRS	Enters EOP-1.0, E-0 Reactor Trip or Safety Injection.	
IOA **Critical Task**	RO	1. Verify Reactor Trip: • Trip the Reactor using both Reactor Trip Switches. • Verify all Reactor Trip and Bypass Breakers are open. • Verify all Rod Bottom Lights are lit. • Verify Reactor Power level is decreasing. **The reactor will not automatically trip and must be manually tripped.**	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

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # 8 Page: 24 of 37

Event Description: Earthquake, followed by three faulted Steam Generators and an ATWS.

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. **(YES)** b. Actuate SI using either SI ACTUATION Switch. c. GO TO Step 6. **Safety Injection will fail to automatically actuate and must be manually actuated. Only the Safety Injection switch on the BOP side will work.**	EOP-1.0

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # 8 Page: 25 of 37

Event Description: Earthquake, followed by three faulted Steam Generators and an ATWS.

Time	Position	Applicant's Actions or Behavior

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.

EOP-1.0

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.

4 RUPTURED STEAM GENERATOR

IF a RUPTURED Steam Generator has been positively identified, THEN throttle EFW to the RUPTURED Steam Generator WHEN its Narrow Range Level is GREATER THAN 26%[41%].

5 FAULTED STEAM GENERATOR

- IF a FAULTED Steam Generator has been positively identified, THEN isolate EFW to the faulted Steam Generator as soon as possible UNLESS all three Steam Generators are FAULTED.
- IF all three Steam Generators are FAULTED, THEN throttle EFW flow to all three Steam Generators to 50 gpm.

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # 8 Page: 26 of 37

Event Description: Earthquake, followed by three faulted Steam Generators and an ATWS.

Time	Position	Applicant's Actions or Behavior	
	BOP	6. Initiate ATTACHMENT 3, SI EQUIPMENT VERIFICATION.	EOP-1.0
EVALUATOR NOTE: Attachment 3 can be found on **page 35 of 37**.			
	CRS	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. **(NO)** OR • With no RCP running, RCS Tcold is stable at OR trending to 557°F.	EOP-1.0
* **Critical Task**	RO	**Alternative Action Step:** 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 26% [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 26% [41%] in at least one SG, THEN control EFW flow as necessary to stabilize RCS temperature at 557°F. c. Initiate ATTACHMENT 6, STEAM VALVE ISOLATION, while continuing with this procedure. 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
EVALUATOR NOTE: The critical task is to throttle EFW flow to all three steam generators to 50 gpm prior to an orange path on integrity. The candidates can use the reference page of EOP-1.0 to establish this flow rate. EOP-1.0 reference page can be found on **page 25 of 37**. Candidates may also throttle EFW to 50 gpm at step 2.c of EOP-3.1 on **page 31 of 37.**			

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Event Description: Earthquake, followed by three faulted Steam Generators and an ATWS.

Time	Position	Applicant's Actions or Behavior	
	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. Ensure one of the following Block Valves is open unless it was closed to isolate an open PZR PORV: • MVG-8000A, RELIEF 445 A ISOL. • MVG-8000B, RELIEF 444 B ISOL.	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. **(YES)** b. Stop all RCPs. **Candidates will meet the RCP Trip criteria based on RCS Pressure and SI flow. OAP-103.4, EOP/FSP/AOP USER'S GUIDE, says that if you trip from MODE 2, which we did, this RCP trip criteria does not apply.**	EOP-1.0
	RO	12. Verify no SG is FAULTED: • No SG pressure is decreasing in an uncontrolled manner. **(NO)** • No SG is completely depressurized.	EOP-1.0
	CRS	**Alternative Action Step:** 12. GO TO EOP-3.0, E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.	EOP-1.0

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # 8 Page: 28 of 37

Event Description: Earthquake, followed by three faulted Steam Generators and an ATWS.

Time	Position	Applicant's Actions or Behavior	
EVALUATOR NOTE: The crew may have a red path on Heat Sink because IF they throttled EFW flow to <450 gpm. If so, they will transition to EOP-15.0, Response to Loss of Secondary Heat Sink. They will read a Caution at the beginning of the procedure and immediately transition out of EOP-15.0 because they throttled EFW on purpose.			
	CRS/CREW	Notices a Red Path on Heat Sink and transitions to 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
	CRS	Transitions out of EOP-15.0 into EOP-3.0, E-2 Faulted Steam Generator Isolation	
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
	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. **(NO)** • Any SG is NOT completely depressurized.	EOP-3.0
	BOP	**Alternative Action Step:** 2. IF all SG pressures are decreasing in an uncontrolled manner OR completely depressurized, THEN GO TO EOP-3.1, ECA-2.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS, Step 1.	EOP-3.0
	CRS	Enters EOP-3.1, ECA-2.1 Uncontrolled Depressurization of all Steam Generators.	

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # 8 Page: 29 of 37

Event Description: Earthquake, followed by three faulted Steam Generators and an ATWS.

Time	Position	Applicant's Actions or Behavior

REFERENCE PAGE FOR EOP-3.1

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].

OR

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

2 SECONDARY INTEGRITY TRANSITION CRITERION

IF any SG pressure increases at any time, except while performing SI Termination in Steps 13 through 18, THEN GO TO EOP-3.0, E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

EOP-3.1

3 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, E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

4 COLD LEG RECIRCULATION TRANSITION CRITERION

IF RWST level decreases to LESS THAN 18%, THEN GO TO EOP-2.2, ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

5 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.

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # 8 Page: 30 of 37

Event Description: Earthquake, followed by three faulted Steam Generators and an ATWS.

Time	Position	Applicant's Actions or Behavior	
	BOP	1. Isolate secondary pressure boundaries for all SGs: a. Close all of the following valves: • MS Isolation, PVM-2801A(B)(C). • MS Isolation Bypass, PVM-2869A(B)(C). • FW Flow Control, FCV-478(488)(498). • FW Isolation, PVG-1611A(B)(C). • SG Blowdown, PVG-503A(B)(C). • FW Flow Control Bypass, FCV-3321(3331)(3341). **CAUTION - Step 1.b** **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.** b. Complete isolation of all SGs: 1. Close all the following valves: • SG Chemical Feed Isolation, MVK-1633A(B)(C). • MS Drain Isolation, PVT-2843A(B)(C) PVT-2877A(B). 2. Locally open the following breakers: • XMC1DA2X 05EH, EF PUMP MAIN STEAM BLOCK VLV XVG2802A-MS (IB-463). • XMC1DB2Y 05EH, EMERG FEEDWATER PUMP MAIN STEAM BLOCK XVG2802B-MS (AB-463). 3. Locally close the following valves (IB-436 East Pen): • XVG02802A-MS, MS HEADER B EF PUMP TURBINE SUPPLY VLV. • XVG02802B-MS, MS HEADER C EF PUMP TURBINE SUPPLY VLV. 4. Place all Steamline PWR RELIEF A(B)(C) SETPT Controllers in MAN and closed. 5. Place all Steamline Power Relief A(B)(C) Mode Switches in PWR RLF.	EOP-3.1
BOOTH OPERATOR:		When contacted to locally open breakers and close 2802A/B, wait 3 minutes, use the LOAs on the LOA RESET PANEL to open the breakers and close the valves, Then report back "I've opened the breakers for 2802A/B and have closed both valves".	

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # 8 Page: 31 of 37

Event Description: Earthquake, followed by three faulted Steam Generators and an ATWS.

Time	Position	Applicant's Actions or Behavior	
		CAUTION - Step 2 A minimum EFW flow of 50 gpm must be maintained to each SG that has a Narrow Range level LESS THAN 26% [41%], to minimize thermal shock to SG components.	EOP-3.1
		NOTE - Step 2 Shutdown margin should be monitored during RCS cooldown.	EOP-3.1
	BOP	2. Ensure the RCS cooldown is minimized: a. Place MD EFP RESET to RESET. b. Place TD EFP RESET to RESET. c. Verify the cooldown rate in the RCS Cold Legs is LESS THAN 100°F/hr. **(NO)** d. Verify Narrow Range level in all SGs is LESS THAN 60%. e. Verify RCS Thot is stable OR decreasing.	EOP-3.1
CRITICAL TASK	BOP	**Alternative Action Step:** 2.c. Decrease EFW flow to 50 gpm to each SG. GO TO STEP 2.e.	EOP-3.1
		NOTE - Step 3 Seal Injection flow should be maintained to all RCPs.	EOP-3.1
	RO	3. Check if RCPs should be stopped: a. Verify annunciator XCP-612 4-2 is NOT lit (PHASE B ISOL). b. Check if RCS pressure is LESS THAN 1418 psig AND SI flow is indicated on FI-943, CHG LOOP B CLD/HOT LG FLOW GPM. **NOTE - Step 3.c** **RCPs should NOT be stopped if the RCS pressure decrease is due solely to the cooldown.** c. Stop all RCPs.	EOP-3.1
	RO	4. 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. **CAUTION - Step 4.b** **If any PZR PORV opens because of high PZR pressure, Step 4.b should be repeated after pressure decreases to LESS**	EOP-3.1

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # 8 Page: 32 of 37

Event Description: Earthquake, followed by three faulted Steam Generators and an ATWS.

Time	Position	Applicant's Actions or Behavior	
		THAN 2330 psig, to ensure the PORV recloses. b. Verify all PZR PORVs are closed. c. Verify at least one PZR PORV Block Valve is open.	
	RO	5. Reset both SI RESET TRAIN A(B) Switches.	EOP-3.1
	RO	6. Reset Containment Isolation: • RESET PHASE A - TRAIN A(B) CNTMT ISOL. • RESET PHASE B - TRAIN A(B) CNTMT ISOL.	EOP-3.1
NOTE - Step 7 Any high radiation level received on a radiation monitor that was unisolated at event initiation, may be considered a valid alarm.			EOP-3.1
	BOP	7. 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. 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-3.1
CAUTION - Step 8 RCS pressure should be monitored. If RCS pressure decreases in an uncontrolled manner to LESS THAN 325 psig, the RHR Pumps must be manually restarted to supply water to the RCS.			EOP-3.1
	RO	8. Check if RHR Pumps should be stopped: a. Check if any RHR Pump is running with suction aligned to the RWST. b. Check RCS pressure: 1. RCS pressure is GREATER THAN 325 psig. 2. RCS pressure is stable OR increasing. c. Stop any RHR Pump which is running with suction aligned to the RWST and place in Standby.	EOP-3.1
	BOP	9. Verify RWST level is GREATER THAN 18%.	EOP-3.1

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # 8 Page: 33 of 37

Event Description: Earthquake, followed by three faulted Steam Generators and an ATWS.

Time	Position	Applicant's Actions or Behavior	
	RO	10. Establish Instrument Air to the RB: a. Start one Instrument Air Compressor and place the other in Standby. b. Verify PI-8342, INSTR AIR HDR PRESS PSIG, indicates GREATER THAN 60 psig. c. Open PVA-2659, INST AIR TO RB AIR SERV. d. Open PVT-2660, AIR SPLY TO RB.	EOP-3.1
	RO	11. Check if SI Accumulators should be isolated: a. Verify RCS pressure is LESS THAN 195 psig. **(NO)**	EOP-3.1
	CRS	**Alternative Action Step:** 11. Check if SI Accumulators should be isolated: a. WHEN RCS pressure is LESS THAN 195 psig, THEN COMPLETE Step 11. CONTINUE WITH Step 12.	EOP-3.1
*	RO	12. Check if SI flow should be reduced: a. Verify RCS subcooling on TI-499A(B), A(B) TEMP °F, is GREATER THAN 52.5°F [67.5°F]. b. Verify RCS pressure is stable OR increasing. **NOTE - Step 12.c** **If PZR level is LESS THAN 10% [28%], the PZR should refill from SI flow after pressure is stabilized.** c. Verify PZR level is GREATER THAN 10% [28%].	EOP-3.1
	RO	13. Stop all but one Charging Pump and place in Standby.	EOP-3.1
	RO	14. Verify RCS pressure is stable OR increasing.	EOP-3.1
Critical Task	RO	15. 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. **Once the crew has closed both MVG-8801A(B), Safety Injection is secured.**	EOP-3.1
	RO	16. Control FCV-122, CHG FLOW, to maintain PZR level between 22% [39%] and 76% [69%].	EOP-3.1

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # 8 Page: 34 of 37

Event Description: Earthquake, followed by three faulted Steam Generators and an ATWS.

Time	Position	Applicant's Actions or Behavior	
	RO	17. 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-3.1
	RO	18. Verify SI flow is NOT required: a. RCS subcooling on TI-499A(B), A(B) TEMP °F, is GREATER THAN 52.5°F [67.5°F]. b. PZR level is GREATER THAN 10% [28%].	EOP-3.1
	RO	19. Check if RB Spray should be stopped: a. Check if any RB Spray Pumps are running. b. Verify RB pressure is LESS THAN 11 psig. c. Depress both RESET TRAIN A(B) RB SPRAY. **NOTE - Step 19.d** **If EOP-14.0, FR-C.1, RESPONSE TO INADEQUATE CORE COOLING, has been implemented, RB Spray must run for a minimum of four hours.** d. Verify EOP-14.0, FR-C.1, RESPONSE TO INADEQUATE CORE COOLING, has NOT been implemented. e. Stop both RB Spray Pumps and place in Standby. f. Close MVG-3003A(B), SPRAY HDR ISOL LOOP A(B).	EOP-3.1
	RO	20. Verify RCS Thot is stable OR decreasing.	EOP-3.1
	RO	21. Verify Narrow Range level in all SGs is LESS THAN 60%.	EOP-3.1
	RO	22. Check if Letdown can be established: a. Verify PZR level is GREATER THAN 22% [39%]. b. Establish Normal Letdown using ATTACHMENT 2, ESTABLISHING NORMAL LETDOWN.	EOP-3.1

EVALUTORE NOTE: The scenario may be terminated once the crew decides to establish Letdown. Watching them establish Letdown is not necessary.

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # N/A Page: 35 of 37

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.	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

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # N/A Page: 36 of 37

Event Description: EOP-1.0, 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 Service Water Booster Pump A is stopped. **(NO)** **Alternative Action Step:** b. GO TO Step 7.e. 7e. Verify that Service Water Booster Pump B is stopped. **(NO)** **Alternative Action Step:** e. GO TO Step 7.h. 7h. 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

Op Test No: NRC-ILO-16-01 Scenario # 3 Event # N/A Page: 37 of 37

Event Description: EOP-1.0, Attachment 3

Time	Position	Applicant's Actions or Behavior	
	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. **Candidates will identify that Phase "A" valves MVT-8100 and MVT-8112 did not close. They will manually try to close both. Only MVT-8112 will close manually.**	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
	BOP	Report completion of Attachment 3.	

EVALUATOR NOTE: ATTACHMENT 3 is complete.

Turnover Notes
Mode 2 // 10^{-3}% Power // Work Week B1 // 2 Trains VU // EOOS: Green // Grid Risk: Green // FEP Risk: Green
The plant has completed a Mid-Cycle Outage to repair a steam leak on the Main Turbine.
The Reactor is critical at 10-3% power.
The secondary has been warmed and the MSIVs are open.
Condensate Polishers are secure.
“B” Motor Driven EFW pump is ready to be started for the startup in accordance with SOP-211, Emergency Feedwater System, Section III.A. As soon as you take the shift, the BOP is to start the pump.
GOP-3, Reactor Startup from Hot Standby to Startup (Mode 3 to Mode 2) complete up to step 3.14. You are to continue the Rx startup starting with step 3.14. and stabilize power at 1-3%.
GTP-702, Surveillance Activity Tracking and Triggering, Att II G, Operational Mode Change Plant Startup - Entering Mode 1 is complete.
GOP-4A, Power Operation (Mode 1 - Ascending) is in progress up to step 3.6.c.
XFN-0065B-AH, REACTOR BLDG COOLING UNIT 2B EMERG FAN, was tagged out for Breaker Maintenance 2 hours ago. The maintenance is expected to take approximately 10 hours.
Current RCS Boron concentration by chemistry is 1481 ppm.
The “C” Circulating Water pump has a Caution Tag on it that reads “"C" CW pump is in Normal After Stop because of higher than normal vibrations, For Emergency Use Only”.
The simulator is in run with surrogate operators attending to the reactor and feed water. After your panel walk down, get a turnover from the surrogates.

CONTROL ROOM SUPERVISOR RELIEF CHECKLIST

DATE/TIME: Today/Now

RELIEF SECTION

Turnover Notes
Mode 2 // 10-3% Power // Work Week B1 // 2 Trains VU // EOOS: Green // Grid Risk: Green // FEP Risk: Green
The plant has completed a Mid-Cycle Outage to repair a steam leak on the Main Turbine.
The Reactor is critical at 10-3% power.
The secondary has been warmed and the MSIVs are open.
Condensate polishers are secured.
Current RCS Boron Concentration by chemistry sample is 1481 ppm.
GOP-3, Reactor Startup From Hot Standby To Startup (Mode 3 to Mode 2) complete up to step 3.14
GTP-702 Surveillance Activity Tracking and Triggering, Attachment II G, Operational Mode Change Plant Startup - Entering Mode 1, has been completed.
GOP-4A Power Operation (Mode 1 - Ascending) has been started.
“B” Motor Driven EFW pump is ready to be started for the startup in accordance with SOP-211, Emergency Feedwater System, Section III.A. As soon as you take the shift, have the BOP start the "B" Motor Driven EFW pump.
XFN-0065B RBCU was tagged out for Breaker maintenance 2 hours ago. The RBCU is expected to be returned in 10 hours.
The “C” Circulating Water pump has a Caution Tag on it that reads “"C" CW pump is in Normal After Stop because of higher than normal vibrations, For Emergency Use Only”.

Offgoing Control Room Supervisor		
	Operations in progress (GOPs, SOPs, load changes, etc.):	
	GOP-3, Reactor Startup From Hot Standby To Startup (Mode 3 to Mode 2) complete to Step 3.14.	
	GOP-4A, Power Operation (Mode 1 - Ascending), has been started	
	Operations scheduled for oncoming shifts: (GTP-702/Tech Spec actions due - Time _____Date _____INIT____	
	Continue up-power in accordance with the reactivity plan.	
	Plant safeguard systems in degraded status:	
	XFN-0065B RBCU is tagged out for repairs.	
		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

CHG B

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	
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 Manager review	

CHG
C

REACTOR OPERATOR RELIEF CHECKLIST

DATE/TIME: Today/Now

LOG SECTION

Date	Entry
Today	Reactor Engineering provided reactivity plan for start up.
Today	Took reactor critical in anticipation of startup, rods at 100 steps on Control Bank D.

RELIEF SECTION

Turnover Notes
Evolutions and Procedures in progress:
Mode 2 // 10-3% Power // Work Week B1 // 2 Trains VU // EOOS: Green // Grid Risk: Green // FEP Risk: Green
The plant has completed a Mid-Cycle Outage to repair a steam leak on the Main Turbine.
The Reactor is critical at 10-3 % power. Critical Data has been recorded.
The secondary has been warmed and the MSIVs are open.
Condensate polishers are secured.
Current RCS Boron Concentration by chemistry sample is 1481 ppm.
GOP-3, Reactor Startup From Hot Standby To Startup (Mode 3 to Mode 2) complete up to step 3.14.
GOP-4A Power Operation (Mode 1 - Ascending) has been started.
The “C” Circulating Water pump has a Caution Tag on it that reads “"C" CW pump is in Normal After Stop because of higher than normal vibrations, For Emergency Use Only”.
“B” Motor Driven EFW pump is ready to be started for the startup in accordance with SOP-211, Emergency Feedwater System, Section III.A.
XFN-0065B RBCU was tagged out for Breaker maintenance 2 hours ago. The RBCU is expected to be returned in 10 hours.

CHG E

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
Timer set for GTP-702 or other actions:	
Review of HVAC Panel.	
Review of Station Log.	
Review of Removal & Restoration Log.	
Review of Main Control Board Panels.	
Review of Generic Logs in Progress:	

CHG B

CHG E

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	X				
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 Manager review	

CHG
C

BALANCE OF PLANT RELIEF CHECKLIST

DATE/TIME: Today/Now

LOG SECTION

Date	Entry
Today	Secondary warm up completed with Turbine on turning gear. Expect start up today.

RELIEF SECTION

Turnover Notes
Evolutions and Procedures in progress:
Mode 2 // 10-3% Power // Work Week B1 // 2 Trains VU // EOOS: Green // Grid Risk: Green // FEP Risk: Green
The Reactor is critical at 10-3 % power. Critical Data has been recorded.
The secondary has been warmed and the MSIVs are open. Condensate polishers are secured.
GOP-3, Reactor Startup From Hot Standby To Startup (Mode 3 to Mode 2) complete up to step 3.14
The “C” Circulating Water pump has a Caution Tag on it that reads ""C" CW pump is in Normal After Stop because of higher than normal vibrations, For Emergency Use Only”.
“B” Motor Driven EFW pump is ready to be started for the startup in accordance with SOP-211, Emergency Feedwater System, Section III.A. as soon as you take the shift.

CHG E

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

Oncoming Balance Of Plant	Initials
Timer set for GTP-702 or other actions	
Review of Main Control Room Panels.	
Review of Station Log.	
Review of Removal & Restoration Log.	
Test annunciator lights (with Offgoing operator concurrence).	
Review of Generic Logs in Progress	

CHG B

CHG E

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 Manager review	

CHG C

REACTIVITY MANAGEMENT PLAN VERIFICATION

CYCLE 24 PLAN # 2018-3 TITLE 10000 MWD/MTU 2-100%

BEACON Filenames:

Model Input:	10K_02_1481.bcn
Summary Results:	sim_10K-startup-2-100.ls
Calibration:	nocal-ni-kbias_7K+
Power Profile:	sim2-100_10K.lf

Initial Conditions and Assumptions

Reactor is at 10-3% RTP, Burnup is approximately 10000 MWD/MTU, RCS Boron is approximately 1481 ppm, D Bank is approximately 100 steps.

Transient Assumptions

Change power per Attachment II schedule

Prediction Constraints

Use control bank D and boron for reactivity compensation.

Maintain Control Bank D position at least 15 steps above RIL.

NOTE: See attached predictive trends.
BEACON predicted xenon will NOT match the xenon displayed on the plant computer.

Contact the following if there are questions about this guidance:

Reactor Engineering	Office	Home/Cell
Damon Bryson	54814	733-7618
Mike Strickland	54625	251-5767

Step Number	Signature	Date
7.40 Verify 9.0 Criteria	Signature 1	Today
7.41 RxE Verifier	RE Signature	Today
7.42 Operations Reviewer	OPS Signature	Today

COMMENTS:

REACTIVITY MANAGEMENT PLAN INPUTS

CYCLE 24 PLAN # 2018-3 TITLE 10000 MWD/MTU 2-100%

PROPOSED POWER MANEUVER

Time (hrs)	Reactor Power	Comments (e.g. control rod or boron issues, activities to be performed, holds, etc.)
Now	10-3%	Increase power to 1-3% in 15 minutes
Now+15min	2%	Hold at 2% for 15 min
Now+30min	8%	Increase to 8% for 45 min
Now+1hr 15min	15%	Hold at 15% for 1 hr and 30 min
Now+2hr 45min	100%	Increase power to 100% in 12.75 hours
Now+15hr 30min	100%	Hold at 100% power for 12 hours

COMMENTS - list power plateau activities, unusual operational restraints, contingency plans, alternate power history variations to address, time periods to avoid boration, etc.

Cycle 24 Simulator 10k MWD/MTU Startup 2-100%

Hours After Start	Rx Power	D Bank Pos	Boron PPM	Boron (gal)	Water (gal)	Total Boron (gal)	Total Water (gal)	Delta-I (%)	RAOC Band Low	RAOC Band High	Xenon Worth (pcm)	RIL Limit (steps)
0.00	10-3%	100	1481.0	0	0	0	0	-0.18	-22.00	20.00	-14	0
0.25	2%	108	1481.0	0	0	0	0	-0.47	-22.00	20.00	-15	7
0.50	8%	122	1481.0	0	0	0	0	-0.46	-22.00	20.00	-16	7
0.75	8%	122	1481.0	0	0	0	0	-0.45	-22.00	20.00	-18	7
1.00	8%	122	1481.0	0	0	0	0	-0.44	-22.00	20.00	-20	7
1.25	15%	133	1481.0	0	0	0	0	-0.43	-22.00	20.00	-23	7
1.50	15%	149	1481.0	0	0	0	0	0.22	-22.00	20.00	-26	21
1.75	15%	149	1481.0	0	0	0	0	0.28	-22.00	20.00	-31	21
2.00	15%	150	1481.0	0	0	0	0	0.34	-22.00	20.00	-36	21
2.25	15%	151	1481.0	0	0	0	0	0.41	-22.00	20.00	-42	21
2.50	15%	152	1481.0	0	0	0	0	0.49	-22.00	20.00	-48	21
2.75	16%	151	1475.5	0	163	0	163	-0.37	-22.00	20.00	-55	23
3.00	18%	144	1455.0	0	363	0	526	-0.36	-22.00	20.00	-62	26
3.25	19%	144	1441.8	0	128	0	654	-0.45	-22.00	20.00	-71	29
3.50	20%	144	1438.0	0	139	0	793	-0.54	-22.00	20.00	-80	31
3.75	21%	147	1436.3	0	61	0	854	-0.39	-22.00	20.00	-89	34
4.00	23%	147	1432.2	0	147	0	1001	-0.50	-22.00	20.00	-100	36
4.25	24%	147	1428.1	0	150	0	1151	-0.62	-22.00	20.00	-111	39
4.50	25%	149	1425.9	0	79	0	1231	-0.46	-22.00	20.00	-123	41
4.75	27%	149	1420.8	0	187	0	1417	-0.60	-22.00	20.00	-135	44
5.00	28%	150	1417.5	0	125	0	1542	-0.53	-22.00	20.00	-148	47
5.25	30%	150	1412.2	0	195	0	1737	-0.69	-22.00	20.00	-163	51
5.50	31%	152	1408.6	0	130	0	1867	-0.59	-22.00	20.00	-177	54
5.75	33%	152	1403.2	0	203	0	2070	-0.77	-22.00	20.00	-193	57
6.00	34%	154	1399.5	0	136	0	2206	-0.63	-22.00	20.00	-209	60
6.25	36%	154	1393.9	0	209	0	2416	-0.84	-22.00	20.00	-226	63
6.50	38%	156	1389.9	0	148	0	2564	-0.69	-22.00	20.00	-243	67
6.75	39%	157	1384.8	0	192	0	2755	-0.75	-22.00	20.00	-261	70
7.00	41%	157	1379.9	0	187	0	2942	-0.77	-22.00	20.00	-280	73
7.25	42%	158	1374.8	0	192	0	3134	-0.81	-22.00	20.00	-300	76
7.50	44%	159	1369.8	0	190	0	3324	-0.83	-22.00	20.00	-320	79
7.75	45%	160	1364.6	0	200	0	3524	-0.86	-22.00	20.00	-340	83
8.00	47%	160	1358.1	0	247	0	3771	-1.16	-22.00	20.00	-361	86
8.25	48%	162	1354.1	0	157	0	3928	-0.87	-22.00	20.00	-383	89
8.50	50%	162	1347.6	0	248	0	4176	-1.17	-22.00	20.00	-405	92
8.75	52%	164	1343.0	0	178	0	4354	-0.94	-21.55	19.62	-427	95
9.00	53%	165	1337.3	0	224	0	4578	-1.03	-21.10	19.23	-450	99
9.25	55%	166	1331.7	0	220	0	4798	-1.04	-20.66	18.85	-473	102
9.50	56%	168	1325.9	0	226	0	5023	-1.09	-20.21	18.46	-497	105
9.75	58%	169	1320.1	0	229	0	5252	-1.12	-19.76	18.08	-521	108
10.00	60%	170	1314.0	0	241	0	5493	-1.14	-19.25	17.64	-545	112
10.25	62%	171	1307.9	0	244	0	5737	-1.16	-18.74	17.21	-569	116
10.50	64%	171	1300.4	0	298	0	6035	-1.64	-18.23	16.77	-594	120
10.75	65%	174	1295.2	0	209	0	6244	-1.32	-17.72	16.33	-618	123
11.00	67%	175	1289.4	0	236	0	6480	-1.23	-17.21	15.90	-643	127
11.25	69%	177	1283.0	0	258	0	6738	-1.30	-16.71	15.46	-668	131
11.50	71%	178	1276.8	0	256	0	6994	-1.31	-16.20	15.03	-693	134
11.75	73%	179	1270.5	0	258	0	7252	-1.36	-15.69	14.59	-718	138
12.00	74%	181	1264.3	0	252	0	7504	-1.40	-15.18	14.15	-743	142
12.25	76%	182	1258.0	0	264	0	7768	-1.43	-14.67	13.72	-768	146
12.50	78%	184	1251.7	0	260	0	8028	-1.46	-14.16	13.28	-793	149
12.75	80%	186	1245.1	0	275	0	8303	-1.52	-13.60	12.80	-818	153

Tech Spec Ref: N/A

Procedure Ref: REP-102.001

Figure Ref: N/A

Cycle 24 Simulator 10k MWD/MTU Startup 2-100%

Hours After Start	Rx Power	D Bank Pos	Boron PPM	Boron (gal)	Water (gal)	Total Boron (gal)	Total Water (gal)	Delta-I (%)	RAOC Band Low	RAOC Band High	Xenon Worth (pcm)	RIL Limit (steps)
13.00	82%	187	1238.5	0	280	0	8583	-1.54	-13.04	12.32	-842	157
13.25	84%	189	1232.0	0	271	0	8853	-1.57	-12.48	11.84	-867	161
13.50	86%	191	1225.4	0	283	0	9136	-1.63	-11.92	11.36	-892	165
13.75	88%	193	1218.9	0	275	0	9411	-1.68	-11.36	10.88	-916	170
14.00	90%	195	1212.4	0	280	0	9691	-1.72	-10.80	10.40	-940	174
14.25	92%	197	1205.8	0	285	0	9976	-1.80	-10.24	9.92	-964	178
14.50	94%	199	1199.4	0	279	0	10255	-1.81	-9.68	9.44	-988	182
14.75	96%	201	1192.5	0	301	0	10556	-1.98	-9.12	8.96	-1012	186
15.00	98%	205	1186.7	0	252	0	10808	-1.68	-8.56	8.48	-1035	190
15.25	100%	209	1181.0	0	252	0	11061	-1.31	-8.00	8.00	-1058	194
15.50	100%	209	1177.5	0	155	0	11215	-1.36	-8.00	8.00	-1083	194
15.75	100%	209	1173.8	0	164	0	11380	-1.50	-8.00	8.00	-1109	194
16.00	100%	209	1170.2	0	161	0	11541	-1.67	-8.00	8.00	-1135	194
16.25	100%	209	1166.4	0	169	0	11710	-1.70	-8.00	8.00	-1162	194
16.50	100%	209	1162.6	0	171	0	11880	-1.90	-8.00	8.00	-1188	194
16.75	100%	209	1158.8	0	173	0	12053	-1.93	-8.00	8.00	-1215	194
17.00	100%	209	1154.9	0	176	0	12229	-2.11	-8.00	8.00	-1242	194
17.25	100%	209	1151.0	0	173	0	12402	-2.29	-8.00	8.00	-1270	194
17.50	100%	209	1147.2	0	175	0	12577	-2.35	-8.00	8.00	-1297	194
17.75	100%	209	1143.3	0	179	0	12755	-2.51	-8.00	8.00	-1324	194
18.00	100%	209	1139.5	0	175	0	12930	-2.66	-8.00	8.00	-1351	194
18.25	100%	210	1136.2	0	152	0	13082	-2.57	-8.00	8.00	-1377	194
18.50	100%	210	1132.3	0	179	0	13261	-2.75	-8.00	8.00	-1404	194
18.75	100%	210	1128.9	0	157	0	13418	-2.67	-8.00	8.00	-1430	194
19.00	100%	211	1125.4	0	161	0	13579	-2.65	-8.00	8.00	-1456	194
19.25	100%	211	1121.9	0	163	0	13742	-2.69	-8.00	8.00	-1482	194
19.50	100%	211	1118.5	0	155	0	13897	-2.67	-8.00	8.00	-1507	194
19.75	100%	212	1115.1	0	159	0	14056	-2.65	-8.00	8.00	-1532	194
20.00	100%	212	1111.6	0	165	0	14221	-2.74	-8.00	8.00	-1557	194
20.25	100%	212	1108.5	0	149	0	14370	-2.70	-8.00	8.00	-1582	194
20.50	100%	213	1105.3	0	151	0	14521	-2.68	-8.00	8.00	-1606	194
20.75	100%	213	1101.9	0	160	0	14681	-2.74	-8.00	8.00	-1630	194
21.00	100%	213	1098.8	0	143	0	14824	-2.72	-8.00	8.00	-1653	194
21.25	100%	214	1095.8	0	147	0	14971	-2.69	-8.00	8.00	-1676	194
21.50	100%	214	1092.6	0	152	0	15123	-2.75	-8.00	8.00	-1698	194
21.75	100%	215	1089.6	0	141	0	15264	-2.71	-8.00	8.00	-1720	194
22.00	100%	215	1086.8	0	136	0	15400	-2.72	-8.00	8.00	-1742	194
22.25	100%	216	1083.9	0	138	0	15537	-2.71	-8.00	8.00	-1763	194
22.50	100%	216	1081.2	0	134	0	15671	-2.70	-8.00	8.00	-1784	194
22.75	100%	216	1078.4	0	134	0	15805	-2.70	-8.00	8.00	-1805	194
23.00	100%	217	1075.7	0	131	0	15935	-2.70	-8.00	8.00	-1825	194
23.25	100%	217	1073.0	0	129	0	16064	-2.70	-8.00	8.00	-1845	194
23.50	100%	218	1070.4	0	127	0	16191	-2.71	-8.00	8.00	-1864	194
23.75	100%	218	1067.9	0	125	0	16316	-2.71	-8.00	8.00	-1883	194
24.00	100%	219	1065.4	0	122	0	16438	-2.72	-8.00	8.00	-1901	194
24.25	100%	219	1062.9	0	120	0	16558	-2.72	-8.00	8.00	-1919	194
24.50	100%	219	1060.6	0	118	0	16675	-2.74	-8.00	8.00	-1937	194
24.75	100%	219	1058.1	0	123	0	16798	-2.75	-8.00	8.00	-1955	194
25.00	100%	221	1056.1	0	97	0	16895	-2.61	-8.00	8.00	-1971	194
25.25	100%	221	1053.8	0	116	0	17011	-2.74	-8.00	8.00	-1988	194
25.50	100%	221	1051.4	0	116	0	17127	-2.75	-8.00	8.00	-2004	194
25.75	100%	223	1049.6	0	90	0	17217	-2.64	-8.00	8.00	-2020	194

Tech Spec Ref: N/A

Procedure Ref: REP-102.001

Figure Ref: N/A

Cycle 24 Simulator 10k MWD/MTU Startup 2-100%

Hours After Start	Rx Power	D Bank Pos	Boron PPM	Boron (gal)	Water (gal)	Total Boron (gal)	Total Water (gal)	Delta-I (%)	RAOC Band Low	RAOC Band High	Xenon Worth (pcm)	RIL Limit (steps)
26.00	100%	223	1047.4	0	110	0	17326	-2.65	-8.00	8.00	-2035	194
26.25	100%	223	1045.3	0	107	0	17434	-2.71	-8.00	8.00	-2051	194
26.50	100%	227	1043.4	0	92	0	17525	-2.71	-8.00	8.00	-2065	194
26.75	100%	227	1041.4	0	103	0	17629	-2.72	-8.00	8.00	-2080	194

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: JPS-001F-N18

Manual Safety Injection with Charging Pumps Fail to Start (Alternate Path)

(NRC JPM a)

CANDIDATE: _____

EXAMINER: _____

TASK: 006-013-01-01 Manually Initiate Safety Injection

TASK STANDARD:

EOP-1.0 Attachment 3 is completed. The following actions have been taken:

- Manual actuation of Safety Injection.
- Manual **trip** of all 3 Feedwater pumps.
- Manual **start** of "B" Charging pump.
- Manual **start** of "B" RHR pump.
- Manual **trip** of "1B" RBCU Normal Speed Fan (XFN-64B)
- Manual **start** of "1B" RBCU Slow Speed Fan (XFN-64B).
- Manual **start** of "B" Service Water Booster pump.
- Manual **start** of "B" Component Cooling Water.

TERMINATING CUE:

The "B" CCW pump has been started.

PREFERRED EVALUATION LOCATION SIMULATOR

PREFERRED EVALUATION METHOD PERFORM

REFERENCES:

EOP-1.0, E-0 REACTOR TRIP OR SAFETY INJECTION

INDEX NO	***K/A NO.***		***RO***	***SRO***
006000A212	A2.12	Ability to (a) predict the impacts of the following malfunctions or operations on the ECCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Conditions requiring actuation of ECCS.	4.5	4.8

TOOLS: Rack copy of EOP-1.0, Attachment 3, SI EQUIPMENT VERIFICATION
Rack copy of EOP-1.0, REACTOR TRIP OR SAFETY INJECTION marked through Step 3.

VALIDATION TIME 15 min ***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: None.

INITIAL CONDITION:

A small break LOCA has occurred. EOP-1.0, E-0 REACTOR TRIP OR SAFETY INJECTION has been entered.

Immediate actions 1 through 3 have been performed.

INITIATING CUES:

The CRS directs you to perform EOP-1.0, beginning at immediate action step 4.

A surrogate operator will acknowledge non-related alarms per your direction.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

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

JPM STEP: 1

Step 4: Check if SI is actuated:

Step 4 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.

Step 4 b: Actuate SI using either SI ACTUATION Switch.

STEP STANDARD:

Candidate observes XCP-626, 1-5 PZR SI lit indicating SI criteria met.

Candidate **places either one of the 2 Safety Injection Manual actuation switches in the ACTUATE** position.

CUES:

BOOTH OPERATOR CUE: Place the Simulator in RUN when the Evaluator indicates the JPM may begin.

EVALUATOR NOTE: Either switch will actuate the Train "A" equipment but Train "B" equipment will NOT start from an SI signal. The candidate must manually reposition all Train "B" equipment. Candidate may operate BOTH switches to assure themselves that Train "B" will not actuate**. This is the point at which the JPM becomes Alternate Path.**

EVALUATOR CUE: Once the candidate has manually actuated SI provide the following verbal cue "CRS Directs you to perform Attachment 3, SI EQUIPMENT VERIFICATION" then provide the rack copy of EOP-1.0, Attachment 3.

EVALUATOR CUE: IF the candidate notes RCS pressure has decreased to less than 1418 psig and indicates they are going to stop RCPs per the reference page guidance, inform them another operator will perform that action and they should continue with EOP-1.0 Attachment 3 actions.

EVALUATOR CUE: Acknowledge any communications as CRS.

COMMENTS:

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

JPM STEP: 2

Attachment 3 Step 1: Ensure EFW Pumps are running:

Step 1a: Ensure both MD EFW Pumps are running.

Step 1b: Verify the TD EFW Pump is running if necessary to maintain SG levels.

STEP STANDARD:

Candidate locates MDEFP controls; verifies both the "A" and "B" pump breakers red lights ON, green lights OFF and normal running amps indicated on the ammeters.

Candidate locates TDEFP controls; checks turbine speed indicates normal.

CUES:

EVALUATOR NOTE: All remaining JPM steps are from EOP-1.0 Attachment 3.

COMMENTS:

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

JPM STEP: 3

Step 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.

STEP STANDARD:

Candidate verifies red lights ON, green lights OFF for MDEFP to SGs Control Valves, FCV-3531(3541)(3551).

Candidate verifies red lights ON, green lights OFF for TDEFP to SGs Control Valves, FCV-3536(3546)(3556).

Candidate verifies red lights ON, green lights OFF on TDEFP steam supply valves MVG-2802A(B).

CUES:

COMMENTS:

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

JPM STEP: 4

Step 3: Verify total EFW flow is GREATER THAN 450 gpm.

STEP STANDARD:

Candidate locates flow indicators and verifies total flow greater than 450 gpm.

CUES:

EVALUATOR NOTE: Flow indication is located in several places. One location is panel XCP-6111, flow meters FI-3561, FI-3571, and FI-3581 another is panel XCP-6112 flow meters FI-3561B, 3571B and 3581B are on Panel XCP-6112 or various SIPCS screens.

COMMENTS:

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

JPM STEP: 5

Step 4: Ensure FW Isolation:

Step 4a: 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).

Step 4b: Ensure all Main FW Pumps are tripped.

STEP STANDARD:

Candidate locates:

FW Flow Control Valve indications; verifies red lights OFF, green lights ON for FCV-478(488)(498).

FW Isolation Valve indications; verifies red lights OFF, green lights ON for PVG-1611A(B)(C).

FW Flow Control Bypass Valve indication; verifies red light OFF, green light ON for FCV-3321(3331)(3341).

SG Blowdown Valve indications; verifies red lights OFF, green lights ON for PVG-503A(B)(C).

SG Sample Valve indications; verifies red lights OFF, green lights ON for SVX-9398A(B)(C).

Main Feed Pump TRIP/RESET switches; observes all 3 amber RESET lights ON **or** observes red RESET status box for each main feed pump on the HMI screen at the Feedwater station. **Places each TRIP/RESET switch to TRIP**, observes green TRIP light ON, and amber RESET light OFF for each pump and green TRIPPED status box for each pump on the HMI screen.

CUES:

EVALUATOR NOTE: All indications are at the front of the Control Room in and around the Feedwater station except the Blowdown Sample valves which are located on Panel XCP-6104 near the RBCU controls.

COMMENTS:

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

JPM STEP: 6

Step 5: Ensure SI Pumps are running:

- Two Charging Pumps are running.
- Both RHR Pumps are running.

STEP STANDARD:

Candidate locates Charging Pump Controls and notes;

"A" Charging Pump breaker indicates red light ON, green light OFF, pump amps very low and no Charging flow indicated.

"B" Charging Pump breaker indicates red light OFF, green light ON and no amps indicated on the ammeter. **Places Control Switch to START**, observes breaker indicates red light ON, green light OFF and amps at running amps.

Candidate locates RHR Pump Controls and notes;

"A" pump breaker indicates red light ON, green light OFF and normal running amps on the ammeter.

"B" pump breaker indicates red light OFF, green light ON and zero amps on the ammeter. **Places control switch to START**, observes breaker indicates red light ON, green light OFF and amps at running amps.

CUES:

EVALUATOR NOTE: The critical step is to start the "B" Charging pump to assure injection flow for the Small Break LOCA that is in progress. Candidate may start the "B" CCW pump prior to starting "B" Charging pump to assure it has cooling water. The "A" Charging pump has a sheared shaft and Candidate may place its switch in Pull to Lock.

COMMENTS:

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

JPM STEP: 7

Step 6: Ensure two RBCU Fans are running in slow speed (one per train).

STEP STANDARD:

Candidate locates RBCU controls and notes;

Red light ON, green light OFF at the 1A SLOW switch and running amps on the 1A SLOW, RBCU Fan Ammeter.

Red light ON, green light OFF at the 1B NORM switch and running amps on the 1B NORM, RBCU Fan Ammeter.

Red light OFF, green light ON at the 1B SLOW switch and zero amps on the 1B SLOW, RBCU Fan Ammeter.

Places control switch 1B NORM to STOP, observes breaker indicates red light OFF, green light ON and NO amps on 1B NORM, RBCU Fan Ammeter.

Places control switch 1B SLOW to START, observes breaker indicates red light ON, green light OFF and running amps on 1B SLOW, RBCU Fan Ammeter.

CUES:

COMMENTS:

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

JPM STEP: 8

Step 7: Verify Service Water flow to RBCUs:

Step 7a: Ensure two Service Water Pumps are running.

STEP STANDARD:

Candidate locates Service Water Pump controls and notes; both the "A" and "B" pump breakers indicate red light ON, green light OFF and normal running amps on the ammeter.

CUES:

COMMENTS:

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

JPM STEP: 9

Step 7b: Verify that Service Water Booster Pump A is stopped. (NO)

Step 7b: ALTERNATIVE ACTION: GO TO Step 7e.

STEP STANDARD:

Candidate locates Service Water Booster Pump controls and notes the "A" Pump breaker indicates red light ON, green light OFF and normal running amps on the ammeter.

CUES:

COMMENTS:

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

JPM STEP: 10

Step 7e: Verify that Service Water Booster Pump B is stopped.

STEP STANDARD:

Candidate locates Service Water Booster Pump controls and notes the "B" Pump breaker indicates red light OFF, green light ON and zero amps on the ammeter.

CUES:

COMMENTS:

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

JPM STEP: 11

Step 7f: Verify both of the following:

- XVB-3107B, RBCU 64B/65B RTN TO SW PND is closed.

  AND

- Alarm XCP-605 1-5 XVB3107B-SW SLOW CLOSURE is NOT lit.

STEP STANDARD:

Candidate locates switch for XVB-3107B; verifies red lights OFF, green lights ON.

Candidate locates annunciator panel 605; verifies Alarm 1-5 is NOT lit.

CUES:

COMMENTS:

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

JPM STEP: 12

Step 7g: Start Service Water Booster Pump B.

STEP STANDARD:

Candidate locates "B" Service Water Booster Pump controls; **places control switch to START**, observes breaker indicates red light ON, green light OFF and amps at running amps and discharge valve XVB-3106B stroking open.

CUES:

COMMENTS:

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

JPM STEP: 13

Step 7h: Verify GREATER THAN 2000 gpm flow for each train on:

- FI-4466, SWBP A DISCH FLOW GPM.
- FI-4496, SWBP B DISCH FLOW GPM.

STEP STANDARD:

Candidate locates FI-4466, SWBP A DISCH FLOW GPM and FI-4496, SWBP B DISCH FLOW GPM and verifies each header indicates greater than 2000 gpm

CUES:

EVALUATOR NOTE: Flow indication on the Train "B" Service Water Booster pump will be elevated above the value displayed for Train "A" because MVG-3109D, RBCU 65B OUTLET ISOL valve did not recieve its close signal due to the Train "B" SI failure. Therefore Train "B" Service water booster pump has a parallel flow path allowing more flow.

COMMENTS:

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

JPM STEP: 14

Step 8: Verify two CCW Pumps are running.

STEP STANDARD:

Candidate locates CCW Pump Controls and notes;

"A" pump breaker indicates red light ON, green light OFF and normal running amps on the ammeter.

"B" pump breaker indicates red light OFF, green light ON and zero amps on the ammeter. **Places control switch to START,** observes breaker indicates red light ON, green light OFF and amps at running amps

CUES:

EVALUATOR NOTE: The critical step is to start the "B" CCW pump to assure that the "B" Charging pump is adequately supported for the Small Break LOCA that is in progress.

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM: JPS-001F-N18, Manual Safety Injection with Charging Pumps Fail to Start (Alternate Path) (NRC JPM a)
IC SET: 291

INSTRUCTIONS:

If IC-291 is designated for this JPM then reset to IC-291 leaving the simulator in FREEZE.

1. Mark up rack copy of EOP-1.0 through step 3 and place it on CRS desk.
2. When Candidate is ready (on Evaluator cue) go to RUN.

If IC-291 is **not** designated for this JPM then initial conditions may be established by resetting to IC-10 and following the below directions:

1. With the simulator reset to IC-10 and in FREEZE, insert the following:

- **PRE-LOAD**
    - MAL-PCS005A
      SAFETY INJECTION FAILURE TRAIN A
      Fail To: FAIL TO AUTO INIT
    - MAL-PCS005B
      SAFETY INJECTION FAILURE TRAIN B
      Fail To: TOTAL FAILURE
- **AUTO-TRIGGER 1** X09i073a | X03i049a = = 1 (Either SI manual switch taken to actuate)
    - PMP-CS004S
      XPP0043A CHRG/SI PMP A SHEARED SHAFT
      Delay: 20 sec

2. Place the simulator in RUN and insert the following:
    - MAL-RCS006A
      REACTOR COOLANT SYSTEM LEAK COLD LEG (LOOP 1)
      Final Value 1700 GPM
3. When RCS Pressure is less than 1850 psig and greater than 1418 psig, place the Simulator in FREEZE and save to the desired IC.
4. Mark up rack copy of EOP-1.0 through step 3 and place it on CRS desk.
5. When Candidate is ready (on Evaluator cue) go to RUN.

COMMENTS:

Provide spare operator to silence alarms.

BOOTH OPERATOR: Use LOA resets page to silence HVAC alarms when they come in.

Mark strip chart recorders with date and time at the completion of each performance of this JPM.

Roll strip chart recorders to show no traces from the just completed performance after marking them as noted above.

CRITICAL TASK METHODOLOGY:

Step 1 is critical because conditions warrant SI and auto SI has failed.

Step 5 is critical because the completion of FWI requires trip of the FW pumps and this is defeated due to Train B SI failure.

Step 6 is critical because the plant is experiencing a Small Break LOCA and neither Charging/SI pump is injecting into the RCS until the Candidate starts the “B” Charging pump.

Step 7 is critical in order to successfully complete Attachment 3.

Step 12 is critical in order to successfully complete Attachment 3.

Step 14 is critical because the plant is experiencing a Small Break LOCA and “B” CCW pump must be started to support operation of the “B” Charging pump.

REVISION HISTORY:

This JPM is new for the 2018 NRC exam for ILO-16-01. SAR 11/2017.

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: None.

INITIAL CONDITION:

A small break LOCA has occurred. EOP-1.0, E-0 REACTOR TRIP OR SAFETY INJECTION has been entered.

Immediate actions 1 through 3 have been performed.

INITIATING CUES:

The CRS directs you to perform EOP-1.0, beginning at immediate action step 4.

A surrogate operator will acknowledge non-related alarms per your direction.

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: JPS-002F-N18

Pressurizer Pressure Control Malfunction (Alternate Path)
(NRC JPM b)

CANDIDATE: _____

EXAMINER: _____

TASK: 000-509-05-02 Recover From Reactor Trip per EOP-1.1.

TASK STANDARD:

The “A” and “C” RCPs are stopped before Pressurizer Pressure reaches the Auto SI setpoint of 1850 psig.

TERMINATING CUE:

RCS depressurization is halted.

PREFERRED EVALUATION LOCATION
SIMULATOR

PREFERRED EVALUATION METHOD
PERFORM

REFERENCES:

EOP-1.1; ES-0.1 REACTOR TRIP RESPONSE

INDEX NO	*K/A NO.*		*RO*	*SRO*
000027A101	AA1.01	Actions to be taken if PZR pressure control malfunctions – PZR heaters, sprays and PORVs	4.0	3.9

TOOLS: Rack copy of EOP-1.1; ES-0.1, REACTOR TRIP RECOVERY with steps 1-7 marked as complete.

VALIDATION TIME 10 min ***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: None.

INITIAL CONDITION:

The reactor was tripped from 100% power. The crew have transitioned to EOP-1.1, ES-0.1 REACTOR TRIP RESPONSE and have completed steps 1 through 7.

INITIATING CUES:

The CRS directs you to perform EOP-1.1 beginning with step 8.

A surrogate operator will acknowledge non-related alarms per your direction.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

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

JPM STEP: 1

Step 8: Verify all Control Rods are fully inserted.

STEP STANDARD:

Candidate locates Control Rod Position Indication and verifies all rod bottom red lights ON and all rods indicate fully inserted, green column LIT for each rod.

CUES:

EVALUATOR CUE: Provide the marked up rack copy of EOP-1.1, ES-0.1, REACTOR TRIP RESPONSE once the candidate has been briefed on the initiating cue.

BOOTH OPERATOR CUE: Place the Simulator in RUN when the Evaluator indicates the JPM may begin.

COMMENTS:

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

JPM STEP: 2

Step 9: Check DA level control:

Step 9 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.

Step 9 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).

STEP STANDARD:

Candidate locates DA Level Indication LI-3135 and verifies level is less than 10.5 ft.

Candidate contacts AO and directs adjustment of Condensate flow from the Blowdown heat exchangers.

CUES:

BOOTH OPERATOR CUE: When contacted as AO to adjust Blowdown Hx condensate flow acknowledge request.

BOOTH OPERATOR NOTE: the “Set TCV-3062A, B, C to 10% Open” button on the COMMON LOA/RESET PANEL will set the ITV to the requested value.

BOOTH OPERATOR CUE: Once candidate completes EOP-1.1 Step 9 insert **TRIGGER 1** – PZR spray valves 444C and 444D fail partially open.

EVALUATOR NOTE: The low Pressurizer Pressure SI setpoint will be reached in approximately 2 minutes after inserting trigger 1 if no operator action is taken.

COMMENTS:

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

JPM STEP: 3

Step 10: Check PZR level control:

Step 10a: Verify PZR level is GREATER THAN 17%.

STEP STANDARD:

Candidate locates PZR LEVEL % LI-459A, 460 and 461 and verifies level is greater than 17%.

CUES:

COMMENTS:

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

JPM STEP: 4

Step 10b: Verify Charging and Letdown are in service.

STEP STANDARD:

Candidate locates Charging controls and notes Charging and Letdown are in service.

CUES:

EVALUATOR NOTE: Charging and letdown indications may be found on panel XCP-6107. Indications include:

- "A" Charging pump breaker red light ON, green light OFF and normal running amps on the ammeter.
- CHG FLOW GPM, FI-122A.
- LO PRESS LTDN FLOW GPM, FI-150.
- PVT-459 and 460, LTDN LINE ISOL indicate red lights ON, green lights OFF.
- PVT-8149A and 8149B, LTDN ORIFCE A (B) ISOL indicate red lights ON, green lights OFF.

COMMENTS:

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

JPM STEP: 5

Step 10c: Verify PZR level is trending to 25%.

Step 10c: Alternative action: Control Charging and Letdown to maintain PZR level at 25%.

STEP STANDARD:

Candidate locates indications and verifies level is trending to 25%.

Candidate locates controls and adjusts as necessary to maintain PZR level.

CUES:

EVALUATOR NOTE: Control of PZR level may be accomplished by placing FCV-122 in manual. Candidate may choose to allow auto control to restore level to 25%. Pressurizer level indication may be found on panel XCP-6109L on meters LEVEL % LI-459A, 460 and 461.

COMMENTS:

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

JPM STEP: 6

Step 11: Check PZR pressure control:

Step 11a: Verify PZR pressure is GREATER THAN 1850 psig.

STEP STANDARD:

Candidate locates indications and verifies pressure is greater than 1850 psig.

CUES:

EVALUATOR NOTE: Pressurizer pressure may be found on panel XCP-6109L on meters PRESS PSIG PI-455, 456, 457 and 444.

COMMENTS:

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

JPM STEP: 7

Step 11b: Verify PZR pressure is stable at OR trending to 2230 psig (2220 psig to 2250 psig). (NO)

STEP STANDARD:

Candidate locates indications and verifies pressure is less than 2230 psig and trending downward.

CUES:

EVALUATOR NOTE: Candidate may refer to IPSC trend and or the WR pressure recorder (PR-402) in order to validate trend.

COMMENTS:

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

JPM STEP: 8

Step 11b Alternative Action: IF PZR pressure is LESS THAN 2230 psig AND decreasing, THEN:

1) Ensure the PZR PORVs are closed. IF any PORV fails to close, THEN close its Block Valve.

STEP STANDARD:

Candidate locates PZR controls and notes; PCV-445A, 445B and 444B, PWR RELIEF indicate red lights OFF, green lights ON.

CUES:

COMMENTS:

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

JPM STEP: 9

Step 11b Alternative Action: IF PZR pressure is LESS THAN 2230 psig AND decreasing, THEN:

2) Ensure PZR Spray Valves are closed.
IF any valve fails to close, THEN perform the following:
a) Stop RCP A.

STEP STANDARD:

Candidate locates PZR controls and notes;

PCV-444C, PZR SPR CNTRL FR LOOP C indicates red light ON, green light ON and **attempts to close PCV-444C are unsuccessful.**

PCV-444D, PZR SPR CNTRL FR LOOP A indicates red light ON, green light ON and **attempts to close PCV-444D are unsuccessful.**

Candidate locates RCP controls and **places switch for RCP "A" in STOP**, observes red light off, green light on and zero amps on ammeter prior to PZR pressure lowering to less than 1850 psig.

CUES:

EVALUATOR NOTE: The critical step is to stop the "A" RCP to assure spray flow is eliminated and RCS pressure is stabilized.

EVALUATOR NOTE: **This is the point where the JPM becomes alternate path.**

COMMENTS:

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

JPM STEP: 10

Step 11b Alternative Action: IF PZR pressure is LESS THAN 2230 psig AND decreasing, THEN:

b) IF PZR pressure continues to decrease, THEN perform the following:

- IF PCV-444C, PZR SPR CNTRL FR LOOP C, will NOT close, THEN stop RCP C.
- IF PCV-444D, PZR SPR CNTRL FR LOOP A, will NOT close, THEN stop either RCP B or RCP C.

STEP STANDARD:

Candidate locates indications and verifies pressure is trending downward.

Candidate locates RCP controls and **places switch for RCP "C" in STOP**, observes red light off, green light on and zero amps on ammeter prior to PZR pressure lowering to less than 1850 psig.

CUES:

EVALUATOR NOTE: The critical step is to stop the "C" RCP to assure spray flow is eliminated and RCS pressure is stabilized.

COMMENTS:

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

JPM STEP: 11

Step 11b Alternative Action: IF PZR pressure is LESS THAN 2230 psig AND decreasing, THEN:

3) Ensure PZR Heaters are on.

STEP STANDARD:

Candidate locates PZR controls and notes;

BU GRP 1 breaker control indicates red light ON, green light OFF and BU GRP1 AMPS ammeter indicates amperage.

CNTRL GRP breaker comntrol indicates red light ON, green light OFF and CNTRL GRP AMPS ammeter indicates amperage.

BU GRP 2 breaker control indicates red light ON, green light OFF and BU GRP 2 AMPS ammeter indicates amperage.

CUES:

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM: JPS-002F-N18, Pressurizer Pressure Control Malfunction (Alternate Path) (NRC JPM b)

IC SET: 292

INSTRUCTIONS:

If IC-292 is designated for this JPM then reset to IC-292 leaving the simulator in FREEZE.

1. Mark up copy of EOP-1.0 steps 1-5 and EOP-1.1 steps 1-7.
2. Ensure any false red path on sub criticality is cleared.
3. When Candidate is ready (on Evaluator cue) go to RUN.

If IC-292 is **not** designated for this JPM then initial conditions may be established by resetting to IC-10 and following the below directions:

1. With the simulator reset to IC-10 and in FREEZE, insert the following:

- **TRIGGER 1**
  - MAL-PRS003A
    PRESSURIZER SPRAY VALVE 444C FAILURE
    Ramp: 60 sec
    Final Value: 55%
  - MAL-PRS003B
    PRESSURIZER SPRAY VALVE 444D FAILURE
    Ramp: 60 sec
    Final Value: 55%

2. Place the Simulator in RUN.
3. Insert a manual Reactor Trip.
4. Perform Actions from EOP-1.0 and EOP-1.1 through step 7.
5. FREEZE and SAVE IC.
6. Mark up copy of EOP-1.0 steps 1-5 and EOP-1.1 steps 1-7.
7. Ensure any false red path on sub criticality is cleared.
8. When Candidate is ready (on Evaluator cue) go to RUN.

COMMENTS:

Provide spare operator to silence alarms.

Mark strip chart recorders with date and time at the completion of each performance of this JPM.

Roll strip chart recorders to show no traces from the just completed performance after marking them as noted above.

CRITICAL TASK METHODOLOGY:

Steps 9 and 10 are critical because spray valves PVT-444C and PVT-444D are failed in a partially open position and Pressurizer pressure will continue to degrade to an eventual SI actuation at 1850 psig unless the Candidate takes action to stop the RCPs.

REVISION HISTORY:

This JPM is a modification of JPSF-011A, PRESSURIZER PRESSURE CONTROL MALFUNCTION SAR 10/2017.

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: None.

INITIAL CONDITION:

The reactor was tripped from 100% power. The crew have transitioned to EOP-1.1, ES-0.1 REACTOR TRIP RESPONSE and have completed steps 1 through 7.

INITIATING CUES:

The CRS directs you to perform EOP-1.1 beginning with step 8.

A surrogate operator will acknowledge non-related alarms per your direction.

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: JPS-003F-N18

Respond to Inadequate Core Cooling (Attempt to Start RCPs and Depressurize Primary) (Alternate Path).

(NRC JPM c)

CANDIDATE: _____

EXAMINER: _____

TASK: 000-088-05-01 Response to Inadequate Core Cooling per SOP-122/EOP-12.0/EOP-2.0/EOP-14.0.

TASK STANDARD:

Completes the following until they are all completed and prior to CETC temperatures exceeding 1700°F:

1. Attempts start of "A" RCP. 2. Does not start "B" RCP. 3. Does not start "C" RCP. 4. Opens all pressurizer PORVs. 5. Opens Reactor Head Vent Valves MVG-8095A and 8095B.

TERMINATING CUE: Opens all pressurizer PORV's and Reactor Head Vent Valves MVG8095A and 8095B.

PREFERRED EVALUATION LOCATION SIMULATOR

PREFERRED EVALUATION METHOD PERFORM

REFERENCES:

EOP-2.0, LOSS OF REACTOR OR SECONDARY COOLANT

EOP-1.0, E-0, REACTOR TRIP OR SAFETY INJECTION

EOP-14.0, RESPONSE TO INADEQUATE CORE COOLING

INDEX NO	***K/A NO.***		***RO***	***SRO***
000074105	1.05	Ability to operate and monitor the following as they apply to Inadequate Core Cooling: PORV	3.9	4.1

TOOLS: Rack copy of EOP-14.0, FR-C.1, RESPONSE TO INADEQUATE CORE COOLING, marked up through step 21.

VALIDATION TIME 10 min ***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: None.

INITIAL CONDITION:

The plant has tripped with Safety Injection initiated due to a LOCA.

"C" Charging pump is tagged out for maintenance.

"A" charging pump failed a few minutes after the RCP's were secured.

"B" charging pump failed to start.

“A” RHR pump tripped and will not re-start.

“B” RHR pump failed to start automatically or manually.

Reactor Building Spray actuated.

Operators entered EOP-2.4, ECA-1.1 LOSS OF EMERGENCY COOLANT RECIRCULATION when a red path on Core Cooling was identified.

EOP- 14.0, FR-C.1, RESPONSE TO INADEQUATE CORE COOLING is in progress.

INITIATING CUES:

CRS directs you as the NROATC to perform Step 22 of EOP-14.0, FR-C.1, RESPONSE TO INADEQUATE CORE COOLING.

A surrogate operator will acknowledge non-related alarms per your direction.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

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

JPM STEP: 1

Step 22: Check if RCPs should be started:

a. Check if core exit TC temperatures are GREATER THAN 1200°F.

STEP STANDARD:

Candidate locates indication and notes; CETC temperatures are >1200°F and rising.

CUES:

BOOTH OPERATOR CUE: Place the Simulator in RUN when the Evaluator indicates the JPM may begin.

EVALUATOR CUE: Provide marked up copy of EOP-14.0 once the candidate has been briefed on the initiating cue.

EVALUATOR NOTE: CETCs indicate on various SIPCS displays.

COMMENTS:

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

JPM STEP: 2

Procedure Notes:

- Normal RCP starting criteria are desired but are NOT required for starting an RCP.
- Preferred RCP starting sequence under Inadequate Core Cooling conditions is B,C,A, to preserve PZR spray capability during the recovery.

Step 22 b: Check if an idle RCS cooling loop is available:

- Verify SG Narrow Range level is GREATER THAN 26% [41%].
- Check if the RCP in the associated loop is available and NOT operating.

STEP STANDARD:

Candidate locates:

Level indication and determines “A” SG level is **greater** than 41%, “B” SG level is **less** than 41% and “C” SG level is **less** than 41%.

RCP controls and notes; RCP “A” breaker control indicates red light off, green light on and zero amps on ammeter with no abnormal annunciators standing on panel XCP-617.

CUES:

EVALUATOR NOTE: SG level indications may be found on LI-474, 475, 476, NR LEVEL % for SG “A”, LI-484, 485, 486, NR LEVEL % for SG “B”, and LI-494, 495, 496, NR LEVEL % for SG “C”.

COMMENTS:

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

JPM STEP: 3

Step 22c: Start XPP-87A(B)(C), A(B)(C) OIL LIFT PP.
Step 22d: Start an RCP in one idle RCS cooling loop.

STEP STANDARD:

Candidate attempts start of "A" RCP;

Places "A" oil lift pump to start, red light ON, green light OFF.

Places "A" RCP to start, red light OFF, green light ON, pump AMPs do NOT rise.

CUES:

EVALUATOR NOTE: **JPM becomes alternate path at this point as no RCS loops are available any longer** and Candidate must employ alternative action to achieve some means of core cooling.

COMMENTS:

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

JPM STEP: 4

Step 22a: Check if core exit TC temperatures are GREATER THAN 1200°F.

STEP STANDARD:

Candidate locates CETCs indication and notes; CETC temperatures are >1200°F and rising.

CUES:

COMMENTS:

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

JPM STEP: 5

Procedure Notes:

- Normal RCP starting criteria are desired but are NOT required for starting an RCP.
- Preferred RCP starting sequence under Inadequate Core Cooling conditions is B,C,A, to preserve PZR spray capability during the recovery.

Step 22 b: Check if an idle RCS cooling loop is available:

- Verify SG Narrow Range level is GREATER THAN 26% [41%].
- Check if the RCP in the associated loop is available and NOT operating.

STEP STANDARD:

Candidate locates:

Level indication and determines “B” SG level is **less** than 41%.

Level indication and determines “C” SG level is **less** than 41%.

Candidate determines that **niether “B” or “C” RCP should be started** due to level less than 41%.

CUES:

EVALUATOR NOTE: It is critical that the Candidate not start the "B" RCP or "C" RCP.

COMMENTS:

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

JPM STEP: 6

Alternative Action 22 b; Perform the following:

1) Open all PZR PORV Block Valves.
2) Open all PZR PORVs.
3) If core exit TC temperature remains GREATER THAN 1200°F, THEN open all Reactor Vessel Head Vent Valves.

STEP STANDARD:

Candidate locates:

PZR PORV Block valve controls, MVG-8000A, 8000B and 8000C and notes; red lights ON, green lights OFF, all valves OPEN.

PZR **PORVs PCV-445A, 445B and 444B and places control switches to OPEN**, notes red lights ON, green lights OFF for all three valves.

CETCs indication and notes; CETC temperatures are >1200°F and rising, locates RX HEAD VENT VLV controls MVG-8095A, 8095B, 8096A and 8096B and **places control switches to OPEN for valves MVG-8095A and MVG-8095B before CETC temperatures exceed 1700°F**, notes red lights ON, green lights OFF on all 4 valves.

CUES:

EVALUATOR NOTE: Fuel Clad temperatures exceed 2250°F in approximately 9 minutes from start of the JPM if no action is taken. The CETC temperature at which the clad temperature reaches 2250°F in this JPM was noted to be 1700°F. At this temperature the Zirconium – Water reaction is excessive.

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM: JPS-003F-N18 Respond to Inadequate Core Cooling (Attempt to Start RCPs and depressurize primary) (Alternate Path) (NRC JPM c)

IC SET: 290

INSTRUCTIONS:

If IC-290 is designated for this JPM then reset to IC-290 leaving the simulator in FREEZE.

1. Place Danger Tag on 'C' Charging pump for Maintenance.
2. Mark up rack copies of EOP-2.0 steps 1-15 as complete and EOP-14.0 steps 1-21 as complete.
3. When Candidate is ready (on Evaluator cue) go to RUN.

If IC-290 is not designated for this JPM then initial conditions may be established by resetting to IC-10 and following the below directions:

1. With the simulator reset to IC-10 and in FREEZE, insert the following:

- **PRE-LOAD**
  - MAL-MSS007A
    S/G A POWER OPERATED RELIEF VALVE FAILURE
    Final Value = 0
  - MAL-MSS007B
    S/G B POWER OPERATED RELIEF VALVE FAILURE
    Final Value = 0
  - MAL-MSS007C
    S/G C POWER OPERATED RELIEF VALVE FAILURE
    Final Value = 0
  - MAL-MSS005
    STEAM DUMP CONTROL FAILURE
    Final Value = 0
  - LOA-RHR006
    ACCUM A ISO VLV 8808A BKR
    Position To = CLOSE
  - LOA-RHR007
    ACCUM B ISO VLV 8808B BKR
    Position To = CLOSE
  - LOA-RHR008
    ACCUM C ISO VLV 8808C BKR
    Position To = CLOSE
  - LOA-RCS009
    RX HEAD VENT VLV 8095A BKR
    Position To = CLOSE
  - LOA-RCS010
    RX HEAD VENT VLV 8095B BKR
    Position To = CLOSE
  - LOA-RCS011
    RX HEAD VENT VLV 8096A BKR
    Position To = CLOSE
  - LOA-RCS012
    RX HEAD VENT VLV 8096B BKR
    Position To = CLOSE
- **TRIGGER 1**
  - MAL-RCS006A
    REACTOR COOLANT SYSTEM LEAK COLD LEG (LOOP 1)
    Final Value = 10000
    Delay =10 sec

- MAL-CVC017A
  CHARGING PUMP A TRIP
  Delay = 120 sec
- MAL-CVC017B
  CHARGING PUMP B TRIP
  Delay = 20 sec
- MAL-RHR001A
  RHR PUMP 1 TRIP
  Delay = 15 sec
- MAL-RHR001B
  RHR PUMP 2 TRIP
  Delay = 25 sec

2. Place the simulator in RUN then insert **TRIGGER 1**.
3. Manually trip RCPs when RCS pressure <1400 psig.
4. Ensure steps of EOP-1.0 and in particular EOP-1.0 attachment 3 have been fully and correctly implemented prior to saving setup for JPM.
5. During EOP implementation align EFW for normal operation and control SG levels to ensure that "B" and "C" Steam Generator Narrow Range Levels are less than 41% and that "A" SG NR level is greater than 41% at EOP-14.0 step 21.
6. Implement EOP-14.0 up through step 21. After Accumulators have been injected and isolated adjust break flow as necessary to establish a Red Path on Core cooling with CETCs at greater than 1200°F but as close to 1200°F as possible.
7. Ensure that "B" and "C" Steam Generator Narrow Range Levels are less than 41% and that "A" SG NR level is greater than 41%.
8. When Core Exit Thermocouples >1200°F: place the simulator in FREEZE.
9. Insert:
   - MAL-RCS003A
     REACTOR COOLANT PUMP 1 TRIP
     Fail To: NO RSTART
10. Save IC.
11. Place Danger Tag on 'C' Charging pump for Maintenance.
12. Mark up rack copies of EOP-2.0 steps 1-15 as complete and EOP-14.0 steps 1-21 as complete.
13. When Candidate is ready (on Evaluator cue) go to RUN.

COMMENTS:

Provide spare operator to silence alarms.

BOOTH OPERATOR: Use LOA resets page to silence HVAC alarms when they come in.

Mark strip chart recorders with date and time at the completion of each performance of this JPM.

Roll strip chart recorders to show no traces from the just completed performance after marking them as noted above.

CRITICAL TASK METHODOLOGY:

Step 3 is critical because Loop “A” SG level is adequate to provide cooling and an attempt to start “A” RCP is required

Step 5 is critical because the “B” and “C” SGs do not contain adequate inventory and the associated RCPs must **not** be started.

Step 6 is critical as this is the lone remaining option to induce core cooling.

REVISION HISTORY:

This JPM is a minor revision of JPSF-044C, Respond to Inadequate Core Cooling (Attempt to Start RCPs and depressurize primary) which was a modification of JPSF-044B.
SAR 10/2017.

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: None.

INITIAL CONDITION:

The plant has tripped with Safety Injection initiated due to a LOCA.

"C" Charging pump is tagged out for maintenance.

"A" charging pump failed a few minutes after the RCP's were secured.

"B" charging pump failed to start.

“A” RHR pump tripped and will not re-start.

“B” RHR pump failed to start automatically or manually.

Reactor Building Spray actuated.

Operators entered EOP-2.4, ECA-1.1 LOSS OF EMERGENCY COOLANT RECIRCULATION when a red path on Core Cooling was identified.

EOP- 14.0, FR-C.1, RESPONSE TO INADEQUATE CORE COOLING is in progress.

INITIATING CUES:

CRS directs you as the NROATC to perform Step 22 of EOP-14.0, FR-C.1, RESPONSE TO INADEQUATE CORE COOLING.

A surrogate operator will acknowledge non-related alarms per your direction.

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: JPS-004-N18

Respond To Steam Generator Overpressure

(NRC JPM d)

CANDIDATE: _____

EXAMINER: _____

TASK: 000-092-05-01 Respond To Steam Generator Overpressure per EOP-15.1/EOP-12.0

TASK STANDARD:
The "B" SG pressure is reduced below 1230 psig and is maintained less than 1230 psig and Tavg is lowered and stabilized at approximately 557°F.

TERMINATING CUE:
The "B" SG pressure has been reduced below 1230 psig in accordance with EOP-15.1 and RCS Tavg is stable at or trending to 557°F.

PREFERRED EVALUATION LOCATION
SIMULATOR

PREFERRED EVALUATION METHOD
PERFORM

REFERENCES:

EOP-15.1, FR-H.2 RESPONSE TO STEAM GENERATOR OVERPRESSURE

INDEX NO	***K/A NO.***		***RO***	***SRO***
WE013EA1.1	EA1.1	Ability to operate and/or monitor the following as they apply to the (Steam Generator Overpressure): Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.1	3.3
WE013EA2.1	EA2.1	Ability to determine and interpret the following as they apply to the (Steam Generator Overpressure): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	2.9	3.4

TOOLS: Rack copy of EOP-15.1, FR-H.2, RESPONSE TO STEAM GENERATOR OVERPRESSURE
Rack copy of EOP-1.1 with steps 1-5 marked as completed and step 6 marked as Alternative Action for RCS temperature greater than 557°F through step c) 2).

VALIDATION TIME 15 min ***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:

The plant has tripped due to a turbine trip from 100% power.

The CRS is implementing EOP-1.1, ES-0.1 REACTOR TRIP RESPONSE and is currently directing actions from step 6.

The Shift Engineer has identified a Yellow Path on Heat Sink due to Steam Generator over pressurization on the "B" SG.

INITIATING CUES:

The CRS directs you to implement EOP-15.1, FR-H.2, RESPONSE TO STEAM GENERATOR OVERPRESSURE in response to the Yellow Path.

A surrogate operator will acknowledge non-related alarms per your direction.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

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

JPM STEP: 1

Step 1: Identify any SG with pressure GREATER THAN 1230 psig.

STEP STANDARD:

Candidate locates SG indications and identifies that the "B" SG pressure is greater than 1230 psig.

CUES:

BOOTH OPERATOR CUE: Place the Simulator in RUN when the Evaluator indicates the JPM may begin.

EVALUATOR CUE: Provide rack copy of EOP-15.1 once the candidate has been briefed on the initiating cue.

COMMENTS:

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

JPM STEP: 2

Step 2: Ensure the following valves are closed to the AFFECTED SG(s):

- FW Flow Control, FCV-488
- FW Isolation, PVG-1611B
- FW Flow Control Bypass, FCV-3331

STEP STANDARD:

Candidate locates:

FW Flow Control Valve indications; notes red light ON, green light OFF **for FCV-488, places control switch in CLOSE**, verifies red light OFF, green light ON. This action is not critical because the Feedwater Pumps have been stopped and there is no driving head for SG overfll.

FW Isolation Valve indications; notes red light ON, green light OFF **for PVG-1611B, places control switch in CLOSE**, verifies red light OFF, green light ON. This action is not critical because the Feedwater Pumps have been stopped and there is no driving head for SG overfll.

FW Flow Control Bypass Valve indication; verifies red light OFF, green light ON for FCV-3331.

CUES:

EVALUATOR NOTE: FW Flow Control FCV-488, and FW Isolation PVG-1611B, are open due to a failure of the FW isolation to initiate.

COMMENTS:

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

JPM STEP: 3

Step 3: Check Narrow Range level in AFFECTED SG(s) is LESS THAN 90% [83%].

STEP STANDARD:

Candidate locates indications and determines “B” SG level is less than 90%.

CUES:

EVALUATOR NOTE: The “B” SG level indication may be found on LI-484, 485, 486, NR LEVEL %.

COMMENTS:

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

JPM STEP: 4

Step 4: Dump steam from each AFFECTED SG to the Condenser:

a. Verify PERMISV C-9 status light is bright on XCP-6114 1-3.

STEP STANDARD:

Candidate locates panel XCP-6114 and verifies that PERMISV C-9 is dim.

CUES:

COMMENTS:

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

JPM STEP: 5

Step 4: ALTERNATIVE ACTION:

Dump steam from each AFFECTED SG using the Steamline PORV:

a) Place the PWR RELIEF A(B)(C) SETPT Controller in MAN and closed.

b) Place the Steamline Power Relief A(B)(C) Mode Switch in PWR RLF.

c) Adjust the PWR RELIEF A(B)(C) SETPT Controller to reduce AFFECTED SG(s) pressure.

STEP STANDARD:

Candidate locates SG Power Relief controls;

Places PWR RELIEF B SETPT Controller in MAN and closed.

Places B SD/PWR RELIEF in PWR RLF.

Adjusts PWR RELIEF B SETPT controller to reduce B SG pressure by pressing the OUTPUT button next to the "up arrow" thus raising controller output and opening "B" S/G PORV.

CUES:

COMMENTS:

Tavg initial = _____

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

JPM STEP: 6

Step 5: Check AFFECTED SG(s) pressures:

a. Verify each AFFECTED SG(s) pressure is decreasing.

b. Verify each AFFECTED SG(s) pressure is LESS THAN 1230 psig.

STEP STANDARD:

Candidate locates indication and notes "B" SG pressure is lowering to less than 1230 psig.

CUES:

EVALUATOR NOTE: The "B" SG pressure indication may be found on MS LINE PRESS, LINE B PSIG, PI-486.

COMMENTS:

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

JPM STEP: 7

Step 5: Check AFFECTED SG(s) pressures:

c. Control steam release to maintain SG pressures LESS THAN 1230 psig.

d. RETURN TO the Procedure and Step in effect.

STEP STANDARD:

Candidate **adjusts PWR RELIEF B SETPT controller output to maintain "B" SG pressure less than 1230 psig** and returns to EOP-1.1 step 6.

CUES:

EVALUATOR CUE: "CRS directs you to complete EOP-1.1 Step 6." Provide copy of EOP-1.1.

EVALUATOR NOTE: The critical step is to assure "B" SG PORV is opened as necessary to maintain less than 1230 psig on "B" SG which is the entry condition to EOP-15.1.

COMMENTS:

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

JPM STEP: 8

Step 6: Check RCS temperature:

- With any RCP running, RCS Tavg is stable at OR trending to 557°F. **(NO)**

Step 6: Alternative Action: IF RCS temperature is GREATER THAN 557°F AND increasing, THEN:

a) Verify PERMISV C-9 status light is bright on XCP-6114 1-3.

b) IF the Condenser is available, THEN ensure Condenser Steam Dump Valves are open.

c) IF the Condenser is NOT available, THEN open the Steamline PORVs, PCV-2000(2010)(2020):

1) Place the Steamline Power Relief A(B)(C) Mode Switches in PWR RLF.

2) Adjust the PWR RELIEF A(B)(C) SETPT Controllers as necessary to reduce RCS temperature.

STEP STANDARD:

Candidate **opens SG PORVs to lower SG pressure and RCS Tavg**.

Candidate **throttles SG PORVs to stabilize RCS Tavg at approximately 557°F and adjusts "B" SG PORV to maintain less than 1230 psig.**

CUES:

EVALUATOR NOTE: The candidate may observe a slowly lowering RCS temperature trend and may elect to not make any adjustments to the steaming rate. The "A" and "C" SG PORVs may be controlled in auto. These PORVs are opened in auto by lowering the setting on the SET PT potentiometer dial and these PORVs are closed in auto by raising the setting on the SET PT potentiometer dial. The "B" SG PORV should NOT be placed in AUTO as its reference pressure input (MS LINE PRESS LINE B PSIG PI-2010) has failed low and the PORV will drive closed. The "B" SG PORV should only be adjusted using the OUTPUT up and down buttons.

EVALUATOR NOTE: The critical step is to control "B" SG PORV position to limit pressure less than 1230 psig. If automatic is selected "B" SG PORV would close and SG pressure would rise to greater than 1230 psig unless the operator takes action to manually re-open the valve.

COMMENTS:

Tavg final = _____

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM: JPS-004F-N18, Respond to Steam Generator Overpressure (NRC JPM d)

IC SET: 294

INSTRUCTIONS:

If IC-294 is designated for this JPM then reset to IC-294 leaving the simulator in FREEZE.

1. Mark rack copy of EOP-1.1 with steps 1-5 marked as complete and step 6 marked as having started the high level step only.
2. When Candidate is ready (on Evaluator cue) go to RUN.

If IC-294 is not designated for this JPM then initial conditions may be established by resetting to IC-10 and following the below directions:

1. With the simulator reset to IC-10 and in FREEZE, insert the following:

- **PRE-LOAD**
  - LOA-CND037
    CONDENSER AIR INLEAKAGE RATE (SCFM)
    Ramp: 60 sec
    Final Value: 1000 SCFM
  - MAL-MSS010B
    S/G B SAFETY VALVE FAILS
    Final Value: 0%
  - MAL-MSS007B
    S/G B POWER OPERATED RELIEF VALVE FAILURE
    Final Value: 0%
  - MAL- FWM015B
    FW CONTROL VALVE LV-488 POSITION FAILURE (SG B)
    Final Value: 76.3%
  - VLV- FW026P
    XVG01611B-FW FEEDWTR ISO VLV B FAIL POSITION
    Final Value: 100%
  - BST-MS054
    ILS02806A REL VLV MS
    Fail To: INHIBITED
  - BST-MS055
    ILS02806B REL VLV MS
    Fail To: INHIBITED
  - BST-MS056
    ILS02806C REL VLV MS
    Fail To: INHIBITED
  - BST-MS057
    ILS02806D REL VLV MS
    Fail To: INHIBITED
  - BST-MS058
    ILS02806E REL VLV MS
    Fail To: INHIBITED
  - BST-MS059
    ILS02806F REL VLV MS
    Fail To: INHIBITED
  - BST-MS060
    ILS02806G REL VLV MS
    Fail To: INHIBITED
  - BST-MS061
    ILS02806H REL VLV MS
    Fail To: INHIBITED

- BST-MS062
  ILS02806I REL VLV MS
  Fail To: INHIBITED
- BST-MS063
  ILS02806J REL VLV MS
  Fail To: INHIBITED
- BST-MS064
  ILS02806K REL VLV MS
  Fail To: INHIBITED
- BST-MS065
  ILS02806L REL VLV MS
  Fail To: INHIBITED
- BST-MS066
  ILS02806M REL VLV MS
  Fail To: INHIBITED
- BST-MS067
  ILS02806N REL VLV MS
  Fail To: INHIBITED
- BST-MS068
  ILS02806P REL VLV MS
  Fail To: INHIBITED

- **TRIGGER 1**
  - MAL-PCS014
    INADVERTENT MS ISOLATION
    Delay: 15 seconds
  - MAL-TUR001
    INADVERTENT TURBINE TRIP
- **AUTO TRIGGER 2** (x07i391c==1) FRV-488 placed in close.
  - MAL- FWM015B (NEW)
    FW CONTROL VALVE LV-488 POSITION FAILURE (SG B)
    Final Value: 76.3%
    Delete in: 1 sec
- **AUTO TRIGGER 3** (x07i091c==1) XVG-1611B placed in close.
  - VLV- FW026P
    XVG01611B-FW FEEDWTR ISO VLV B FAIL POSITION
    Final Value: 100%
    Delete in: 1 sec

2. Place the simulator in RUN then insert **TRIGGER 1**.
3. Perform all applicable actions from EOP-1.0 and EOP-1.1. Make certain to trip MFPs and TDEFP.
4. Control “B” SG level to maintain less than 90% NR level and adjust EFW and steam flow on “A” and “C” SG to achieve desired initial condition.
5. When “B” SG pressure is greater than 1230 psig stabilize “A” and “C” SG levels and pressure and place the simulator in FREEZE.
6. Save IC.
7. Mark rack copy of EOP-1.1 with steps 1-5 marked as complete and step 6 marked as Alternative Action for RCS temperature greater than 557°F complete through step c) 2).
8. When Candidate is ready (on Evaluator cue) go to RUN.

COMMENTS:

Provide spare operator to silence alarms.

Mark strip chart recorders with date and time at the completion of each performance of this JPM.

Roll strip chart recorders to show no traces from the just completed performance after marking them as noted above.

CRITICAL TASK METHODOLOGY:

Step 5 is critical because the Candidate must take action to remove energy from the affected SG to preclude excessive pressurization.

Step 7 is critical because the Candidate must control “B” SG pressure to preclude a return to greater than 1230 psig.

Step 8 is critical because the Candidate must control “B” SG pressure to preclude a return to greater than 1230 psig.

REVISION HISTORY:

This JPM is a minor revision of JPS-149, Respond to Steam Generator Overpressure.
SAR 12/2017.

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: None.

INITIAL CONDITION:

The plant has tripped due to a turbine trip from 100% power.

The CRS is implementing EOP-1.1, ES-0.1 REACTOR TRIP RESPONSE and is currently directing actions from step 6.

The Shift Engineer has identified a Yellow Path on Heat Sink due to Steam Generator over pressurization on the "B" SG.

INITIATING CUES:

The CRS directs you to implement EOP-15.1, FR-H.2, RESPONSE TO STEAM GENERATOR OVERPRESSURE in response to the Yellow Path.

A surrogate operator will acknowledge non-related alarms per your direction.

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: JPS-005-N18

Loss of All ESF AC with Restoration via XTF-5052

(NRC JPM e)

CANDIDATE: _____

EXAMINER: _____

TASK: O-000-055-05-01 Respond To Loss of Off Site and On Site Power

TASK STANDARD:

1. The Train "A" Charging pump, the PZR Backup Heaters (Group 1), the Train "A" EFW pump and the "C" CCW pump (aligned to Train "A") control switches are placed in pull to lock. 2. The Train "A" ESF Load Sequencer is deenergized. 3. The Train "A" ESF bus distribution breakers are opened. 4.The Transformer 4 and 5 low side breakers are opened. 5. ESF bus 1DA is energized from the Alternate AC Source via XTF-5052 fed from the grid only after completion of items 1-4 above.

TERMINATING CUE: ESF bus 1DA is energized from the 115 KV line via XTF-5052.

PREFERRED EVALUATION LOCATION
SIMULATOR

PREFERRED EVALUATION METHOD
PERFORM

REFERENCES:

EOP-6.0, ECA-0.0 LOSS OF ALL ESF AC POWER

SOP-304, 115KV/7.2KV OPERATIONS

INDEX NO	***K/A NO.***		***RO***	***SRO***
00062A205	A2.05	Ability to (a) predict the impacts of the following malfunctions or operations on the ac distribution system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Methods for energizing a dead bus.	2.9	3.3

TOOLS: Marked up copy of SOP-304, 115KV/7.2KV OPERATIONS, mark entry conditions complete for section V.A.

Marked up copy of EOP-1.0, E-0 REACTOR TRIP OR SAFETY INJECTION, mark steps 1-5 complete and step 6 in progress.

Marked up copy of EOP-6.0, ECA-0.0 LOSS OF ALL ESF AC POWER

VALIDATION TIME 20 min ***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:

The Unit Auxiliary Transformer (XTF-2) experienced a fault and caused a Turbine and Reactor Trip.

The Emergency Auxiliary transformer (XTF-32) is faulted.

ESF Transformer XTF-4 is faulted.

ESF Transformer XTF-5 was unavailable prior to the trip due to scheduled maintenance.

The LOCK-OUT RELAY, 51BX-1DB is actuated for ESF Bus 1DB.

The “A” DG failed to start automatically and will not start in manual.

The 115 KV Parr bus 2 and XTF-5052 have been determined to be available.

The crew is implementing EOP-6.0, ECA-0.0 LOSS OF ALL ESF AC POWER.

INITIATING CUES:

The CRS has directed you to restore offsite power to the 1DA ESF Bus in accordance SOP-304, 115KV/7.2KV OPERATIONS, Section V.A.

A surrogate operator will acknowledge non-related alarms per your direction.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

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

JPM STEP: 1

Step 2.1: Notify the System Controller of the situation.

STEP STANDARD:

Candidate uses system controller direct line and provides an update concerning VC Summer electrical plant status.

CUES:

BOOTH OPERATOR CUE: Place the Simulator in RUN when the Evaluator indicates the JPM may begin.

EVALUATOR CUE: Provide the marked up rack copy of SOP-304 and marked up copy of EOP-6.0 once the candidate has been briefed on the initiating cue.

BOOTH OPERATOR CUE: Acknowledge communications from candidate using the System Controller Direct line.

COMMENTS:

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

JPM STEP: 2

Step 2.2: At XPN6020, ESF LOADING SEQUENCE CONTROL PANEL - UNIT 1, deenergize the ESFLS by opening the switch labeled CIRCUIT BREAKER (CB-436).

STEP STANDARD:

Candidate contacts an AO to open the ESFLS breaker.

CUES:

BOOTH OPERATOR CUE: When contacted as AO to open the ESFLS breaker acknowledge the communication, wait briefly and then activate **TRIGGER 2.** Once the breaker LOA has inserted (15 seconds) contact the Candidate and report “ESFLS circuit breaker at XPN-6020 is open”.

COMMENTS:

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

JPM STEP: 3

Step 2.3: Unload and de-energize Bus 1DA as follows:
Step 2.3 a: Place SW PUMP A in PULL TO LOCK NON-A.

STEP STANDARD:

Candidate locates SW pump controls and **places "A" Service Water pump switch in pull to lock**.

CUES:

EVALUATOR CUE: If candidate requests a peer check, acknowledge the request by saying "Understand you request a peer check" This response should be provided as often as a peer check is requested.

COMMENTS:

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

JPM STEP: 4

Step 2.3 b: Ensure the following loads are in PULL TO LOCK:
Step 2.3 b 1): Component Cooling Water Pump A(C).

STEP STANDARD:

Candidate locates Component Cooling Water pump controls and **places "A" CCW pump switch in pull to lock** and then **places "C" CCW pump Train "A" switch in pull to lock**.

CUES:

EVALUATOR NOTE: If the candidate fails to place the "C" CCW pump switch in pull to lock, the pump will auto start upon power restoration to the 1DA bus due to a low header pressure auto start signal.

COMMENTS:

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

JPM STEP: 5

Step 2.3 b: Ensure the following loads are in PULL TO LOCK:
Step 2.3 b 2): Service Water Pump A(C).

STEP STANDARD:

Candidate locates SW pump controls and verifies "A" and "C" Service Water pump switches in pull to lock.

CUES:

COMMENTS:

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

JPM STEP: 6

Step 2.3 b: Ensure the following loads are in PULL TO LOCK:
Step 2.3 b 3): Service Water Booster Pump A.

STEP STANDARD:

Candidate locates Service Water pump controls and **places "A" Service Water Booster pump switch in pull to lock**.

CUES:

COMMENTS:

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

JPM STEP: 7

Step 2.3 b: Ensure the following loads are in PULL TO LOCK:
Step 2.3 b 4): RBCUs (Slow)

STEP STANDARD:

Candidate locates RBCU controls and **places XFN-64A, 1A SLOW and XFN-65A, 2A SLOW switches in pull to lock**.

CUES:

COMMENTS:

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

JPM STEP: 8

Step 2.3 b: Ensure the following loads are in PULL TO LOCK:
Step 2.3 b 5): RB Spray Pump A

STEP STANDARD:

Candidate locates RB Spray pump controls and **places "A" RB Spray pump switch in pull to lock**.

CUES:

COMMENTS:

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

JPM STEP: 9

Step 2.3 b: Ensure the following loads are in PULL TO LOCK:
Step 2.3 b 6): RHR Pump A.

STEP STANDARD:

Candidate locates RHR pump controls and **places "A" RHR pump switch in pull to lock**.

CUES:

COMMENTS:

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

JPM STEP: 10

Step 2.3 b: Ensure the following loads are in PULL TO LOCK:
Step 2.3 b 7): Charging Pump A.

STEP STANDARD:

Candidate locates Charging pump controls and **places "A" Charging pump switch in pull to lock**.

CUES:

EVALUATOR NOTE: The "A" Charging pump will restart on re-energizing the bus if NOT placed in pull to lock.

COMMENTS:

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

JPM STEP: 11

Step 2.3 b: Ensure the following loads are in PULL TO LOCK:
Step 2.3 b 8): PZR Backup Heaters (Group 1)

STEP STANDARD:

Candidate locates PZR Heater controls and **places Backup Group 1 switch in pull to lock**.

CUES:

COMMENTS:

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

JPM STEP: 12

Step 2.3 b: Ensure the following loads are in PULL TO LOCK:
Step 2.3 b 9): EFW Pump A.

STEP STANDARD:

Candidate locates EFW pump controls and **places "A" EFW pump switch in pull to lock**.

CUES:

EVALUATOR NOTE: The "A" EFW pump will restart on re-energizing the bus if NOT placed in pull to lock.

COMMENTS:

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

JPM STEP: 13

Step 2.3 b: Ensure the following loads are in PULL TO LOCK:
Step 2.3 b 10): HVAC Chiller Unit A(C).

STEP STANDARD:

Candidate locates HVAC controls and **places "A" HVAC Chiller switch in pull to lock** and verifies "C" HVAC Chiller switch in pull to lock.

CUES:

COMMENTS:

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

JPM STEP: 14

Step 2.3 b: Ensure the following loads are in PULL TO LOCK:
Step 2.3 b 11): HVAC Chiller Pump A(C).

STEP STANDARD:

Candidate locates HVAC controls and **places "A" HVAC Chiller Pump switch in pull to lock** and verifies "C" HVAC Chiller Pump switch in pull to lock.

CUES:

COMMENTS:

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

JPM STEP: 15

Step 2.3 c: Open BUS 1DA2 FEED.

STEP STANDARD:

Candidate locates Electrical Switchgear controls and **places BUS 1DA2 FEED** switch in TRIP and observes red light OFF, green light ON.

CUES:

COMMENTS:

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

JPM STEP: 16

Step 2.3 d: Open BUS 1DA1 FEED.

STEP STANDARD:

Candidate locates Electrical Switchgear controls **and places BUS 1DA2 FEED switch in TRIP** and observes red light OFF, green light ON.

CUES:

COMMENTS:

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

JPM STEP: 17

Step 2.3 e: Open XFMR 1DA1 & 1DA2 FEED.

STEP STANDARD:

Candidate locates Electrical Switchgear controls **and places XFMR 1DA1&1DA2 FEED switch in TRIP** and observes red light OFF, green light ON.

CUES:

COMMENTS:

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

JPM STEP: 18

Step 2.3 f: Open BUS 1EA1 FEED.

STEP STANDARD:

Candidate locates Electrical Switchgear controls and **places BUS 1EA1 FEED switch in TRIP** and observes red light OFF, green light ON.

CUES:

COMMENTS:

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

JPM STEP: 19

Step 2.3 g: Open XFMR 1EA1 FEED.

STEP STANDARD:

Candidate locates Electrical Switchgear controls and **places XFMR 1EA1 FEED switch in TRIP** and observes red light OFF, green light ON.

CUES:

COMMENTS:

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

JPM STEP: 20

Step 2.3 h: Open BUS 1EA FEED.

STEP STANDARD:

Candidate locates Electrical Switchgear controls and **places BUS 1EA FEED switch in TRIP** and observes red light OFF, green light ON.

CUES:

COMMENTS:

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

JPM STEP: 21

Step 2.3 i: Open BUS 1DA NORMAL FEED.

STEP STANDARD:

Candidate locates Electrical Switchgear controls and **places BUS 1DA NORMAL FEED switch in TRIP** and observes red light OFF, amber light OFF, green light ON.

CUES:

COMMENTS:

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

JPM STEP: 22

Step 2.3 j: Open BUS 1DA ALT FEED.

STEP STANDARD:

Candidate locates Electrical Switchgear controls and verifies BUS 1DA ALT FEED switch in indicates after TRIP (green flag) and observes red light OFF, green light ON.

CUES:

EVALUATOR NOTE: The Alternate feed breaker was never closed and was never given a close signal.

COMMENTS:

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

JPM STEP: 23

Step 2.3 k: Verify Bus 1DA potential lights are not lit.

Step 2.3 l: Ensure the following Breakers are open:

1) BUS 1DA NORM FEED Breaker.
2) BUS 1DB ALT FEED Breaker.

STEP STANDARD:

Candidate locates Electrical Switchgear controls and verifies BUS 1DA white potential lights are dim and that BUS 1DA NORM and ALT FEED breakers indicate red lights OFF, green lights ON with green targets on breaker control switches.

CUES:

COMMENTS:

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

JPM STEP: 24

Step 2.4: De-energize XSW1DX as follows (TB-463):

a. Open XSW1DX 01, XTF-4 LOW SIDE BREAKER.
b. Open XSW1DX 04, XTF-5 LOW SIDE BREAKER.
c. Ensure the following potential lights indicate de-energized:
   1) BUS 1DA NORM FEED Breaker.
   2) BUS 1DB ALT FEED Breaker.

STEP STANDARD:

Candidate contacts an AO to open XSW1DX 01, XTF-4 LOW SIDE BREAKER and XSW1DX 04, XTF-5 LOW SIDE BREAKER.

Once breakers are reported open Candidate verifies BUS 1DA NORM FEED and BUS 1DA ALT FEED white potential lights are dim.

CUES:

BOOTH OPERATOR CUE: When contacted as AO to open XSW1DX 01, XTF LOW SIDE BREAKER and XSW1DX 04, XTF-5 LOW SIDE BREAKER acknowledge the communication, wait 1 minute and then activate **TRIGGER 3** Once the breaker(s) is(are) opened contact the Candidate and report “XSW1DX 01 (XSW1DX 04) is (are) open”.

EVALUATOR NOTE: The potential lights were dim prior to the breakers being opened due to events that occurred to create the JPM initial conditions.

COMMENTS:

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

JPM STEP: 25

Step 2.5: Re-energize XSW1DX from XTF5052, ALTERNATE AC SOURCE TRANSFORMER as follows:

Step 2.5 a: Perform one of the following methods to verify XTF-5052 ALT AC PWR VOLTAGE, is ready for load (N/A step not performed).

1) Verify XTF-5052 ALT AC PWR VOLTAGE indicates between 6511 volts and 7920 volts on the MCB.

2) Have electrical maintenance verify XTF-5052 ALT AC PWR VOLTAGE indicates between 116 volts and 124 volts at XSW1DX 03 terminals C3 and C5 on device TX.

STEP STANDARD:

Candidate either locates XTF-5052 ALT AC PWR VOLTAGE meter and verifies 6511 – 7920 volts **or** contacts Electrical Maintenace to verify XTF-5052 ALT AC PWR VOLTAGE indicates 116-124 volts at XSW1DX 03 terminals C3 and C5 on device TX.

CUES:

BOOTH OPERATOR CUE:IF contacted as Electrical Maintenance acknowledge request and wait 1 minute then report “XTF-5052 ALT AC PWR VOLTAGE indicates 116.9 volts at XSW1DX 03 terminals C3 and C5 on device TX.”

COMMENTS:

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

JPM STEP: 26

Step 2.5 b: At XSW1DX 03, close XSW1DX 03, ALTERNATE AC POWER SUPPLY BREAKER, by depressing the AUX 3 Pushbutton on SEL- 351S, RELAY METER CONTROL FAULT LOCATOR

Step 2.5 c: Ensure BUS 1DA NORM FEED bus potential lights are lit.

STEP STANDARD:

Candidate contacts an AO to close XSW1DX 03, ALTERNATE AC POWER SUPPLY BREAKER.
Once breaker is reported closed Candidate verifies BUS 1DA NORM FEED white potential lights are bright.

CUES:

BOOTH OPERATOR CUE: When contacted as AO to close XSW1DX 03, ALTERNATE AC POWER SUPPLY BREAKER acknowledge the communication, wait 1 minute and then activate **TRIGGER 4.** Once the breaker is closed contact the Candidate and report “XSW1DX 03 ALTERNATE AC POWER SUPPLY BREAKER is closed”.

COMMENTS:

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

JPM STEP: 27

Step 2.6: To supply XSW1DA from XTF5052, ALTERNATE AC SOURCE TRANSFORMER, perform the following:

Step 2.6 a: Ensure BUS 1DA ALT FEED Breaker is open.

Step 2.6 b: Verify 1DA VOLTS reads zero volts across each phase.

Step 2.6 c: Close BUS 1DA NORM FEED Breaker.

Step 2.6 d: Verify Bus 1DA potential lights are lit.

STEP STANDARD:

Candidate locates:

BUS 1DA ALT FEED breaker switch and verifies it is in after TRIP and observes red light OFF, green light ON.

BUS 1DA VOLTMETER SEL and operates the selector switch to display zero volts across each phase.

BUS 1DA NORM FEED breaker control and places switch in CLOSE. Observes red light ON, green light OFF. Observes white potential lights bright for bus 1DA and voltage indicated on voltmeter 1DA VOLTS.

CUES:

EVALUATOR NOTE: The critical step is closing BUS 1DA NORM FEED breaker.

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM: JPS-005-N18, Loss of All ESF AC with Restoration via XTF-5052 (NRC JPM e)

IC SET: 295

INSTRUCTIONS:

If IC-295 is designated for this JPM then reset to IC-295 leaving the simulator in FREEZE.

1. Mark up rack copy of SOP-304, 115KV/7.2KV OPERATIONS, mark entry conditions complete for section V.A.
2. Mark up rack copy of EOP-1.0, E-0 REACTOR TRIP OR SAFETY INJECTION, mark steps 1-5 complete and step 6 in progress.
3. Mark up rack copy of EOP-6.0, ECA-0.0 LOSS OF ALL ESF AC POWER mark steps 1 -6 a. as completed with 6 a. AA in progress.
4. Place red hold tag on EFS XFMR 5 FEED CKT SW 1838 (XES5)
5. When Candidate is ready (on Evaluator cue) go to RUN.

If IC-295 is **not** designated for this JPM then initial conditions may be established by resetting to IC-10 and following the below directions:

1. With the simulator reset to IC-10 and in FREEZE, insert the following:

- **PRE-LOAD**
  - MAL-EPS006A
    DIESEL GENERATOR A FAILURE
    Fail To: FAIL
- **TRIGGER 1**
  - LOA-EPS167
    RELAY 51BX-1DB – 7.2 KV BUS 1DB OVERCURRENT
    Fail To: TRIP
  - MAL-EPS009
    LOSS OF UNIT AUXILIARY TRANSFORMER
  - MAL-EPS003
    LOSS OF EMERGENCY AUXILIARY TRANSFORMER
  - MAL-EPS018A
    LOSS OF ESF TRANSFORMER XTF-4
- **TRIGGER 2**
  - ANN-SG012
    ESFLS PNL DOOR OPEN
    Fail To: ON
  - LOA-EPS136
    LOAD SEQUENCER A: CONTROL POWER SWITCH
    Position To: OPEN
    Delay: 15 seconds
- **TRIGGER 3**
  - LOA-EPS007
    ESF XFMR XTF-4 LOW SIDE BREAKER – DX1
    Position To: FALSE
  - LOA-EPS008
    ESF XFMR XTF-5 LOW SIDE BREAKER – DX4
    Position To: FALSE
- **TRIGGER 4**
  - LOA-EPS188
    XFMR XTF-5052 DISCONNECT BREAKER – DX3
    Position To: CLOSED

2. Open breaker ESF XFMR 5 FEED CKT SW 1838 (XES5)
3. Place the simulator in RUN and insert **TRIGGER 1**.
4. Perform Steps 1 through 5 of EOP-6.0.
5. Place the Simulator in Freeze and save to the desired IC.
6. Mark up rack copy of SOP-304, 115KV/7.2KV OPERATIONS, mark entry conditions complete for section V.A.
7. Mark up rack copy of EOP-1.0, E-0 REACTOR TRIP OR SAFETY INJECTION, mark steps 1-5 complete and step 6 in progress.
8. Mark up rack copy of EOP-6.0, ECA-0.0 LOSS OF ALL ESF AC POWER mark steps 1 -6 a. as completed with 6 a. AA in progress.
9. Place red hold tag on EFS XFMR 5 FEED CKT SW 1838 (XES5)
10. When Candidate is ready (on Evaluator cue) go to RUN.

COMMENTS:

Provide spare operator to silence alarms.

BOOTH OPERATOR: Use LOA resets page to silence HVAC alarms when they come in.

Mark strip chart recorders with date and time at the completion of each performance of this JPM.

Roll strip chart recorders to show no traces from the just completed performance after marking them as noted above.

CRITICAL TASK METHODOLOGY:

Step 2 is critical because the Alternate AC source (5052 fed from the Grid) to ESF bus 1DA is limited in loading capacity. If the load sequencer is not defeated the Alternate AC source breaker will not close.

Step 4 is critical because the “C” CCW pump will auto start on low header pressure once bus 1DA is re-energized as the auto start block from ESFLS is removed when the Sequencer is de-energized at JPM step 2.

Step 10 is critical because the “A” Charging pump will start due to it being associated with load block 1 of the ESFLS. It is not locked out by the load shedding feature of the ESFLS. It will energize immediately once bus 1DA is re-energized.

Step 11 is critical because the PZR Backup group 1 heaters would energize. They are associated with output 4 of the ESFLS. The heaters will not lock out from the load shedding feature of the ESFLS for these conditions. The heaters would energize immediately once bus 1DA is re-energized.

Step 12 is critical because the “A” EFW pump will auto start due to low low SG water level or loss of all MFPs once Bus 1DA is re-energized as the auto start block from ESFLS is removed when the Sequencer is de-energized at JPM step 2.

Steps 17 and 20 are critical because the ESF distribution bus supply breakers would remain closed unless opened by the candidate and the busses would re-energize immediately once bus 1DA was re-energized.

Step 21 is critical because the 1DA Normal bus feed must be opened in order to clear the lockout and allow subsequent re-closure.

Step 24 is critical because Transformer 4 and 5 would be energized once the 1DX bus is re-energized with potential for fault propagation.

Step 26 is critical because the 1DX bus will not be energized until the local action is performed and that action will not be performed until Candidate asks for it. Bus 1DX must be energized in order to re-energize ESF bus 1DA.

Step 27 is critical because the ESF Bus 1DA will not be energized until the Candidate closes the BUS 1DA NORM FEED.

REVISION HISTORY:

This JPM is new for the 2018 NRC exam for ILO-16-01.
SAR 12/2017.

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: None.

INITIAL CONDITION:

The Unit Auxiliary Transformer (XTF-2) experienced a fault and caused a Turbine and Reactor Trip.

The Emergency Auxiliary transformer (XTF-32) is faulted.

ESF Transformer XTF-4 is faulted.

ESF Transformer XTF-5 was unavailable prior to the trip due to scheduled maintenance.

The LOCK-OUT RELAY, 51BX-1DB is actuated for ESF Bus 1DB.

The “A” DG failed to start automatically and will not start in manual.

The 115 KV Parr bus 2 and XTF-5052 have been determined to be available.

The crew is implementing EOP-6.0, ECA-0.0 LOSS OF ALL ESF AC POWER.

INITIATING CUES:

The CRS has directed you to restore offsite power to the 1DA ESF Bus in accordance SOP-304, 115KV/7.2KV OPERATIONS, Section V.A.

A surrogate operator will acknowledge non-related alarms per your direction.

.

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: JPS-006-N18

Loss of Power Range Instrument N-44

(NRC JPM f)

CANDIDATE: _____

EXAMINER: _____

TASK: 000-034-05-01 Respond to Power Range Instrumentation Channel Failure

TASK STANDARD:
Automatic control rod motion has been stopped and the bank selector switch is placed in MAN prior to steps removing Channel N-44 from service. Channel N-44 has been removed from service with ROD STOP BYPASS SWITCH in the BYPASS PR N44 position and the COMPARATOR CHANNEL DEFEAT, UPPER SECTION and LOWER SECTION switches to N44 and Tavg has been returned to within 1°F of Tref.

TERMINATING CUE: Tech Spec Status lights for Channel IV have been verified in correct status.

PREFERRED EVALUATION LOCATION
SIMULATOR

PREFERRED EVALUATION METHOD
PERFORM

REFERENCES:

AOP-401.10 POWER RANGE CHANNEL FAILURE

INDEX NO	***K/A NO.***		***RO***	***SRO***
015000A201	A2.01	Ability to (a) predict the impacts of the following malfunctions or operations on the NIS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Power supply loss or erratic operation.	3.5	3.9

TOOLS: Rack copy of AOP-401.10, POWER RANGE CHANNEL FAILURE

VALIDATION TIME 10 min ***TIME CRITICAL*** NO ***10CFR55:*** 45(a)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 75% power with all controls in automatic.

INITIATING CUES:

Respond to developing plant conditions.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

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

JPM STEP: 1

Step 1: Verify normal indication on Power Range Channel N-44.

STEP STANDARD:

Candidate locates % FULL POWER % NI-44B indicator and observes N-44 has failed low.

CUES:

BOOTH OPERATOR CUE: When the Evaluator gives the direction, insert **TRIGGER 1**.

EVALUATOR NOTE: This is an immediate operator action.

COMMENTS:

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

JPM STEP: 2

Alternative Action Step 1; IF Power Range Channel N-44 has failed, THEN place the ROD CNTRL BANK SEL Switch in MAN.

STEP STANDARD:

Candidate locates **ROD CNTRL BANK SEL and places it in the MAN position** prior to performing steps to remove N-44 from service.

CUES:

EVALUATOR NOTE: This is an immediate operator action. The steps of the procedure that remove the channel from service begin at JPM step 6.

COMMENTS:

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

JPM STEP: 3

Step 2: Stabilize any plant transients in progress.

STEP STANDARD:

Verifies no load change is in progress.

CUES:

EVALUATOR NOTE: This is an immediate operator action.

COMMENTS:

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

JPM STEP: 4

Step 3: Maintain stable plant conditions.

STEP STANDARD:

Pzr pressure and Tavg maintained stable.

CUES:

EVALUATOR NOTE: This is a continuous action step.

COMMENTS:

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

JPM STEP: 5

Step 4: Verify no testing is in progress on the operable Power Range channels.

STEP STANDARD:

Candidate looks at NI panel and observes no testing and/or asks CRS if any testing is in progress.

CUES:

EVALUATOR CUE: If Candidate asks concerning testing in progress, as CRS reply “No testing is in progress”.

COMMENTS:

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

JPM STEP: 6

Step 5: Place ROD STOP BYPASS Switch (on the MISCELLANEOUS CONTROL AND INDICATION PANEL) for the failed Power Range channel in BYPASS.

Step 6: Verify the appropriate Rod Stop Bypass status light is bright:

- For N-44, B2 OP ROD STOP BYP (XCP-6111 4-4).

STEP STANDARD:

Candidate locates the MISCELLANEOUS CONTROL AND INDICATION PANEL and the **ROD STOP BYPASS SWITCH and places it in the BYPASS PR N44 position**.

Candidate locates the Status Light display and observes XCP-6111 4-4, B2 OP ROD STOP BYP is bright.

CUES:

EVALUATOR NOTE: The status light panel XCP-6111 is located above the EFW pump controls and below annunciator panels XCP-622 and XCP-623.

EVALUATOR CUE: Provide the Candidate the following cue "The BOP will monitor Rods in manual."

EVALUATOR NOTE: Failure to complete this step is critical because future activities such as toubleshooting could result in an unwarranted rod stop.

COMMENTS:

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

JPM STEP: 7

Step 7: Adjust Control Rods to maintain Tavg within 1.0°F of Tref.

STEP STANDARD:

Candidate locates Tavg – Tref indication (TR-406 on panel XCP 6109R) and assesses mismatch. If Tavg is more than 1°F above Tref adjusts rod position by **placing ROD CONTROL, ROD MOTION switch in the IN or OUT position as necessary to restore mismatch to within 1°F**.

CUES:

EVALUATOR NOTE: Candidate may not make any adjustment if the mismatch is slight.

EVALUATOR CUE: If Candidate requests a control band provide the following cue "Control band is 195 to 185 steps on Control Bank D"

COMMENTS:

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

JPM STEP: 8

Step 8: Align the Power Range channel comparator circuits:

a. Place the following switches to the failed Power Range channel position:

1) COMPARATOR CHANNEL DEFEAT Switch (on the COMPARATOR AND RATE drawer).

2) UPPER SECTION Switch (on the DETECTOR CURRENT COMPARATOR drawer).

3) LOWER SECTION Switch (on the DETECTOR CURRENT COMPARATOR drawer).

STEP STANDARD:

Candidate locates:

COMPARATOR AND RATE drawer and **places COMPARATOR CHANNEL DEFEAT switch to N44**.

DETECTOR CURRENT COMPARATOR drawer and **places UPPER SECTION switch to PRN44**.

DETECTOR CURRENT COMPARATOR drawer and **places LOWER SECTION switch to PRN44**.

CUES:

EVALUATOR NOTE: Placing the UPPER SECTION and LOWER SECTION switches in defeat is done to adjust inputs to XCP-620 1-5 and 1-6 which are the TS Required QPTR monitoring alarms. Removal of the inoperable channel input restores the alarm to operable.

COMMENTS:

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

JPM STEP: 9

Step 9: Ensure NR-45 is selected to the appropriate operable channels.

STEP STANDARD:

Candidate locates NIS RCDR PEN 1 (PEN 2) SELECT NR-45 and verifies that the PEN 1 selector is NOT in the P4 position and that the PEN 2 selector is NOT in the P4 or△ FIV position.

CUES:

COMMENTS:

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

JPM STEP: 10

Step 10: Within one hour, verify that the following permissive status lights are in the required state for the existing plant condition.

- P-7.
- P-8.
- P-9.
- P-10.

STEP STANDARD:

Candidate locates XCP-6109 REACTOR PERMISSIVES and observes:

P7 light dim under REACTOR TRIP BLOCKED section.

P8 light dim under REACTOR TRIP BLOCKED section.

P9 light dim under REACTOR TRIP BLOCKED section.

P10 light bright under NIS PR section.

CUES:

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM: JPS-006-N18 Loss of Power Range Instrument N-44 (NRC JPM f)

IC SET: 296

INSTRUCTIONS:

If IC-296 is designated for this JPM then reset to IC-296 leaving the simulator in FREEZE.

1. Place Simulator in RUN
2. Reset SIPCS screens to normal full power arrangement and clear all SIPCS and Bailey alarms.

If IC-296 is **not** designated for this JPM then initial conditions may be established by resetting to IC-11 and following the below directions:

1. With the simulator reset to IC-11 and in FREEZE, insert the following:

- **TRIGGER 1**
  - MAL-NIS003D
    POWER RANGE CHANNEL 44 FAILURE
    Ramp: 5 sec
    Final Value: 0%

2. Place the Simulator in FREEZE and save to the desired IC.
3. Place Simulator in RUN.
4. Reset SIPCS screens to normal full power arrangement and clear all SIPCS and Bailey alarms.

COMMENTS:

Mark strip chart recorders with date and time at the completion of each performance of this JPM.

Roll strip chart recorders to show no traces from the just completed performance after marking them as noted above.

CRITICAL TASK METHODOLOGY:

Step 2 is critical because leaving rods in AUTO creates the potential for further transients from the failed channel (e.g. trouble shooting) that would produce more uncontrolled rod motion.

Step 6 is critical because failure to place the Rod Stop Bypass in Bypass N-44 could result in an unwarranted rod stop signal during future troubleshooting.

Step 7 is critical because failure to do so could lead to plant conditions that are outside assumed control bands and because the AOP requires the action to be completed.

Step 8 is critical because the inoperable channel must be removed from the QPTR monitoring alarm required by TS 4.2.4.1.b. Failure to remove N-43 input results in a TS action requirement to perform manual monitoring for QPTR.

REVISION HISTORY:

This is a bank JPM that was selected for the 2018 NRC Exam for ILO-16-01 under safety function 7. The source JPM, JPS-008-A15 was revised to reflect current procedure guidance described in AOP-401.10.

SAR 1/2018.

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: None.

INITIAL CONDITION:

The plant is operating at 75% 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: JPS-007-N18

Swap Active CCW Loops

(NRC JPM g)

CANDIDATE: _____

EXAMINER: _____

TASK: 008-021-01-01 Switch Component Cooling Water Trains per SOP-117/SOP-118/SOP-501

TASK STANDARD:

The "B" CCW pump is started and CCW non-essential loads are aligned to the "B" loop of CCW before CCW booster pump trips.

TERMINATING CUE: CCW flow to the RB is verified as not isolated.

PREFERRED EVALUATION LOCATION
SIMULATOR

PREFERRED EVALUATION METHOD
PERFORM

REFERENCES:

SOP-118, COMPONENT COOLING SYSTEM

INDEX NO	***K/A NO.***		***RO***	***SRO***
008000A401	A4.01	Ability to manually operate and/or monitor in the control room: CCW indications and controls	3.3	3.1

TOOLS: Rack copy of SOP-118, COMPONENT COOLING SYSTEM with Section III.B marked as complete up to step 2.5.

VALIDATION TIME 10 min ***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: None.

INITIAL CONDITION:

The “A” CCW loop is currently the Active loop.

The “C” CCW pump has been aligned to Train “B” per SOP-118, COMPONENT COOLING WATER, Section III.B, step 2.2.

INITIATING CUES:

The CRS has directed you to establish CCW Train “B” as the active loop using SOP-118 Section III.B, step 2.5.

A surrogate operator will acknowledge non-related alarms per your direction.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

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

JPM STEP: 1

Step 2.5 Establish Train B as the active loop as follows:

a: Ensure MVB-9503B, CC TO RHR HX B, is open.

STEP STANDARD:

Candidate locates control switch for MVB-9503B and notes red light ON, green light OFF.

CUES:

EVALUATOR NOTE: Provide marked up copy of SOP-118 once candidate has been briefed on the initiating cue.

COMMENTS:

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

JPM STEP: 2

Step 2.5b: Start one of the following in slow speed:

1) XPP-0001B, PUMP B.

STEP STANDARD:

Candidate locates the **PUMP B XPP-0001B control switch and places it to START**, verifies red light ON, green light OFF and pump AMPs indicated.

CUES:

EVALUATOR CUE: If Candidate requests a peer check, acknowledge request.

BOOTH OPERATOR CUE: When contacted as field operator concerning “B” CCW pump ready for start, acknowledge request, wait a briefly then report “The “B” CCW pump is ready for start”.

BOOTH OPERATOR CUE: Once Candidate starts the “B” CCW pump call back and report “The “B” CCW pump is running good after start and RML-2B indicates greater than 5 gpm flow.”

EVALUATOR NOTE: The “C” CCW pump breaker is not racked up thus the Candidate should start the “B” CCW Pump. The step is critical because a pump must be in service to provide flow to the oncoming active loop.

COMMENTS:

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

JPM STEP: 3

Procedure caution Step 2.5.c and 2.5.d: Failure to complete Step 2.5.d in a timely manner after reducing RHR Heat Exchanger flow will result in a loss of flow through the running CCW Pump or excessive flow perturbations in the CCW non-essential loop.

Step 2.5c: Start MVB-9503B, CC TO RHR HX B, stroking in the closed direction.

STEP STANDARD:

Candidate locates **MVB-9503B control switch and places it to CLOSE**, verifies red light ON, green light ON, proceeds to step 2.5d.

CUES:

EVALUATOR NOTE: This step is critical because the RHR Heat exchanger must be isolated from the active loop to assure adequate capacity for loads serviced on the non essential header and to preclude overload on the running CCW pump.

COMMENTS:

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

JPM STEP: 4

Step 2.5.d: When flow, as indicated on FI-7044, HX B FLOW GPM, is between 5000 gpm and 4000 gpm, perform the following in rapid succession:

1) Open MVB-9687B/9525B, LP B NON-ESSEN LOAD ISOL.
2) Open MVB-9524B/9526B, LP B NON-ESSEN LOAD ISOL.
3) Close MVB-9524A/9526A, LP A NON-ESSEN LOAD ISOL.
4) Close MVB-9687A/9525A, LP A NON-ESSEN LOAD ISOL.
5) Open MVB-9503A, CC TO RHR HX A.

STEP STANDARD:

Candidate locates:

FI-7044, HX B FLOW GPM and verifies between 5000 and 4000 gpm.

Control Switch for **MVB-9687B/9525B and places it to OPEN**, verifies red light ON, green light ON.

Control Switch for **MVB-9524B/9526B and places it to OPEN**, verifies red light ON, green light ON.

Control Switch for **MVB-9524A/9526A and places it to CLOSE**, verifies red light ON, green light ON.

Control Switch for **MVB-9687A/9525A and places it to CLOSE**, verifies red light ON, green light ON.

Control Switch for **MVB-9503A and places it to OPEN**, verifies red light ON, green light ON.

Steps 1 and 2 must be initiated prior to the running CCW booster pumps tripping on loss of suction flow.

CUES:

EVALUATOR NOTE: Steps 2.5.d 1), 2), 3) and 4) are critical to preserve the CCW pump function and to align Train "B" as the active loop. Step 2.5.d 5) is critical to preserve a flow path for the Train "A" CCW pump. The CCW booster pumps trip approximately 12 minutes after of closure of the Train "A" supplies to the non-essential header if steps 1 and 2 are not initiated.

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM: JPS-007-N18, Swap Active CCW Loops (NRC JPM g)

IC SET: 297

INSTRUCTIONS:

If IC-297 is designated for this JPM then reset to IC-297.

1. Place Simulator in RUN.
2. Mark up the rack copy of SOP-118 with Section III B steps 2.1 and 2.2 completed and steps 2.3 and 2.4 as NA.
3. Reset SIPCS screens to normal at power arrangement and clear all SIPCS and Bailey alarms.

If IC-297 is **not** designated for this JPM then initial conditions may be established by resetting to IC-10 and following the below directions:

1. With the simulator reset to IC-10 and in FREEZE, insert the following:
2. Go to RUN.
3. Perform SOP-118 Section III B steps 2.1 and 2.2.

   Swap "C" CCW pump to Train "B using the following:

   - LOA-CCW001
     CCW PUMP C DISCONNECT SWITCH
     Position to: TRAIN B
   - LOA-CCW009
     CC PP C SUCT LP B ISO VLV - 9519
     Final Value: 1 (OPEN)
   - LOA-CCW010
     CC PP C SUCT LP A ISO VLV – 9521
     Final Value: 0 (CLOSED)
   - LOA-CCW011
     CC PP C DISCH LP B ISO VLV - 9523C
     Final Value: 1 (OPEN)
   - LOA-CCW012
     CC PP C DISCH LP A ISO VLV - 9523D
     Final Value: 0 (CLOSED)
   - LOA-CCW044
     CELL SWITCH OF CCW PUMP C TRAIN A
     Position To: RACK OUT

4. Place the Simulator in FREEZE and save to the desired IC.
5. Mark up the rack copy of SOP-118 Section III B with steps 2.1 and 2.2 completed and steps 2.3 and 2.4 as NA.
6. Place Simulator in RUN, reset SIPCS screens to normal full power arrangement and clear all SIPCS and Bailey alarms.

COMMENTS:

Provide spare operator to silence alarms.

Mark strip chart recorders with date and time at the completion of each performance of this JPM.

Roll strip chart recorders to show no traces from the just completed performance after marking them as noted above.

CRITICAL TASK METHODOLOGY:

Step 2 is critical because a CCW pump must be in service to provide flow to the oncoming active loop.

Step 3 is critical because the RHR Heat exchanger must be isolated from the active loop to assure adequate capacity for loads serviced on the non essential header and to preclude overload on the running CCW pump.

Step 4 is critical because the valve alignment is required preserve the CCW pump function and to align Train “B” as the active loop. If the candidate fails to align the Train “B” non-essential header within 12 minutes of closing the Train “A” supplies to the non-essential header the running CCW booster pumps will trip and the RCP cooling flow will be lost.

REVISION HISTORY:

This is a modified bank JPM (JPS-070).
SAR 12/2017.

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: None.

INITIAL CONDITION:

The “A” CCW loop is currently the Active loop.

The “C” CCW pump has been aligned to Train “B” per SOP-118, COMPONENT COOLING WATER, Section III.B, step 2.2.

INITIATING CUES:

The CRS has directed you to Establish CCW Train “B” as the active loop using SOP-118 Section III.B, step 2.5.

A surrogate operator will acknowledge non-related alarms per your direction.

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: JPS-008F-N18

Respond to High RB Radiation Level (Alternate Path)

(NRC JPM h)

CANDIDATE: _____

EXAMINER: _____

TASK: 311-018-06-01 Response to High RB Radiation Level

TASK STANDARD:

Two RBCU Filter Trains are placed in service by placing RBCU damper controls for XDP-111A and XDP-110B in the FILTER position. The RBCU Train "A" Emergency switch has been placed to the XFN-65A position and RBCU XFN-65A and XFN-64B have been started.

TERMINATING CUE: Both RBCU Filter Trains are operating.

PREFERRED EVALUATION LOCATION
SIMULATOR

PREFERRED EVALUATION METHOD
PERFORM

REFERENCES:

EOP-17.2, RESPONSE TO HIGH REACTOR BUILDING RADIATION LEVEL

INDEX NO	*K/A NO.*		*RO*	*SRO*
WE16EA11	EA1.1	Ability to operate and/or monitor the following as they apply to the (High Containment Radiation): Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.1	3.2

TOOLS: Rack copy of EOP-17.2, RESPONSE TO HIGH REACTOR BUILDING RADIATION LEVEL

VALIDATION TIME 10 min ***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:

A LOCA is in progress.

A Yellow Path on Containment exists due to Containment Radiation > 2 R/hr

INITIATING CUES:

The CRS has directed you to implement EOP-17.2, RESPONSE TO HIGH REACTOR BUILDING RADIATION LEVEL.

A surrogate operator will acknowledge non-related alarms per your direction.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

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

JPM STEP: 1

Step 1. Verify Containment Ventilation Isolation Valves closed by verifying the following SAFETY INJECTION monitor lights are dim:

a. XCP-6103 2-1 (POST ACCID HR EXH 6056/6066).

b. XCP-6103 3-4 (POST ACCID HR EXH 6057 & 6067).

STEP STANDARD:

Candidate locates XCP 6103 and verifies light 2-1 POST ACCID HR EXH 6056/6066 and 3-4 POST ACCID HR EXH 6057 & 6067 are dim.

CUES:

BOOTH OPERATOR CUE: Place the Simulator in RUN when the Evaluator indicates the JPM may begin.

EVALUATOR CUE: Provide the rack copy of EOP-17.2 once the candidate has been briefed on the initiating cue.

COMMENTS:

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

JPM STEP: 2

Step 2. Start both RBCU HEPA Filter Trains:

Step 2 a. Stop RBCU Normal Speed Fans:

- XFN 0064A-AH,1A NORM.
- XFN 0065A-AH, 2A NORM.
- XFN 0064B-AH,1B NORM.
- XFN 0065B-AH, 2B NORM.

STEP STANDARD:

Candidate locates RBCU controls and verifies RBCU Normal Speed Fans are stopped:

1A NORM, XFN-0064A-AH, observes red light OFF, green light ON with 0 amps indicated.

2A NORM, XFN-0065A-AH, observes red light OFF, green light ON with 0 amps indicated.

1B NORM, XFN-0064B-AH, observes red light OFF, green light ON with 0 amps indicated.

2B NORM, XFN-0065B-AH, observes red light OFF, green light ON with 0 amps indicated.

CUES:

EVALUATOR NOTE: Attachment 1 and Attachment 2 to this JPM provide a visual representation of RBCU flow paths.

COMMENTS:

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

JPM STEP: 3

Step 2 b. Place RBCU HEPA Filters in service by placing the switches in FILTER:

- XDP-110A, RBCU 64A HEPA FLTR BYP DMPR.
- XDP-111A, RBCU 65A HEPA FLTR BYP DMPR.
- XDP-110B, RBCU 64B HEPA FLTR BYP DMPR.
- XDP-111B, RBCU 65B HEPA FLTR BYP DMPR.

STEP STANDARD:

Candidate locates RBCU damper controls and places:

XDP-110A switch in FILTER, observes red BYP light ON and green FILTER light OFF.

XDP-111A switch in FILTER, observes red BYP light OFF and green FILTER light ON.

XDP-110B switch in FILTER, observes red BYP light OFF and green FILTER light ON.

XDP-111B switch in FILTER, observes red BYP light ON and green FILTER light OFF.

CUES:

EVALUATOR NOTE: RBCU 64A HEPA and RBCU 65B HEPA Filter Bypass dampers failed to reposition to filter as shown by XDP-110A; RBCU 64A HEPA FLTR BYP DMPR, red light ON, green light OFF and XDP-111B; RBCU 65BA HEPA FLTR BYP DMPR, red light ON, green light OFF.

EVALUATOR NOTE: **Alternate path begins at this step.**

EVALUATOR NOTE: Placing XDP-111A and XDP-110B in FILTER is critical because the damper will remain bypassed otherwise and there would be no HEPA filter in service on Train “A” or Train”B”.

COMMENTS:

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

JPM STEP: 4

Alternative Action Step 2 b. IF any HEPA Filter fails to position to FILTER, THEN ensure the RBCU TRAIN A(B) EMERG Switch is selected to the fan with its respective filter aligned.

STEP STANDARD:

Candidate locates **RBCU TRAIN A EMERG switch and places it to the XFN65A position**, observes XFN 64A white light OFF, XFN 65A white light ON and RBCU-65A does not start.

Candidate locates RBCU TRAIN B EMERG switch and verifies it is in the XFN64B position, observes XFN 64B white light ON, XFN 65B white light OFF.

CUES:

COMMENTS:

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

JPM STEP: 5

Step 2 c. Start the RBCU Slow Speed Fans selected on RBCU TRAIN A EMERG and RBCU TRAIN B EMERG.

STEP STANDARD:

Candidate **places XFN 0065A-AH slow speed fan switch to START**, observes; red light ON, green light OFF, and normal amps.

Candidate **places XFN 0064B-AH slow speed fan switch to START**, observes; red light ON, green light OFF, and normal amps.

CUES:

EVALUATOR NOTE: The Candidate may place XFN 0064A-AH to stop.

EVALUATOR NOTE: Placing the XFN-65A switch in START is critical because the fan must be started in order to align a Train “A” HEPA filter. Placing the XFN-64B switch in START is critical because the fan must be started in order to align a Train “B” HEPA filter.

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM: JPS-008-N18, Respond to High RB Radiation Level (Alternate Path) (NRC JPM h)

IC SET: 298

INSTRUCTIONS:

If IC-298 is designated for this JPM then reset to IC-298 leaving the simulator in FREEZE.

1. When Candidate is ready (on Evaluator cue) go to RUN.

If IC-298 is **not** designated for this JPM then initial conditions may be established by resetting to IC-10 and following the below directions:

1. With the simulator reset to IC-10 and in FREEZE, insert the following:

- **PRE-LOAD**
  - MAL-RCS010
    GROSS ISOTOPIC CONCENTRATION IN THE RCS
    Final Value: 1.42e+008 uC/gm
  - PLP-RMS027
    AREA RAD MON RM-G7 BACKGROUND
    Final Value: 2.1R/hr
  - PLP-RMS038
    AREA RAD MON RM-G18 BACKGROUND
    Final Value: 2.1R/hr
  - OVR-AH025E
    SS-AH281 RBCU HEPA FILTER BYPASS DAMPER
    Override To: False
  - OVR-AH025A
    SS-AH281 RBCU HEPA FILTER BYPASS DAMPER
    Override To: Off
  - OVR-AH025B
    SS-AH281 RBCU HEPA FILTER BYPASS DAMPER
    Override To: On
  - OVR-AH018E
    SS-AH283 RBCU HEPA FILTER BYPASS DAMPER
    Override To: False
  - OVR-AH018A
    SS-AH283 RBCU HEPA FILTER BYPASS DAMPER
    Override To: Off
  - OVR-AH018B
    SS-AH283 RBCU HEPA FILTER BYPASS DAMPER
    Override To: On
  - OVR-AH026E
    SS-AH282 RBCU HEPA FILTER BYPASS DAMPER
    Override To: False
  - OVR-AH026A
    SS-AH282 RBCU HEPA FILTER BYPASS DAMPER
    Override To: Off
  - OVR-AH026B
    SS-AH282 RBCU HEPA FILTER BYPASS DAMPER
    Override To: On
  - OVR-AH024E
    SS-AH284 RBCU HEPA FILTER BYPASS DAMPER
    Override To: False

- OVR-AH024A
  SS-AH284 RBCU HEPA FILTER BYPASS DAMPER
  Override To: Off
- OVR-AH024B
  SS-AH284 RBCU HEPA FILTER BYPASS DAMPER
  Override To: On
- PMP-AH046F
  XFN0064BL RB CLG FAN LOW FAIL TO START

- **TRIGGER 1**
  - MAL-RCS019C
    DBA LOCA (HOT LEG) LOOP 3
- **AUTO TRIGGER 2** (x02i082f==1) HEPA Filter Bypass damper XDP-111A placed in filter
  - OVR-AH018E (NEW)
    SS-AH283 RBCU HEPA FILTER BYPASS DAMPER
    Override To: False
    Delete in: 1 sec
  - OVR-AH018A (NEW)
    SS-AH283 RBCU HEPA FILTER BYPASS DAMPER
    Override To: Off
    Delete in: 1 sec
  - OVR-AH018B (NEW)
    SS-AH283 RBCU HEPA FILTER BYPASS DAMPER
    Override To: On
    Delete in: 1 sec
- **AUTO TRIGGER 3** (x02i394f==1) HEPA Filter Bypass damper XDP-110B placed in filter
  - OVR-AH026E (NEW)
    SS-AH282 RBCU HEPA FILTER BYPASS DAMPER
    Override To: False
    Delete in: 1 sec
  - OVR-AH026A (NEW)
    SS-AH282 RBCU HEPA FILTER BYPASS DAMPER
    Override To: Off
    Delete in: 1 sec
  - OVR-AH026B (NEW)
    SS-AH282 RBCU HEPA FILTER BYPASS DAMPER
    Override To: On
    Delete in: 1 sec
- **AUTO TRIGGER 4** (x02i093S==1) RB Cooling Fan 64B slow speed switch to start.
  - PMP-AH046F (NEW)
    XFN0064BL RB CLG FAN LOW FAIL TO START
    Delete in: 1 sec

3. Place simulator in RUN and activate **TRIGGER 1.**
4. Perform EOP-1.0.
5. Perform steps of EOP-2.0 as necessary.
6. Run until RB Press < 11 psig and Containment CSFST is YELLOW due to high RB Rad Levels.
7. Place simulator in FREEZE and SAVE IC.
8. When Candidate is ready (on Evaluator cue) go to RUN

COMMENTS:

Provide spare operator to silence alarms.

BOOTH OPERATOR: Use LOA resets page to silence HVAC alarms when they come in.

Mark strip chart recorders with date and time at the completion of each performance of this JPM.

Roll strip chart recorders to show no traces from the just completed performance after marking them as noted above.

CRITICAL TASK METHODOLOGY:

Step 3 is critical because XDP-111B must be placed in filter since XDP-110B will not reposition to filter.

Step 4 is critical in order to assure that the selected RBCU, XFN-65A will be properly aligned.

Step 5 is critical because XFN-65A is the only RBCU with a HEPA filter available on Train “A” likewise XFN-64B is the only RBCU with a HEPA filter available on Train “B”. The fans will not start unless the Candidate places the respective control switch to START.

REVISION HISTORY:

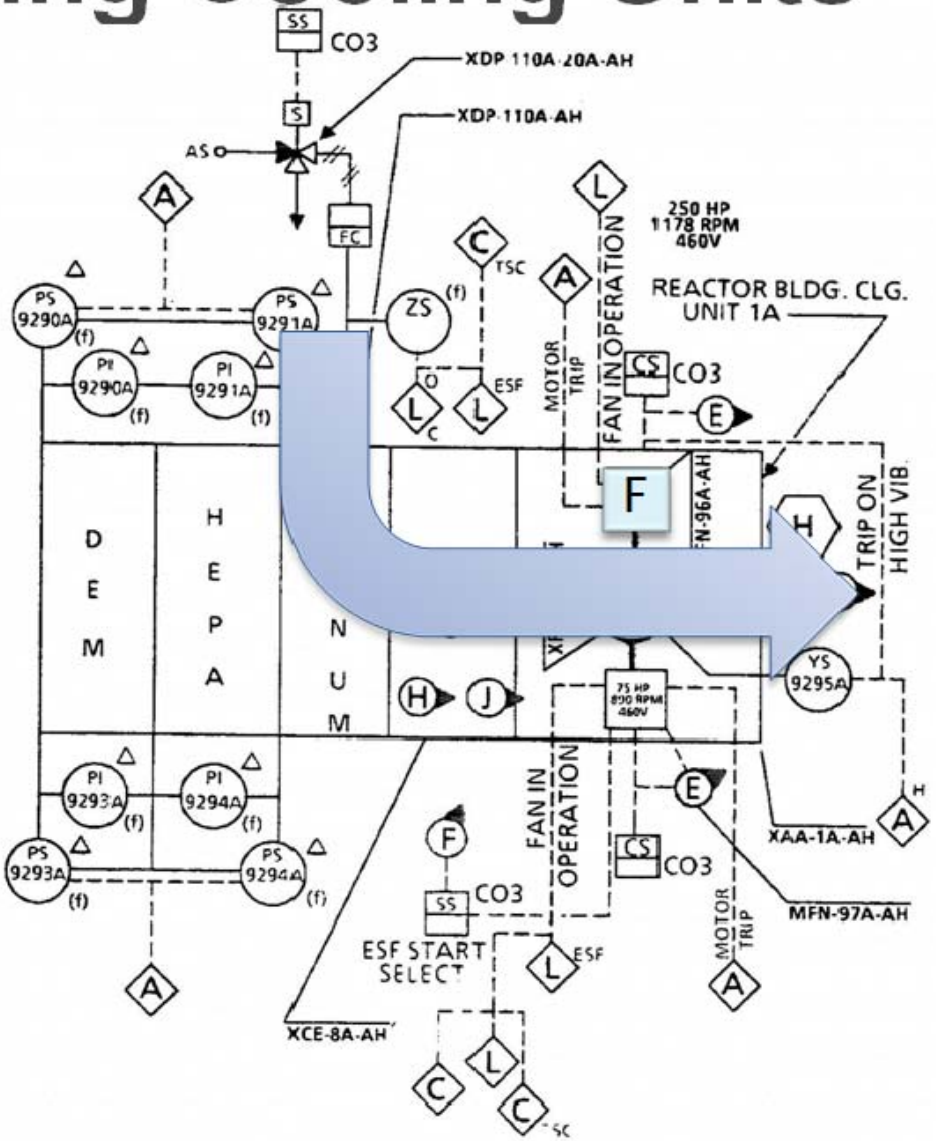
This JPM is a revision of JPSF-1003-N16, RESPOND TO HIGH RB RADIATION LEVEL which was developed as a new JPM on the 2016 NRC exam for ILO-14-0.

SAR 10/2017.

Reactor Building Cooling Units

Normal ops

- 3 RBCUs in service
- Fast Speed
- Bypass damper open
- Exhaust is routed through a gravity damper into ring duct.



Attachment 1
RBCU Normal flow path

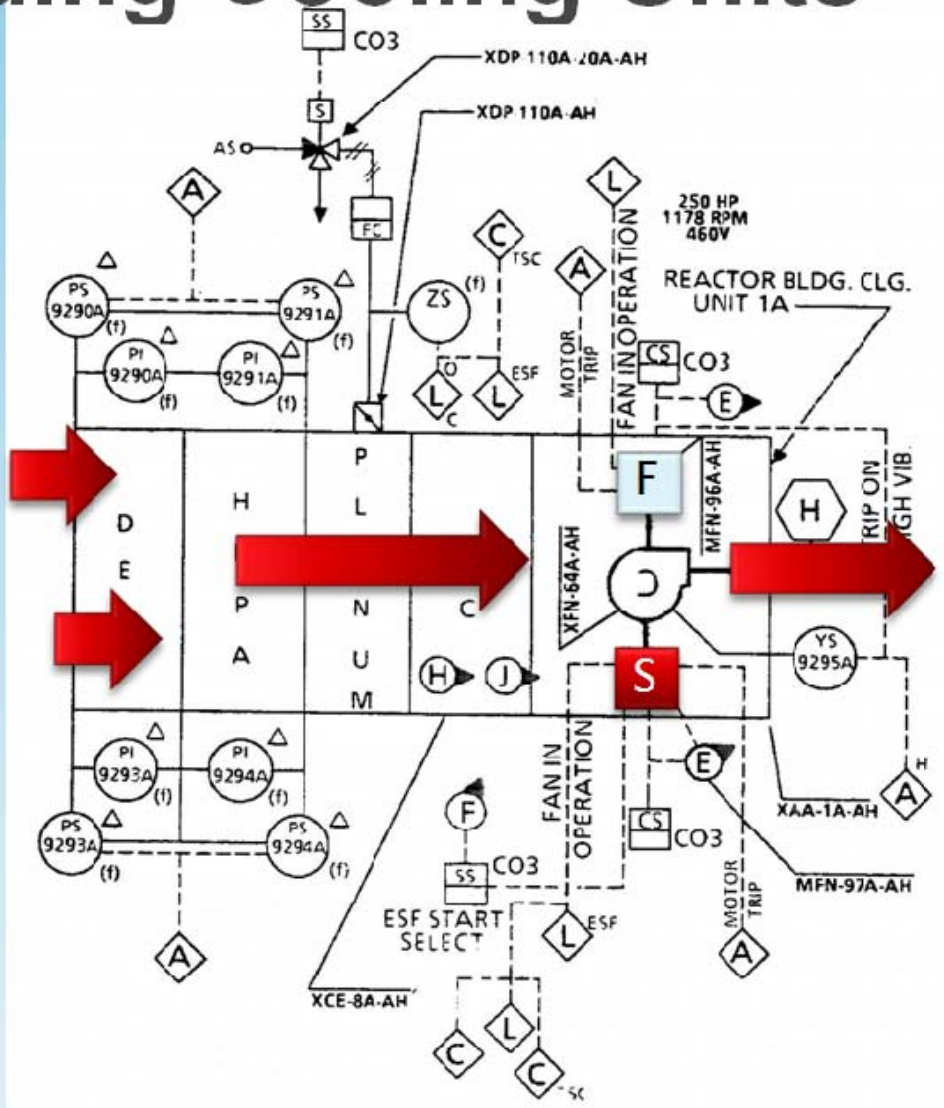
Reactor Building Cooling Units

Emergency Ops:

- 2 RBCUs in service
- Motor tripped, then restarts in slow speed
- Cooling coil supply shifts from ICW to SW booster pumps

Flow Path:

- Bypass damper closes
- Air pulled in two openings on each side of RBCUs
- Air flows through the Demister and HEPA filter prior to reaching the cooling coils



Attachment 2
RBCU Post Accident flow path

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: None.

INITIAL CONDITION:

A LOCA is in progress.

A Yellow Path on Containment exists due to Containment Radiation > 2 R/hr

INITIATING CUES:

The CRS has directed you to implement EOP-17.2, RESPONSE TO HIGH REACTOR BUILDING RADIATION LEVEL.

A surrogate operator will acknowledge non-related alarms per your direction.

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: JPP-009F-N18

Locally Trip the Reactor (Open motor breakers on 1C1 and 1B1) (Alternate Path)

(NRC JPM i)

CANDIDATE: _____

EXAMINER: _____

TASK: 000-117-05-04 Respond to Abnormal Nuclear Power Generation

TASK STANDARD:

The Reactor has been tripped by opening Breaker XSW1C1 05D (TB-412) and Breaker XSW1B1 06C (TB-436).

TERMINATING CUE:

Breaker XSW1C1 05D (TB-412) and Breaker XSW1B1 06C (TB-436) are open.

PREFERRED EVALUATION LOCATION
PLANT

PREFERRED EVALUATION METHOD
SIMULATE

REFERENCES:

EOP-13.0, FR-S.1, RESPONSE TO ABNORMAL NUCLEAR POWER GENERATION

INDEX NO	*K/A NO.*		*RO*	*SRO*
000029EA112	EA1.12	Ability to operate and monitor the following as they apply to a ATWS: M/G set power supply and reactor trip breakers.	4.1	4.0
000029EK3.12	EK 3.12	Knowledge of the reasons for the following responses as they apply to the ATWS: Actions contained in EOP for ATWS.	4.4	4.7

TOOLS: Hard copy of EOP-13.0 ATT. 1, TRIPPING THE REACTOR LOCALLY
Picture 1 – Photo of Rx Trip Breaker A in the closed position.
Picture 2 – Photo of Rx Trip Breaker B in the closed position.
Picture 3 – Photo of Rx Trip Bypass Breaker A in the racked out and open position.
Picture 4 – Photo of Rx Trip Bypass Breaker B in the racked out and open position.

VALIDATION TIME 10 min ***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: High Noise Area.

INITIAL CONDITION:

The RO inserted a manual Reactor trip but the Reactor trip breakers did not open. EOP-13.0 has been implemented for the ATWS.

INITIATING CUES:

Control Room Supervisor directs you to locally trip the reactor using EOP-13.0 Attachment 1, TRIPPING THE REACTOR LOCALLY.

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!

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

JPM STEP: 1

Step 1; Open all the following breakers at XSW0001-CR, Reactor Trip Breaker Switchgear (IB-463):

- XSW0001-RT-A, REACTOR TRIP BREAKER A.
- XSW0001-RT-B, REACTOR TRIP BREAKER B.
- XSW0001-BY-A, REACTOR TRIP BYPASS BREAKER A.
- XSW0001-BY-B, REACTOR TRIP BYPASS BREAKER B.

STEP STANDARD:

Candidate locates **reactor trip and bypass breakers and simulates an attempt to open the Reactor Trip Breakers by indicating they would depress the RX TRIP BKR A(B) MECH TRIP pushbuttons on the lower right of the reactor trip breaker cubicle door or that they would open the Trip breaker cubicle and depress the red Trip pushbutton**.

CUES:

EVALUATOR NOTE: Provide a hard copy of EOP-1.0 Attachment 1 once the Candidate has been briefed on the initiating cue.

EVALUATOR NOTE: If the Candidate indicates they would open the Reactor Trip Breaker cabinet to open the breaker provide a photograph of the Trip Breaker they ask for and have the Candidate identify the action they would take using the photograph.

Use Picture 1 for RT-A

Use Picture 2 for RT-B

EVALUATOR CUE: After the Candidate indicates whatever action they would perform on either Reactor Trip breaker, report "The Breaker did **not** open." This is the point that the JPM becomes Alternate Path.

EVALUATOR NOTE: The Bypass breakers are racked out and no action is required to open them. The Candidate may indicate that they would depress the Shunt Trip Pushbutton for the Bypass breakers or the RX TRIP BYPASS BKR A(B) MECH TRIP trip button or they may not attempt any action.

EVALUATOR NOTE: If the Candidate indicates they would open the Reactor Trip Breaker Bypass Breaker cabinet to open the breaker provide the photograph of the Bypass Breaker they ask for and have the Candidate identify the action they would take using the photograph.

Use Picture 3 for BY-A

Use Picture 4 for BY-B

EVALUATOR CUE: After the Candidate indicates whatever action if any they would perform on either Bypass breaker, report "The Breaker is open."

COMMENTS:

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

JPM STEP: 2

Step 1, Alternative Action; Open all the following breakers at XCA0005-CR, Rod Drive MG Control Cabinet (IB-463):

- Generator No. 1 GENERATOR.
- Generator No. 1 MOTOR.
- Generator No. 2 GENERATOR.
- Generator No. 2 MOTOR.

STEP STANDARD:

Candidate locates Rod Drive MG Control Cabinet and **simulates an attempt to open the Generator and Motor Breakers by indicating that they would turn the pistol grips counterclockwise to the TRIP position**.

CUES:

EVALUATOR CUE: After the Candidate indicates the action they would perform, report "The red light is ON and the green light is OFF." Repeat the cue after each attempt to open a breaker.

COMMENTS:

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

JPM STEP: 3

Step 1, Alternative Action; IF the Reactor is NOT tripped, THEN open the following breakers:

- XSW1B1 06C, ROD DRIVE MG SET B XMG0001B-CR (TB-436).

STEP STANDARD:

Candidate locates **Rod Drive MG Set "B" breaker and simulates an attempt to open it by indicating that they would push the TRIP pushbutton**.

CUES:

EVALUATOR CUE: If the Candidate initially indicates they would depress the TRIP button on the right side of the breaker, report "The red light is ON, the green light is OFF and the red CLOSED Flag is showing."

EVALUATOR CUE: After the Candidate indicates the correct action (depressing the left hand TRIP pushbutton), report "The red light is OFF, green light is ON and an OPEN flag is showing."

COMMENTS:

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

JPM STEP: 4

Step 1, Alternative Action; IF the Reactor is NOT tripped, THEN open the following breakers:

- XSW1C1 05D, ROD DRIVE MG SET A XMG0001A-CR (TB-412).

STEP STANDARD:

Candidate locates **Rod Drive MG Set "A" breaker and simulates an attempt to open it by indicating that they would push the TRIP pushbutton.**

CUES:

EVALUATOR CUE: If the Candidate initially indicates they would depress the TRIP button on the right side of the breaker, report "The red light is ON, the green light is OFF and the red CLOSED Flag is showing."

EVALUATOR CUE: After the Candidate indicates the correct action (depressing the left hand TRIP pushbutton), report "The red light is OFF, green light is ON and an OPEN flag is showing."

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM: JPP-009F-N18, Locally Trip the Reactor (Alternate Path) (NRC JPM i)

IC SET: NA

INSTRUCTIONS: NA

COMMENTS:

CRITICAL TASK METHODOLOGY:

Step 3 is critical because with neither the Reactor Tip Breaker nor the MG Set control breakers opening the 480 volt supply to the Motor must be opened on both MG sets in order to trip the reactor.

Step 4 is critical because with neither the Reactor Tip Breaker nor the MG Set control breakers opening the 480 volt supply to the Motor must be opened on both MG sets in order to trip the reactor.

REVISION HISTORY:

This JPM is a minor revision of JPPF-096A, LOCALLY TRIP THE REACTOR.
SAR 1/2018.

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: None.

INITIAL CONDITION:

The RO inserted a manual Reactor trip but the Reactor trip breakers did not open. EOP-13.0 has been implemented for the ATWS.

INITIATING CUES:

The CRS directs you to locally trip the reactor using EOP-13.0 Attachment 1, TRIPPING THE REACTOR LOCALLY.

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 this paper back to your Evaluator when you feel that you have satisfactorily completed the assigned task.

ACTION/EXPECTED RESPONSE	ALTERNATIVE ACTION
NOTE The following steps should be performed as necessary until the Reactor is tripped.	
1 **Open all the following breakers at XSW0001-CR, Reactor Trip Breaker Switchgear (IB-463):** • XSW0001-RT-A, REACTOR TRIP BREAKER A. ☐ • XSW0001-RT-B, REACTOR TRIP BREAKER B. ☐ • XSW0001-BY-A, REACTOR TRIP BYPASS BREAKER A. ☐ • XSW0001-BY-B, REACTOR TRIP BYPASS BREAKER B. ☐	1 Open all the following breakers at XCA0005-CR, Rod Drive MG Control Cabinet (IB-463): • Generator No. 1 GENERATOR. ☐ • Generator No. 1 MOTOR. ☐ • Generator No. 2 GENERATOR. ☐ • Generator No. 2 MOTOR. ☐ IF the Reactor is NOT tripped, THEN open the following breakers: • XSW1B1 06C, ROD DRIVE MG SET B XMG0001B-CR (TB-436). ☐ • XSW1C1 05D, ROD DRIVE MG SET A XMG0001A-CR (TB-412). ☐
2 **Notify the Control Room when actions are complete.** ☐	

Picture 1


NO OVERCURRENT PROTECTION PROVIDED
RT-1
Conn
To use Levering Mech
Hold in Trip Button
Pull down shutter
Insert crank
Breaker Closed
WARNING
CAUTION
Trip
Push To Close
Spring Discharged
CIRCUIT BREAKER BUILT AT:
WESTINGHOUSE ELECTRIC COMPANY
Repair, Replacements & Automation Services
NEW STANTON, PA 15672-9606
SERIAL NUMBER: 208.039-1 IT.10
DATE COMPLETED: 05/16/2008
• Before doing dielectric testing, see caution note on left side of breaker.
• Read instruction book before installing, operating or maintaining this device.

Picture 2


NO OVERCURRENT PROTECTION PROVIDED
LOW-VOLTAGE AC POWER CIRCUIT BREAKER
RT-2
Breaker Closed
WARNING
CAUTION
Trip
Push To Close
Spring Discharged
CIRCUIT BREAKER BUILT AT:
WESTINGHOUSE ELECTRIC COMPANY
Repair, Replacements & Automation Services
NEW STANTON, PA 15672-9606
SERIAL NUMBER: 208.039-2 IT.10
DATE COMPLETED: 05/16/2008
• Before doing dielectric testing, see caution note on left side of breaker.
• Read instruction book before installing, operating or maintaining this device.

Picture 3

Picture 4

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: JPP-010-N18

Locally De-Energize and Close MS Loop "B" and "C" To TDEFP

(NRC JPM j)

CANDIDATE: _____

EXAMINER: _____

TASK: 000-169-05-04 Locally Isolate a Faulted Steam Generator per EOP-3.0.

TASK STANDARD:

Turbine driven emergency feed pump main steam loop "B" and "C" supply valve are manually closed and power removed from 2802A per EOP-3.0.

TERMINATING CUE: MVG-2802A and MVG-2802B are closed and de-energized per EOP-3.0.

PREFERRED EVALUATION LOCATION
PLANT

PREFERRED EVALUATION METHOD
SIMULATE

REFERENCES:

EOP-3.0, E-2 FAULTED STEAM GENERATOR ISOLATION

INDEX NO	*K/A NO.*		*RO*	*SRO*
000040A110	AA1.10	Ability to operate and/or monitor the following as they apply to the Steam Line Rupture: AFW System	4.1	4.1

TOOLS: 2018 NRC JPM j handout (EOP-3.0 step 5.j, page 4 of 9 of the procedure)

VALIDATION TIME 20 min ***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: Thermal Burn Hazard.

INITIAL CONDITION:

- The plant was at 100% power when a steamline break occurred inside containment.
- "B" and "C" SGs are faulted as indicated by steam pressure dropping in an uncontrolled manner.
- Both motor driven emergency feedwater pumps have started.
- The CRS has implemented EOP-3.0, FAULTED STEAM GENERATOR ISOLATION, after exiting EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION.
- The BOP has tried and failed to close MVG-2802A, MS LOOP B TO TD EFP and MVG-2802B, MS LOOP C TO TD EFP from the MCB.
- The Shift Manager has approved the waiving of ISP-027, ELECTRICAL SAFETY INDUSTRIAL SAFETY PROCEDURE, requirements due to the emergency condition.

INITIATING CUES:

You are the IB operator and you are directed to perform the **ALTERNATIVE** action for EOP-3.0, Step 5.j.

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!

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

JPM STEP: 1

Step 5.j; Alternative Action; Locally deenergize and close the appropriate valve.

- For SG B:

  1) Open XMC1DA2X 05EH, EF PUMP MAIN STEAM BLOCK VLV XVG2802A-MS (IB-463).

STEP STANDARD:

Candidate locates **Breaker 1DA2X 05EH for XVG-02802A and simulates opening the breaker by indicating that they would pull the breaker control lever down**.

CUES:

EVALUATOR NOTE: Provide a hard copy EOP-3.0, E-2, FAULTED STEAM GENERATOR ISOLATION, page 4 which includes step 5.j once the Candidate has been briefed on the initiating cue.

EVALUATOR NOTE: The only sequence that is important is to open each breaker before closing each valve. If the examinee repositions a valve prior to opening the breaker the JPM is considered unsat.

EVALUATOR CUE: If the candidate simulates pulling the breaker control lever down, state "The lever moves and you hear a clunk from the breaker cubicle."

If the candidate simulates pushing the breaker control lever up, state "The lever does not move."

COMMENTS:

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

JPM STEP: 2

Step 5.j; Alternative Action; Locally deenergize and close the appropriate valve.

- For SG C:

  1) Open XMC1DB2Y 05EH, EF PUMP MAIN STEAM BLOCK VLV XVG2802B-MS (AB-463).

STEP STANDARD:

Determines that the AB operator has already opened XMC1DB2Y 05EH, EMERG FEEDWATER PUMP MAIN STEAM BLOCK XVG2802B-MS (AB-463).

CUES:

EVALUATOR CUE: If the Candidate contacts the AB operator or Control Room to open the 2802B breaker, report; "Breaker 05EH on XMC1DB2Y has been opened in accordance with EOP-3.0 step 5 j Alternative Action." If the Candidate tries to go to the Aux Building to open 1DB2Y tell the applicant "Another operator will open the breaker." and "The breaker 1DB2Y 05EH is now open"

COMMENTS:

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

JPM STEP: 3

Step 5.j; Alternative Action; Locally deenergize and close the appropriate valve.

- For SG B:

  2) Close XVG02802A-MS, MS HEADER B EF PUMP TURBINE SUPPLY VLV (IB-436 East Pen).

STEP STANDARD:

Candidate locates **XVG-2802A-MS and simulates manual closure by indicating that they would pull the manual engagement clutch lever down and then indicating they would turn the valve handwheel in the clockwise (CW) direction until the valve position arrow of the handwheel points to the right and the handwheel will no longer rotate**. Note: The valve operator is a Limitorque SMB-00 and **does not** require the clutch lever to be held in the down position during operation.

CUES:

EVALUATOR CUE: If the Candidate operates the declutch lever and then simulates CW motion state: "The handwheel moves freely, you feel resitance from handwheel engagement after less than one turn and the handwheel continues turning until you feel a change in resistance and the handwheel will not rotate. The valve position arrow points to the right."

If the Candidate operates the declutch lever and initially simulates Counter Clockwise (CCW) motion state: "The handwheel moves freely a short ways and then you feel resistance immediately and the handwheel will not move anymore"

If the Candidate subsequently simulates CW motion state: "The handwheel moves freely, you feel resitance from handwheel engagement after less than one turn and the handwheel continues turning until you feel a change in resistance and the handwheel will not rotate. The valve position arrow points to the right."

If the Candidate does **not** indicate that they would operate the manual engagement lever **then** regardless of CW or CCW motion on the handwheel state: "The handwheel moves and you do NOT feel resistance"

COMMENTS:

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

JPM STEP: 4

Step 5.j; Alternative Action; Locally deenergize and close the appropriate valve.

- For SG C:

  2) Close XVG02802B-MS, MS HEADER C EF PUMP TURBINE SUPPLY VLV (IB-436 East Pen).

STEP STANDARD:

Candidate locates **XVG-2802B-MS and simulates manual closure by indicating that they would pull the manual engagement clutch lever down and then indicating they would turn the valve handwheel in the clockwise (CW) direction until the valve position arrow of the handwheel points to the right and the handwheel will no longer rotate.** Note: The valve operator is a Limitorque SMB-00 and **does not** require the clutch lever to be held in the down position during operation.

CUES:

EVALUATOR CUE: If the Candidate operates the declutch lever and then simulates CW motion state: "The handwheel moves freely, you feel resitance from handwheel engagement after less than one turn and the handwheel continues turning until you feel a change in resistance and the handwheel will not rotate. The valve position arrow points to the right."

If the Candidate operates the declutch lever and initially simulates Counter Clockwise (CCW) motion state: "The handwheel moves freely a short ways and then you feel resistance immediately and the handwheel will not move anymore"

If the Candidate subsequently simulates CW motion state: "The handwheel moves freely, you feel resitance from handwheel engagement after less than one turn and the handwheel continues turning until you feel a change in resistance and the handwheel will not rotate. The valve position arrow points to the right."

If the Candidate does **not** indicate that they would operate the manual engagement lever **then** regardless of CW or CCW motion on the handwheel state: "The handwheel moves and you do NOT feel resistance"

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM: JPP-010-N18, Locally De-Energize and Close MS Loop "B" and "C" to TDEFP (NRC JPM j)

IC SET: NA

INSTRUCTIONS: NA

COMMENTS:

CRITICAL TASK METHODOLOGY:

Step 1 is critical because the breaker must be open to assure that the valve motor cannot be operated to re-open the valve.

Step 3 is critical because the valve is normally open and must be closed to assure isolation of the faulted SG.

Step 3 is critical because the valve is normally open and must be closed to assure isolation of the faulted SG.

REVISION HISTORY:

This JPM is a minor revision of JPP-107A-N16, LOCALLY DE-ENERGIZE AND CLOSE MS LOOP "B" AND "C" TO TDEFP which was last used on the 2016 NRC exam for ILO-14-01 for safety function 4S.
SAR 1/2018.

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: Thermal Burn Hazard.

INITIAL CONDITION:

- The plant was at 100% power when a steamline break occurred inside containment.
- "B" and "C" SGs are faulted as indicated by steam pressure dropping in an uncontrolled manner.
- Both motor driven emergency feedwater pumps have started.
- The CRS has implemented EOP-3.0, FAULTED STEAM GENERATOR ISOLATION, after exiting EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION.
- The BOP has tried and failed to close MVG-2802A, MS LOOP B TO TD EFP and MVG-2802B, MS LOOP C TO TD EFP from the MCB.
- The Shift Manager has approved the waiving of ISP-027, ELECTRICAL SAFETY INDUSTRIAL SAFETY PROCEDURE, requirements due to the emergency condition.

INITIATING CUES:

You are the IB operator and you are directed to perform the **ALTERNATIVE** action for EOP-3.0, Step 5.j.

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 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: JPP-011-N18

Fill Spent Fuel Pool from Rx M/U Water

(NRC JPM k)

CANDIDATE: _____

EXAMINER: _____

TASK: 033-002-01-04 MAKEUP TO THE SPENT FUEL POOL PER SOP-123

TASK STANDARD:

Spent fuel pool level is increased to 461.8 ft using Reactor Makeup water and system is returned to standby; XVA-16729 is closed.

TERMINATING CUE:

Control Room requested to start Reactor Make up water pumps.

PREFERRED EVALUATION LOCATION
PLANT

PREFERRED EVALUATION METHOD
SIMULATE

REFERENCES:

SOP-123, SPENT FUEL COOLING SYSTEM

INDEX NO	*K/A NO.*		*RO*	*SRO*
000033A1.01	A1.01	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with Spent Fuel Pool Cooling System operating the controls including: Spent Fuel Pool Water Level	2.7	3.3

TOOLS: Hard copy of SOP-123, Section IV.Z, Raising the level in the Spent Fuel Pool Using the Reactor Makeup Water System.
JPM k Handout – OAP-106.3 Attachment II, Locked Component Operating Sheet.

VALIDATION TIME 10 min ***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: Radiological Control Area.

INITIAL CONDITION:

Plant is at 100% power.

AB Upper reports from the Fuel Handling building that Spent Fuel Pool level is 461.1ft.

The “B” Reactor Makeup water pump is in service.

Chemistry reports that the Reactor Makeup Water Tank contents are within specification for addition to the Spent Fuel Pool.

Spent Fuel Cooling Loop “B” is cooling the Spent Fuel Pool.

Key number 27 is in your possession.

INITIATING CUES:

CRS directs you to raise level in the Spent Fuel Pool to 461.8 ft using the guidance found in SOP-123, Spent Fuel Cooling System, Section IV.Z, Raising the Level in the Spent Fuel Pool Using the Reactor Makeup Water System.

AT NO TIME ARE YOU TO OPERATE ANY PLANT EQUIPMENT!

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

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

JPM STEP: 1

Step 2.1; Minimize the DP across and open XVA16729-SF, RMU SYSTEM TO SF SYSTEM SUPPLY ISOLATION VALVE, as follows:

a. Secure any operating Reactor Makeup Water Pump.

STEP STANDARD:

Candidate contacts control room and requests that the "B" Reactor Makeup water pump be secured. Candidate may request ALL Reactor Makeup water pump be secured.

CUES:

EVALUATOR NOTE: Provide a hard copy of SOP-123 Section IV.Z and JPM k handout, OAP-106.3 Attachment II, once the Candidate has been briefed on the initiating cue.

EVALUATOR CUE: When contacted as Control Room to secure the "B" Reactor Makeup Water pump, acknowledge the request and then report "All Reactor Makeup Water Pumps are OFF."

COMMENTS:

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

JPM STEP: 2

Step 2.1.b; Close XVT06726-SF, REACTOR MU WTR SF SYS POOL SUPPLY VALVE (AB-388).

STEP STANDARD:

Candidate locates **XVT-6726 and simulates closing it by indicating they would turn the handwheel in the Clockwise (CW) direction.**

CUES:

EVALUATOR NOTE: Valve XVT-6726 is normally throttled one half turn open.

EVALUATOR CUE: If the Candidate simulates CW motion state: "The Handwheel moves one half turn, the stem lowers and then you feel resistance."

If the Candidate initially simulates Counter Clockwise (CCW) motion state: "The handwheel operates several turns, the stem rises then you feel resistance."

If the Candidate subsequently simulates CW motion state: "The handwheel operates several turns, the stem lowers then you feel resistance."

COMMENTS:

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

JPM STEP: 3

Step 2.1.c; Unlock XVA16729-SF, RMU SYSTEM TO SF SYSTEM SUPPLY ISOLATION VALVE (AB-388).

STEP STANDARD:

Candidate locates **XVA-16729 and simulates unlocking the valve by indicating they would place the LVP key number 27 into the lock and turn the key to open the lock.**

CUES:

EVALUATOR NOTE: Valve XVA-16729 is approximately 7 feet above the floor. Candidate may require use of a ladder to positively identify and/or operate the valve.

EVALUATOR NOTE: The LVP key 27 would be furnished with the Locked Component Operating Sheet. An initial condition stated that the Candidate has the key in their possession.

EVALUATOR CUE: Once the Candidate locates the valve and simulates unlocking it report: “The valve is unlocked.”

COMMENTS:

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

JPM STEP: 4

Step 2.1.d; Open XVA16729-SF, RMU SYSTEM TO SF SYSTEM SUPPLY ISOLATION VALVE (AB-388).

STEP STANDARD:

Candidate **locates XVA-16729 and simulates opening it by indicating they would turn the operating handle in the CCW (as viewed from above the valve) direction until parallel with the pipe.**

CUES:

EVALUATOR CUE: If the Candidate simulates CCW motion after removing the lock state: “The handle operates until it is parallel with the piping, then you feel resistance.”

If the Candidate initially simulates CW motion or did not remove the lock state: “The handle does not operate and you feel resistance immediately.”

COMMENTS:

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

JPM STEP: 5

Step 2.2; Start at least one Reactor Makeup Water Pump.

STEP STANDARD:

Candidate contacts control room and requests that a Reactor Makeup water pump be started.

CUES:

EVALUATOR CUE: When contacted as Control Room to start a Reactor Makeup Water pump, acknowledge the request and then report "The "B" Reactor Makeup Water Pump is ON."

COMMENTS:

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

JPM STEP: 6

Step 2.3; To prevent RMUW Pump runout, throttle XVT06726-SF, REACTOR MU WTR SF SYS POOL SUPPLY VALVE (AB-388), to less than or equal to ½ turn open.

STEP STANDARD:

Candidate locates **XVT-6726 and simulates opening it by indicating they would turn the handwheel in the CCW direction one half turn**.

CUES:

EVALUATOR CUE: If the Candidate simulates CCW motion state: "The handwheel operates one half turn."

If the Candidate initially simulates CW motion state: "The handwheel does not operate and you feel resistance immediately."

COMMENTS:

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

JPM STEP: 7

Step 2.4 Verify Spent Fuel Pool level increases.

STEP STANDARD:

Candidate contacts the Control Room or AB Upper to verify Spent Fuel Pool Level increase.

CUES:

EVALUATOR CUE: When contacted as Control Room or AB Upper to verifiy level rise, ackowledge the request.

If Candidate opened XVA-16729 and XVT-6726 and requested a Reactor Makeup Water pump start then report "Spent Fuel Pool Level is rising"

If candidate did not open either XVA-16729 or XVT-6726 or did not request a Reactor Makeup Water pump start then report "Spent Fuel Pool Level is NOT rising."

COMMENTS:

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

JPM STEP: 8

Step 2.5 When desired level has been reached, secure any operating Reactor Makeup Water Pump.

STEP STANDARD:

Candidate acknowledges CR communication.

CUES:

EVALUATOR NOTE: This step is a control room function. The Control room will monitor the level increase and secure the Reactor Makeup Water pump at the desired level. Candidate may inquire as to level. If so provide the following cue.

EVALUATOR CUE: If the Candidate has lined up flow by opening the valves and requesting the pump start report "Using time compression, This is the Control Room. Spent Fuel Pool level is now 461.8 ft. The "B" Reactor Makeup Water Pump is OFF. You may proceed with step 2.6 of SOP-123 Section IV.Z."

COMMENTS:

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

JPM STEP: 9

Step 2.6; Close XVA16729-SF, RMU SYSTEM TO SF SYSTEM SUPPLY ISOLATION VALVE (AB-388).

STEP STANDARD:

Candidate locates **XVA-16729 and simulates closing it by indicating they would turn the handle in the CW (as viewed from above the valve) direction until it is perpindicular to the piping.**

CUES:

EVALUATOR CUE: If the Candidate simulates CW motion state: "The handwheel operates until it is perpindicular to the piping and then you feel resistance."

If the Candidate initially simulates CCW motion state: "The handle does not operate and you feel resistance immediately."

COMMENTS:

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

JPM STEP: 10

Step 2.7; Lock XVA16729-SF, RMU SYSTEM TO SF SYSTEM SUPPLY ISOLATION VALVE (AB-388).

STEP STANDARD:

Candidate contacts a second operator to lock XVA-1629-SF.

CUES:

EVALUATOR CUE: When contacted as a second operator, acknowledge request and report "Using time compression, XVA-16729-SF is locked and the OAP-106.3 Attachment II, Locked Component Operating Sheet has been returned to the CRS for review."

COMMENTS:

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

JPM STEP: 11

Step 2.8; Throttle XVT06726-SF, REACTOR MU WTR SF SYS POOL SUPPLY VALVE (AB-388), to ½ turn open.

STEP STANDARD:

Candidate locates **XVT-6726 and simulates throttling it by indicating they would turn the handwheel in the CW direction till closed then CCW one half turn**.

CUES:

EVALUATOR NOTE: Candidate may not attempt to throttle XVT-6729-SF as it was throttled to one half turn open in procedure step 2.3 (JPM step 6).

EVALUATOR CUE: If the Candidate inititally simulates CW motion first, state: "The handwheel operates one half turn, the stem lowers and then you feel resistance." If the Candidate then simulates CCW motion state, "The handwheel operates one half turn."

If the Candidate initially simulates CCW motion state: "The handwheel operates many turns, the stem rises and you feel resistance." If the Candidate then simulates CW motion state, "The handwheel operates many turns, the stem lowers and you feel resistance."

COMMENTS:

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

JPM STEP: 12

Step 2.9; Start Reactor Makeup Water Pump(s) per Shift Manager.

STEP STANDARD:

Candidate contacts control room and requests that a Reactor Makeup water pump be started per the Shift Manager.

CUES:

EVALUATOR CUE: Acknowledge request. Terminate JPM.

COMMENTS:

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM: JPP-011-N18, Fill Spent Fuel Pool from Rx M/U Water (NRC JPM k)

IC SET: NA

INSTRUCTIONS:

Determine the date and time of performance for this JPM. Contact the ALARA group in advance of the scheduled date of performing this JPM. Inform the ALARA group that the JPM should not result in transit through radiation areas and all aspects of the task will be performed in low dose areas.

COMMENTS:

Survey Maps can be accessed from the Company Intranet by typing VSDS (Virtual Survey Display System) in the Explorer command line.

CRITICAL TASK METHODOLOGY:

Step 1 is critical because this is how DP across XVA16729-SF is minimized to allow opening the valve.

Step 2 is critical to prevent possible runout of the Reactor Makeup Water pump during subsequent steps.

Step 3 is critical because the lock would prevent opening of XVA-16729.

Step 4 is critical because without opening XVA-16729 no flow path to the Spent Fuel Pool is available for Reactor Makeup Water.

Step 5 is critical because without starting a Reactor Makeup Water Pump no flow to the Spent Fuel Pool is available in order to raise Spent Fuel Pool level.

Step 6 is critical because without opening XVT-6726 no flow path to the Spent Fuel Pool is available for Reactor Makeup Water.

Step 9 is critical because failure to close XVA-16729 would allow subsequent unplanned additions to the Spent Fuel Pool whenever a Reactor Makeup Water pump is started.

REVISION HISTORY:

This is a new JPM that was created for the 2018 NRC Exam for ILO-16-01. It is assigned to Safety Function 8 for that exam.

SAR 1/2018.

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: Radiological Control Area.

INITIAL CONDITION:

Plant is at 100% power.

AB Upper reports from the Fuel Handling building that Spent Fuel Pool level is 461.1ft.

The “B” Reactor Makeup water pump is in service.

Chemistry reports that the Reactor Makeup Water Tank contents are within specification for addition to the Spent Fuel Pool.

Spent Fuel Cooling Loop “B” is cooling the Spent Fuel Pool.

Key number 27 is in your possession.

INITIATING CUES:

CRS directs you to raise level in the Spent Fuel Pool to 461.8 ft using the guidance found in SOP-123, Spent Fuel Cooling System, Section IV.Z, Raising the Level in the Spent Fuel Pool Using the Reactor Makeup Water System.

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.

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPA-81E-(R)N18**

2018 NRC A1-b (RO)

CANDIDATE: _____

EXAMINER: _____

DESCRIPTION: Operational Leak Rate Test without IPCS available

TASK: 02-001-02-01 PERFORM REACTOR COOLANT SYSTEM WATER INVENTORY BALANCE.

TASK STANDARD: Candidate completes STP-114.002, Attachment I, Test Data Sheet, including calculation of IDENTIFIED and UNIDENTIFIED leakages, within the answer key tolerances.

TERMINATING CUE: The candidate completes the STP-114.002, ATTACHMENT I contained in a handout and returns it and the briefing sheet to the examiner.

PREFERRED LOCATION:	***PREFERRED METHOD:***
CLASSROOM	PERFORM

REFERENCES:

STP-114.002 OPERATIONAL LEAKAGE CALCULATION.

STATION CURVE BOOK

K/A 2.1.20 Ability to interpret and execute procedure steps. (RO 4.6)

2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc. (RO 3.9)

10CFR55: 45 b(1)(12)

TOOLS:
Calculator
Handout 1 containing STP-114.002, OPERATIONAL LEAKAGE CALCULATION
Handout 2 containing plant data
Access to paper or electronic copies of V.C. Summer procedures

VALIDATION TIME: 25 Minutes. ***TIME CRITICAL:*** NO

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

CANDIDATE: _____

EXAMINER: _____

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 CONDITIONS:

- The plant is in Mode 1.
- The IPCS Leak Rate Program unavailable.
- IPCS can be used to obtain plant data.
- No RCS makeup or diversion to the recycle holdup tanks will occur.
- No Chemical additions or primary samples will be performed.
- RCS pressure will be maintained at 2235 psig.
- Primary to secondary leakage is 0 gpm.
- There is no recorded leakage to atmosphere in the RB.

INITIATING CUES:

You are directed to perform the following:

USING PLANT DATA ON THE HANDOUT PROVIDED, perform STP-114.002, OPERATIONAL LEAKAGE CALCULATION starting at STEP 6.4.b and **complete through** STEP 6.4.j.

- You are to assume that another operator operates valves as required in STEP 6.4.c.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

CRITICAL:	YES	SEQUENCED:	NO	SAT		UNSAT	

JPM STEP 1

Inputs data into STP-114.002. ATTACHMENT I, TEST DATA SHEET.

STEP STANDARD:

Applicant transfers IPCS data provided on RO Handout 2 into the correct spaces on STP-114.002, Attachment I, Test Data Sheet.

CUES:

EVALUATOR NOTES:

The candidate should have the JPM Briefing Sheet, Handouts #1 (Includes a complete copy of STP-114.002, OPERATIONAL LEAKAGE CALCULATION) and Handout 2.

If the candidate requests operation of valves PVD-7170 and PVD-7136, refer the candidate to the briefing sheet.

COMMENTS:

CRITICAL:	YES	SEQUENCED:	NO	SAT		UNSAT	

JPM STEP 2

Calculates change in test data.

STEP STANDARD:

Student subtracts initial data from final to determine changes in the following parameters as indicated on answer key.

- TAVG
- PZR LEVEL
- VCT LEVEL
- PRT LEVEL
- RCDT LEVEL

CUES:

EVALUATOR NOTE:

It is not critical that the candidate follow the sequence to determine all changes as long as Attachment I is filled in correctly at the completion of the JPM.

COMMENTS:

CRITICAL: YES	SEQUENCED: NO	SAT		UNSAT	

JPM STEP 3

Determines the RCS Inventory change due to Tavg, PZR level, VCT level, PRT, and RCDT changes

STEP STANDARD:

Applicant refers to the correct curves for Tavg (Figure V-7), PRT (Figure VI-21), and RCDT (Figure VI-22), calculates changes for all items, including the correct polarity, as shown on the answer key.

CUES:

EVALUATOR NOTE: It is not critical that the candidate follow the JPM sequence to determine all inventory deviations as long as Attachment I is filled in correctly at the completion of the JPM.

COMMENTS:

CRITICAL: YES	SEQUENCED: YES	SAT		UNSAT	

JPM STEP 4

Calculates Identified and Unidentified leakrates and indicates the values in Attachment 1, Part 2.

STEP STANDARD:

The final Identified and Unidentified leakrates are required to be within the tolerances indicated on the answer key.

CUES:

COMMENTS:

JPM SETUP SHEET

JPM: JPM: JPA-81E-(R)N18

IC SET: N/A

INSTRUCTIONS:

Ensure that current procedures and curve book are available in hard copy or electronically.

Provide Handout 1 - STP-114.002, Attachment I

Provide Handout 2 - sheet Containing the following:

Name: _____ Date: _____

INITIAL DATA Start time 0800:
T0499A, RCL MEDIAN TAVG = 586.2°F
L0480A, PRESSURIZER LEVEL-LT459 = 60.5%
L0112A, VOLUME CONTROL TANK LEVEL-LT-115 = 38.0%
L0485A, PRESSURIZER RELIEF TANK L-LT470 = 72.5%
L1028, REACTOR COOL DR TNK LEV = 4%

FINAL DATA Stop time 0915:
T0499A, RCL MEDIAN TAVG = 586.8°F
L0480A, PRESSURIZER LEVEL-LT459 = 60.0%
L0112A, VOLUME CONTROL TANK LEVEL-LT-115 = 22.4%
L0485A, PRESSURIZER RELIEF TANK L-LT470 = 72.5%
L1028, REACTOR COOL DR TNK LEV = 55%

COMMENTS:

JPM BRIEFING SHEET

SAFETY CONSIDERATIONS: NONE

INITIAL CONDITIONS:

- The plant is in Mode 1.
- The IPCS Leak Rate Program unavailable.
- IPCS can be used to obtain plant data.
- No RCS makeup or diversion to the recycle holdup tanks will occur.
- No Chemical additions or primary samples will be performed.
- RCS pressure will be maintained at 2235 psig.
- Primary to secondary leakage is 0 gpm.
- There is no recorded leakage to atmosphere in the RB.

INITIATING CUES:

You are directed to perform the following:

USING PLANT DATA ON THE HANDOUT PROVIDED, perform STP-114.002, OPERATIONAL LEAKAGE CALCULATION starting at STEP 6.4.b and **complete through** STEP 6.4.j.

- You are to assume that another operator operates valves as required in STEP 6.4.c.

Hand this paper back to your Evaluator when you feel that you have satisfactorily completed the assigned task.

2018 NRC A1-b RO Handout 2

Name: _____ Date: _____

INITIAL DATA

Start time 0800:

T0499A, RCL MEDIAN TAVG = 586.2°F

L0480A, PRESSURIZER LEVEL-LT459 = 60.5%

L0112A, VOLUME CONTROL TANK LEVEL-LT-115 = 38.0%

L0485A, PRESSURIZER RELIEF TANK L-LT470 = 72.5%

L1028, REACTOR COOL DR TNK LEV = 4%

FINAL DATA

Stop time 0915:

T0499A, RCL MEDIAN TAVG = 586.8°F

L0480A, PRESSURIZER LEVEL-LT459 = 60.0%

L0112A, VOLUME CONTROL TANK LEVEL-LT-115 = 22.4%

L0485A, PRESSURIZER RELIEF TANK L-LT470 = 72.5%

L1028, REACTOR COOL DR TNK LEV = 55%

TEST DATA SHEET

PART 1

	TIME	TAVG		PZR LEVEL		VCT LEVEL		PRT LEVEL		RCDT LEVEL	
		MCB TI-___	COMPUTER T0499A/ U0091	MCB LI-___	COMPUTER L0480A	MCB LI-___	COMPUTER L0112A	MCB LI-470	COMPUTER L0485A	XPN-0007 ILI01003	COMPUTER L1028
FINAL	0915		586.8°F		60.0%		22.4%		72.5%		55%
INITIAL	0800		586.2°F		60.5%		38.0%		72.5%		4%
CHANGE	75 min	*	* 0.6°F	**	** -0.5%		-15.6%		0.0%		51%

CHG C

PART 2

2a: 48.6 (6.4.d.3), Tavg) gallons + 28.285 (6.4.e.3), PZR Level) gallons + 218.4 (6.4.f.2), VCT Level) gallons = 295.285 gallons ÷ 75 (Test Time) minutes

(48.6-50.1) (28-29) (218.4-224) (295-303.1)

= 3.937 (3.93-4.04) gallons/minute TOTAL LEAKAGE

2b: (1) 0 (6.4.g), PRT Level) gallons + (1) 169.78 (6.4.h), RCDT Level) gallons = 169.78 gallons ÷ 75 (Test Time) minutes

(165-185) (165-185)

= 2.263 (2.2-2.46) gallons/minute + (1) 0 (6.4.i, Primary to Secondary leakage) gallons/minute = 2.263 gallons/minute IDENTIFIED LEAKAGE

(2.2-2.46) <-CRITICAL RANGE FOR CALCULATION

2c: 3.937 (2a, Total Leakage) (3.93-4.04) gallons/minute - 2.263 (2b, Identified Leakage) (2.2-2.46) gallons/minute = 1.674 gallons/minute UNIDENTIFIED LEAKAGE

(1.47-1.84) <-CRITICAL RANGE FOR CALCULATION

* Tavg decrease = negative gal./Tavg increase = positive gal. ** Pzr Level decrease = positive gal./Pzr Level increase = negative gal.

CHG C

(1) Record value as zero for negative changes.

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPA-040A-(R)N18**

2018 NRC A2 (RO)

CANDIDATE: _____

EXAMINER: _____

DESCRIPTION: Review a tagout prior to approval.

TASK: O-115-148-03-04 Generate Tagouts and Enclosures

TASK STANDARD: Identifies omission of the power supply breaker and venting, and an improper tagging sequence.

TERMINATING CUE: The candidate returns JPM briefing sheet and Handout materials provided to the examiner.

PREFERRED LOCATION:	***PREFERRED METHOD:***
CLASSROOM	PERFORM

REFERENCES:
SAP-0201, EQUIPMENT TAGGING AND LOCKOUT-TAGOUT.
OAP-100.5, GUIDELINES FOR CONFIGURATION CONTROL AND OPERATION OF PLANT EQUIPMENT
SOP-118, COMPONENT COOLING WATER
DRAWING 302-611

K/A 2.2.13 Knowledge of tagging and clearance procedures.(RO 4.1)

10CFR55: 45 b(1)(13)

TOOLS:
Copies of 2018 NRC A2 RO Handouts 1 and 2
Marked up excerpt of 302-611 with proposed mechanical isolation.
Excerpt of 302-614
Electronic or Hardcopy versions of station procedures

VALIDATION TIME: 30 Minutes. ***TIME CRITICAL:*** NO

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

CANDIDATE: _____

EXAMINER: _____

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 CONDITIONS:

- The plant is in Mode 1.
- Mechanical Maintenance has requested a tagout to repair the outboard bearing and pump shaft on "C" CCW Pump.
- "A" and "B" CCW pumps will remain in service.
- A proposed tagout to perform this work is in "PREPARED" status awaiting review.

INITIATING CUES:

You are to review the tagout sheet provided in Handout 1 and record any and all discrepancies that will require correction to advance the tagout enclosure to the "REVIEWED" state.

If discrepancies do exist, circle the discrepancy on Handout 1 and explain the nature of the discrepancy on Handout 2.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

CRITICAL: NO	SEQUENCED: NO	SAT		UNSAT	

JPM STEP 1

Reviews SAP-0201, EQUIPMENT TAGGING AND LOCKOUT-TAGOUT and OAP-105, GUIDELINES FOR CONFIGURATION CONTROL AND OPERATION OF PLANT EQUIPMENT.

STEP STANDARD:

Reviews the guidance contained in SAP-201, step 6.1.3 and OAP-100.5, step 9.1.

CUES:

EVALUATOR NOTES: Provide candidate with the 2018 NRC A2 RO Handouts 1 and 2.

SAP-201 and OAP-100.5 are classified as "INFORMATION USE". These procedures may be performed from memory; however, the user retains accountability for proper performance.

The steps in this JPM do not need to be performed in order.

COMMENTS:

CRITICAL: YES	SEQUENCED: NO	SAT		UNSAT	

JPM STEP 2

Examinee reviews the tagout contained in handout 1.

STEP STANDARD:

Identifies **all** the following errors:

- Power supply breaker from 7.2 KV Bus 1DB has not been included.
- There are no vent valves included within the proposed tagout boundary.(SAP-0201, Section 4.5.1)
- The sequence of valve tagging is not correct.(OAP-100.5, Section 9.1.a.1))

CUES:

Evaluator notes:

The following technically specific items are not required to satisfy the task standard. They are, however, normally specified for a tagout of “C” CCW pump and are included here for reference if required during follow-up questioning:

- Breaker XSW1DB 11 Breaker Open/Racked down.
- At least one Vent valve included (XVT(s) 19549, 19550 and 19551) OPEN and UNCAPPED.
- Suction valve XVB09518C-CC closed after the discharge valve XVB09501C-CC and before venting and draining.

COMMENTS:

JPM SETUP SHEET

JPM: JPA-040A-(R)N18

IC SET: N/A

INSTRUCTIONS:

Provide:

Handout 1 – LOTO Tagout enclosure for "C" CCW Pump without 1DB power supply breaker or vent valves included and the drain valves specified open before suction valve is tagged closed.

Handout 2 that includes the following:

Name: _____ Date: _____

IF DISCREPANCIES WERE FOUND, FULLY EXPLAIN THEN BELOW:

Marked up excerpt of drawing 302-611 with suction valve, discharge valve and drain valves identified as part of isolation boundary.

Excerpt of drawing 302-614 showing cooling coils for "C" CCW Pump.

Ensure that current procedures are available in hard copy or electronically.

COMMENTS:

JPM BRIEFING SHEET

SAFETY CONSIDERATIONS: NONE

INITIAL CONDITIONS:

- The plant is in Mode 1.
- Mechanical Maintenance has requested a tagout to repair the outboard bearing and pump shaft on "C" CCW Pump.
- "A" and "B" CCW pumps will remain in service.
- A proposed tagout to perform this work is in "PREPARED" status awaiting review.

INITIATING CUES:

You are to review the tagout sheet provided in Handout 1 and record any and all discrepancies that will require correction to advance the tagout enclosure to the "REVIEWED" state.

If discrepancies do exist, circle the discrepancy on Handout 1 and explain the nature of the discrepancy on Handout 2.

Hand this paper back to your Evaluator when you feel that you have satisfactorily completed the assigned task.

VC Summer Nuclear Station	TAGOUT	Tagout ID: 18 -1264
Hang 18 -1264-1	Status: **Complete**	Page 1 of 1
Authorized By: FOR INFORMATION ONLY		

Enclosure Name:	**XPP0001C (COMPONENT COOLING PUMP C)**
Enclosure Purpose:	**REPAIR / REPLACE OB BEARING AND PUMP SHAFT AS REQUIRED.**
Enclosure Comments:	**ALIGN XPP0001C TO THE MAINTENANCE TRAIN ('A' TRAIN) FOR PROMPT RESTORATION AND RETEST WHEN TAGS ARE CLEARED.**
Enclosure Start Date/Time:	_____ / _____

Seq: **1.0** Red Tag **1805416**	**XSW1DA 07** **CC PUMP C XPP0001C-CC** **IB-463-G-09**	**Breaker Open/ Racked Down**	Hung By: Verified By: Hold Tag Inst:
Seq: **2.0** Red Tag **1805417**	**XVB09501C-CC** **COMPONENT COOLING PUMP C DISCHARGE VLV** **IB-412-H-05**	**Closed**	Hung By: Verified By: Hold Tag Inst:
THIS VALVE REQUIRES A LOCKED VALVE TRACKING SHEET.			
Seq: **3.0** Procedure Step	**See comment** **Perform guidance specified in the comment below.**	**Complete**	Performed By: Verified By:
Seq: **4.0** Red Tag **1805418**	**XVT19556-CC** **CC PUMP C DISCHARGE HEADER DRAIN VALVE** **IB-412-H-05**	**Open/ Uncapped**	Hung By: Verified By: Hold Tag Inst:
Seq: **4.0** Red Tag **1805419**	**XVT19560-CC** **CC PUMP C SUCTION HEADER DRAIN VALVE** **IB-412-H-05**	**Open/ Uncapped**	Hung By: Verified By: Hold Tag Inst:
Seq: **5.0** Red Tag **1805420**	**XVB09518C-CC** **COMPONENT COOLING PUMP C SUCTION VALVE** **IB-412-H-05**	**Closed**	Hung By: Verified By: Hold Tag Inst:
THIS VALVE REQUIRES A LOCKED VALVE TRACKING SHEET.			

Enclosure Completion Date/Time: _____ / _____		Recorded in LOTO: ____
Enclosure Completion Notes:	Enclosure Performed By:	
	User ID	Initials

Hang **18 -1264-1**	**TAGOUT**	
Page 1 of 1	6/3/2018 10:15	17-1264-1

VC Summer Nuclear Station	TAGOUT	Tagout ID: 17-1264
Tagout Details	Status: **Cleared**	Page 1 of 1

System:	System Name:	Train:	Outage:
CC	COMPONENT COOLING	X	

Reason For Tagout:
REPAIR / REPLACE OB BEARING AND PUMP SHAFT AS REQUIRED.

Tagout Comments:
DWGS: D-302-611

Impact Section

Safety Impacts:	Safety Impact Comments:	Reviewed By:
Caution/Notes	Recommend aligning 'C' CCW pump to 'A' train in preparation for testing.	
EOOS	This task impacts EOOS Risk: GREEN. This task impacts FEP Equipment Availability Risk: YELLOW (30-day RMA's.) RxM is not impacted.	
Fire Protection	30-day RMA's	
FME	STANDARD, as defined by SAP-363	
Operations Retest	STP-222.002	
Removal & Restoration	R&R # 170646	
S/RWP	Required	
Security Review	SAP-163 Security Compliance Review: Exclude	
Technical Specifications	3.7.3, OAP-100.5 Encl. Q	
WPO	WPO # 10-35	

Review Section

Tagout Prepared By:	Tagout Reviewed By:	Tagout Approved By:
DENNIS SMITH 10/30/2017 05:27	GREG E ERVIN 11/01/2017 07:04	RODGER WINN 12/04/2017 08:41

Out Of Service Section

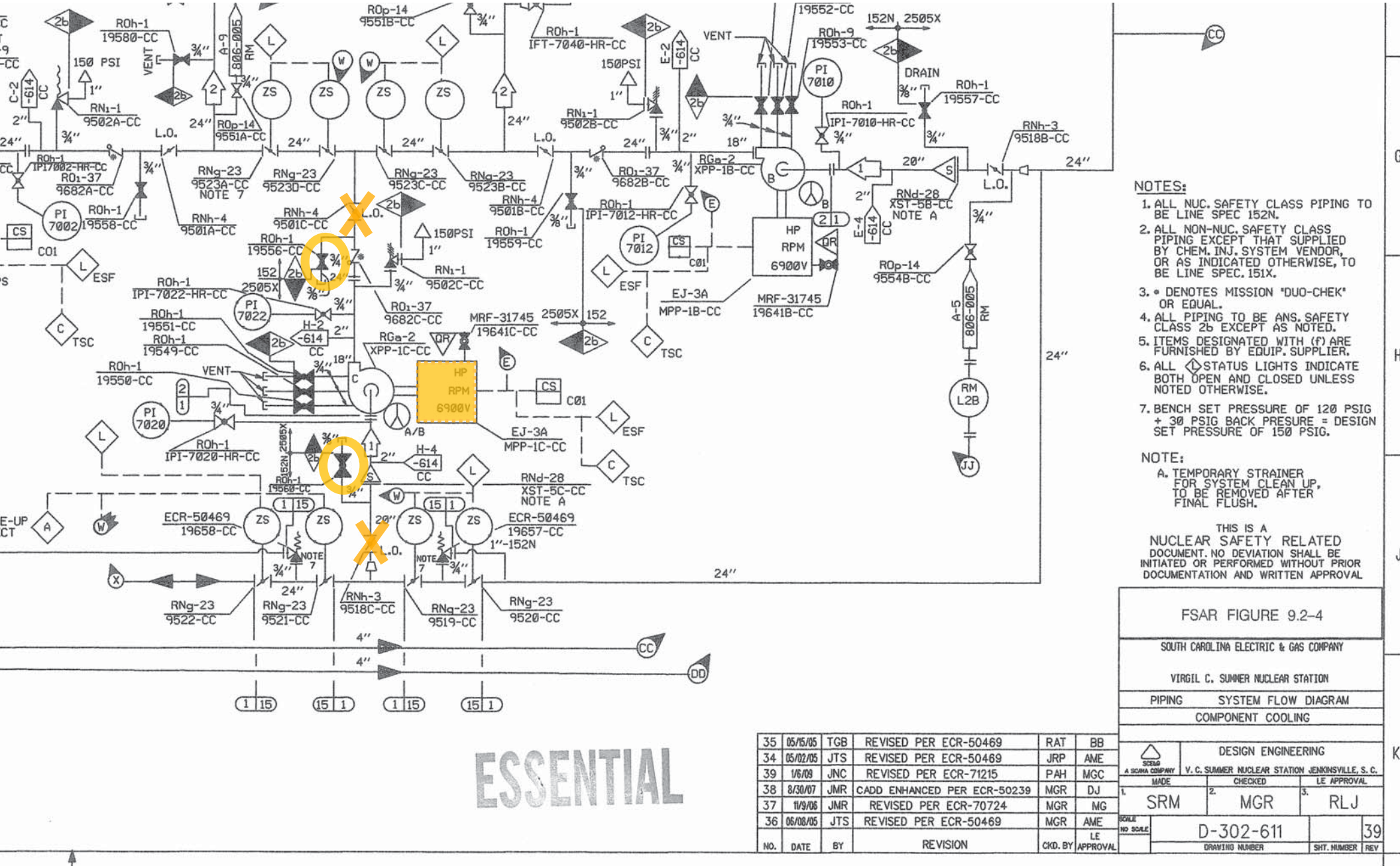
Tagout Hung Date/Time	Tagout Cleared Date/Time	Total Time Out Of Service
12/11/2017 00:53	12/16/2017 00:48	4 Days 23 Hours 55 Minutes

Enclosure Section

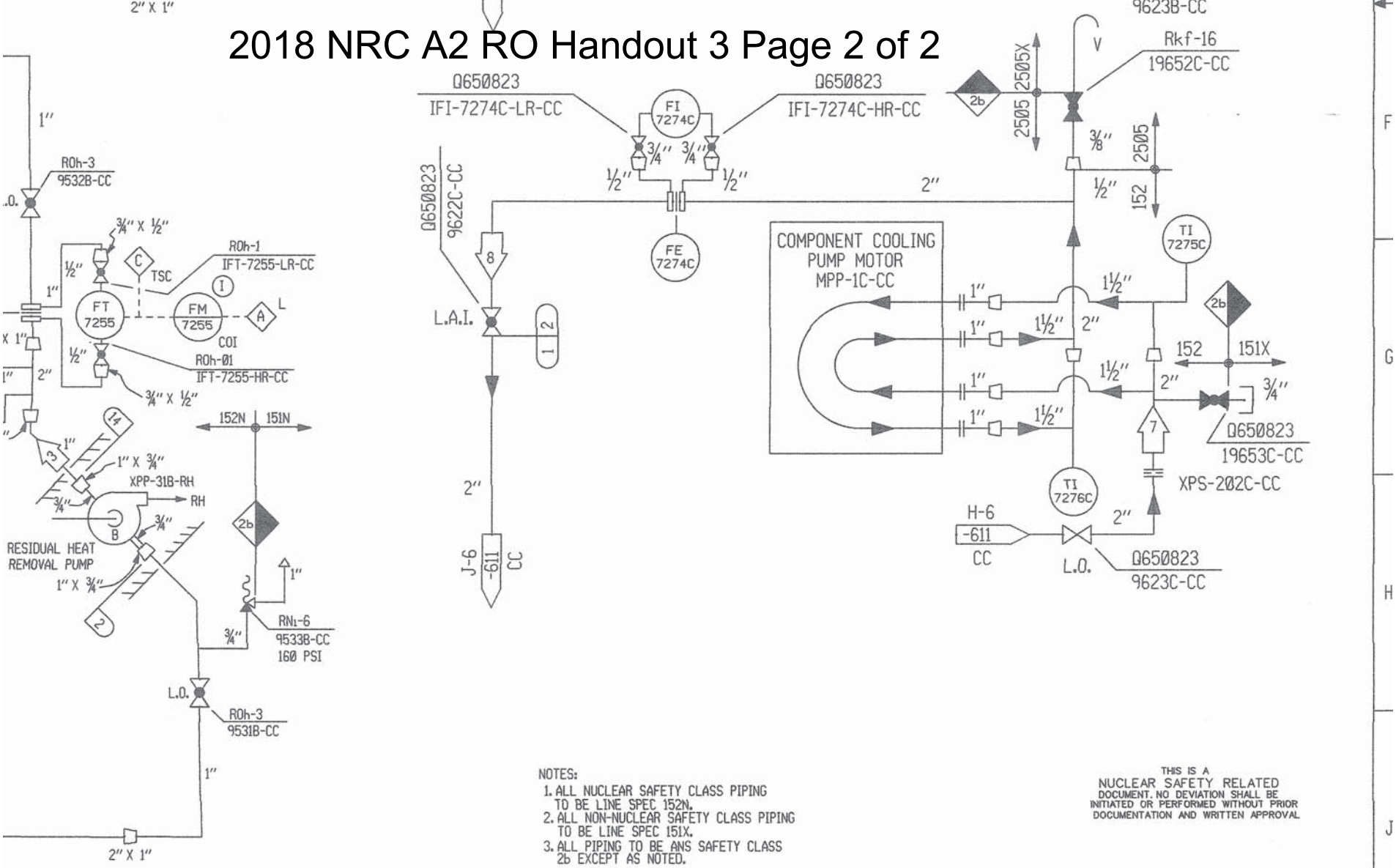
Enclosure Type	ID	Enclosure Name	Authorized By
Hang	1	XPP0001C (COMPONENT COOLING PUMP C)	DAVE DUHAIME 12/11/2017 00:53
Clear	999	XPP0001C (COMPONENT COOLING PUMP C)	JEFF MANROSS 12/15/2017 23:02

Work Order Section

Work Order #	Step #	EQ/Device ID	Crew	Start Date/Time	Clearance Authorized By
1612563	001	XPP0001C	MM	12/12/2017 06:31	RICKY STURKIE 12/15/2017 17:44
1612563	003	XPP0001C	MI	12/11/2017 17:06	JOHN KENNERLY 12/12/2017 14:29
1612563	008	XPP0001C	MI	12/11/2017 17:06	JOHN KENNERLY 12/15/2017 19:44
1705809	001	ITE07024	MI	12/11/2017 17:07	JOHN KENNERLY 12/12/2017 14:29



2018 NRC A2 RO Handout 3 Page 1 of 2



NOTES:
1. ALL NUCLEAR SAFETY CLASS PIPING TO BE LINE SPEC 152N.
2. ALL NON-NUCLEAR SAFETY CLASS PIPING TO BE LINE SPEC 151X.
3. ALL PIPING TO BE ANS SAFETY CLASS 2b EXCEPT AS NOTED.
4. OPERATOR INITIATED INPUT TO THE TSC COMPUTER.
5. FOR CHARGING PUMP COOLING AFTER LOSS OF CCW.
6. SEE 1MS-12-004-2 FOR PIPING ON CHARGING PUMP SKID.

THIS IS A NUCLEAR SAFETY RELATED DOCUMENT. NO DEVIATION SHALL BE INITIATED OR PERFORMED WITHOUT PRIOR DOCUMENTATION AND WRITTEN APPROVAL

ESSENTIAL

DRAWING LEGIBILITY CLASS 1
SCE&G CAD ENHANCED

NO.	DATE	BY	REVISION	CKD. BY	LE APPROVAL
15	6/24/09	JMR	REVISED PER ECR-71297	MGR	GK
14	10/21/03	JTS	REVISED PER ECR-50239	RHM	DDJ
13	06/18/99	DDJ	REVISED PER MRF-22594	MGR	CHR
12	05/03/99	JMR	REVISED PER CGSS-99-0261	MGR	TOC
11	03/31/95	SRM	REVISED PER MRF-22594	MGR	CHR
10	10/13/93	SRM	REVISED PER MRF-21475	MGR	RLJ

FSAR Figure 9.2-7

SOUTH CAROLINA ELECTRIC & GAS COMPANY

VIRGIL C. SUMMER NUCLEAR STATION

PIPING SYSTEM FLOW DIAGRAM

COMPONENT COOLING SYSTEM TO NSSS PUMPS

SCE&G A SCANA COMPANY — DESIGN ENGINEERING
V. C. SUMMER NUCLEAR STATION JENKINSVILLE, S. C.

MADE	CHECKED	LE APPROVAL
1. SRM	2. MGR	3. RLJ

SCALE NO SCALE | D-302-614 DRAWING NUMBER | SHT. NUMBER | 15 REV

2018 NRC A2 RO Handout 3 Page 2 of 2

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPA-815-(R)N18**

2018 NRC A3 (RO)

CANDIDATE: _____

EXAMINER: _____

DESCRIPTION: Determine worker exposure and apply administrative exposure limits.

TASK: O-119-008-04-04 Apply radiation and contamination safety procedures

TASK STANDARD: Candidate calculates exposure of 9 – 12 mrem and determines that an extension of the administrative dose limit is required.

TERMINATING CUE: The candidate returns the handout and briefing sheet to examiner.

PREFERRED LOCATION: CLASSROOM

PREFERRED METHOD: PERFORM

REFERENCES:

VCS-HPP-0153, ADMINISTRATIVE EXPOSURE LIMITS

K/A 2.3.4 Knowledge of radiation exposure limits under normal or emergency conditions. (RO 3.2)

10CFR55: 45 b(10)

TOOLS: Access to paper or electronic copies of V.C. Summer procedures.
Handout 1 containing survey maps of "B" RHR/Spray pump rooms.
Handout 2 answer sheet.

VALIDATION TIME: 20 *Minutes*. ***TIME CRITICAL:*** NO

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

CANDIDATE: _____

EXAMINER: _____

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 CONDITIONS:

- The plant is in mode 5 with an outage in progress.
- To support work, you will be required to stand in the "B" RHR pump room inside the contaminated area for 3.5 hours.
- You will stand inside the contaminated area boundary adjacent to the step-off pad where the lowest exposure will be received.
- You have signed NRC Form 4 and your total 2018 dose is 1995 mrem TEDE.

INITIATING CUES:

You are to calculate what your total exposure will be if you perform this activity and whether you will require an extension to any administrative exposure limit.

Assume no exposure other than as stated above.

SHOW ALL WORK ON THE HANDOUT PROVIDED TO YOU.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

CRITICAL: YES	SEQUENCED: NO	SAT		UNSAT	

JPM STEP 1

Determines the administrative exposure limit.

STEP STANDARD:

Determines initial administrative exposure limit of 2000 mrem. (Section 5.1VCS-HPP-153, ADMINISTRATIVE EXPOSURE LIMITS).

CUES:

EVALUATOR NOTE: This limit may be recalled from memory as long as work shown is correct.

COMMENTS:

CRITICAL: YES	SEQUENCED: NO	SAT		UNSAT	

JPM STEP 2

Determines expected exposure for the activity to be performed.

STEP STANDARD:

Uses 3 mr/hr for the dose rate: 3 mr/hr x 3.5 hours = 10.5 mrem (9 -12 mrem acceptable).

CUES:

EVALUATOR NOTE: 3 mr/hr is the dose rate inside the boundary at the lower right entrance to the "B" RHR Pump room on the survey map. Using 6 mr/hr dose rate from the other entrance would make this step UNSAT since this doubles the exposure received.

COMMENTS:

CRITICAL: YES	SEQUENCED: NO	SAT		UNSAT	

JPM STEP 3

Determines that an extension is required.

STEP STANDARD:

Calculates 1995 mrem(previous exposure) + 10.5 mrem for the work activity = 2005.5 mrem. (2004 – 2007 mrem acceptable).

This exceeds the 2000 mrem administrative exposure limit.

CUES:

EVALUATOR NOTE: All work is required to be shown in the Handout provided.

COMMENTS:

JPM SETUP SHEET

JPM: JPM: JPA-815-(R)N18

IC SET: N/A

INSTRUCTIONS:

Provide a handout containing survey maps for the “B” RHR pump room with exposure at the step-off pads 3 mrem/hr and 6 mrem/hr.

Provide Handout 2 containing the following:

Name: _____ Date: _____

SHOW ALL WORK TO SUPPORT YOUR DETERMINATION BELOW:

Provide access to hard-copy or electronic station procedures.

COMMENTS:

JPM BRIEFING SHEET

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 CONDITIONS:

- The plant is in mode 5 with an outage in progress.
- To support work, you will be required to stand in the "B" RHR pump room inside the contaminated area for 3.5 hours.
- You will stand inside the contaminated area boundary adjacent to the step-off pad where the lowest exposure will be received.
- You have signed NRC Form 4 and your total 2018 dose is 1995 TEDE.

INITIATING CUES:

You are to calculate what your total exposure will be if you perform this activity and whether you will require an extension to any administrative exposure limit.

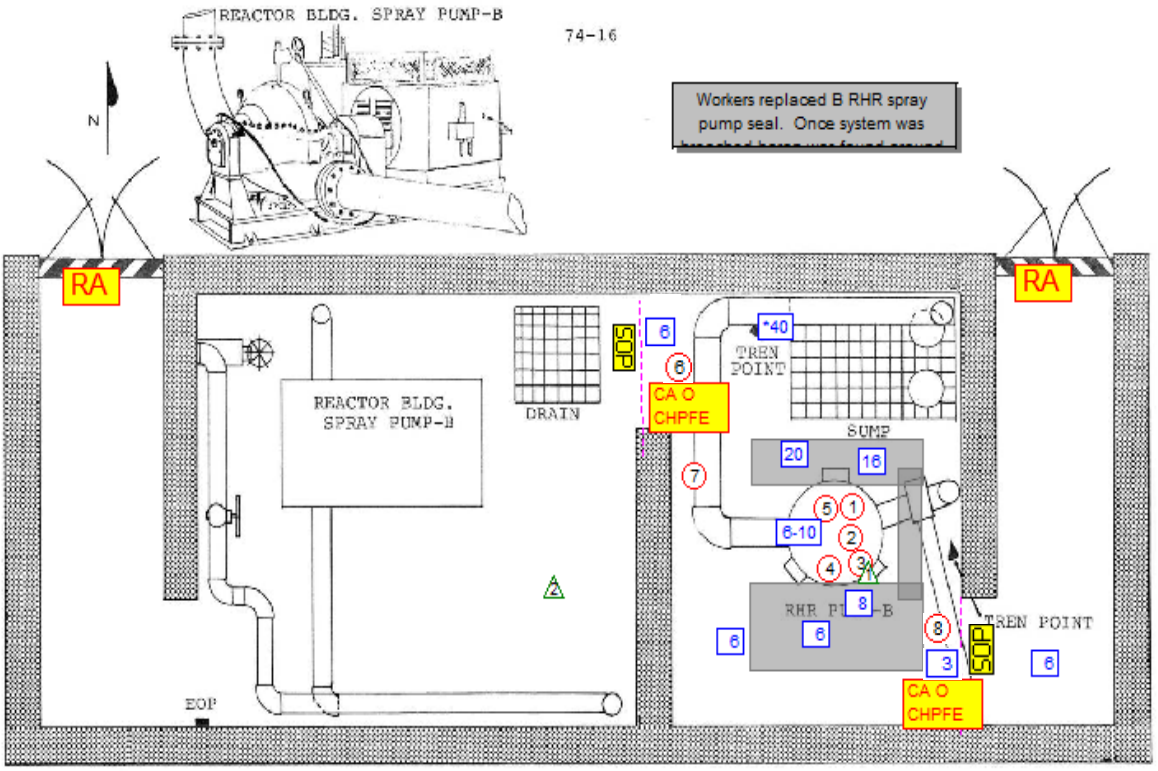
Assume no exposure other than as stated above.

SHOW ALL WORK ON THE HANDOUT PROVIDED TO YOU.

Hand this paper back to your Evaluator when you feel that you have satisfactorily completed the assigned task.

AB374-16	Survey #: VCS1-M-20170425-4	Date/Time: 4/24/2017 20:00

AB 374-16



Comments: system was breacked boron inside seal. new seal in place will continue work on old seal in decon room once, work is finished in B RHR

Summary of Highest Readings
(All available values may not be listed)

Smears	Air Samples & Wipes
3) 120000 dpm/100 cm2 β/γ	A/S 2) <MDA DAC Particulate
3) <20 dpm/100 cm2 α	

Type: Job Coverage

Dose Rate
*150 Contact Reading
/75 30 cm Reading
20 General Area
HS-50 Hot Spot
RCA Posting
Drip Bag
15 Smear 15 Air Sample 1 Sweep 15 Wipe

RWP #: 17-04014
Reactor Power = 0 %

Unless otherwise noted, dose rates in mrem/hr.

Lead Surveyor: Bryant Young	Status: Approved by: Casey Carlson, 4/25/2017 04:16:55
Location Code: AB	Bldg/Area Name: 374
Location Description: AB374-16	

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPA-102-(S)N18**

2018 NRC A1-a (SRO)

CANDIDATE: _____

EXAMINER: _____

DESCRIPTION: Verification of Senior Licensed Operator watchstanding Certification

TASK: O-341-038-03-02 Interpret and ensure compliance with plant administrative procedures during normal and off normal plant operations.

TASK STANDARD: Candidate determines that only Operator 3 maintained an active license to allow standing watch as CRS on July 7 by standing five 12 hour watches as CRS, NROATC and BOP in the months of May and June.

TERMINATING CUE: The candidate enters answers on the handout provided and returns it to the examiner.

PREFERRED LOCATION: CLASSROOM

PREFERRED METHOD: PERFORM

REFERENCES:

OAP-110.2, OPERATOR WATCHSTANDING CERTIFICATION AND TRACKING

K/A 2.1.4 Knowledge of individual licensed operator responsibilities related to shift staffing, such as medical requirements, "no-solo" operation, maintenance of active license status, 10CFR55, etc. (SRO 3.8)

10CFR55: 43 b(2)

TOOLS:
Calculator
Copy of JPM handout
Access to paper or electronic copies of V.C. Summer procedures

VALIDATION TIME: 20 Minutes. ***TIME CRITICAL:*** NO

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

CANDIDATE: _____

EXAMINER: _____

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 CONDITIONS:

- Today is **July 7**.
- The person scheduled to stand CRS cannot report to work due to illness.
- Three Operator work histories must be evaluated to determine their eligibility to stand on-coming CRS.
    - All three have met Operator Continuing Training requirements.
    - All three meet the Medical requirements to stand watch.

INITIATING CUES:

You are directed to evaluate the work histories in the handout provided to you and determine which, if any, of the operators (Operators 1, 2 or 3) can stand watch in the CRS position.

Justify your answer **for each operator** in the handout provided.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

CRITICAL: NO	SEQUENCED: NO	SAT		UNSAT	

JPM STEP 1

Refers to OAP-110.2, OPERATOR WATCHSTANDING CERTIFICATION AND TRACKING.

STEP STANDARD:

Refers to either a hard-copy or electronic controlled copy of OAP-110.2.

CUES:

EVALUATOR NOTE:

The candidate should have the JPM Briefing Sheet and the Handout.

It is not critical for the candidate to refer to the procedure if the candidate can make the correct determination in step 4 from memory.

COMMENTS:

CRITICAL: YES	SEQUENCED: NO	SAT		UNSAT	

JPM STEP 2

Determines the minimum watchstanding requirement for the quarter.

STEP STANDARD:

Determines that the minimum requirement is five 12-hour shifts that were required to be stood in the calendar quarter which includes April through June.

CUES:

COMMENTS:

CRITICAL: YES	SEQUENCED: NO	SAT		UNSAT	

JPM STEP 3

Determines the hours stood that count toward the minimum requirement and eligibility to stand watch on July 7.

STEP STANDARD:

Determines that **only Operator 3** can stand CRS on the on-coming CRS for the following reasons:

- Operator 1 stood only four 12 hours shifts that count toward the minimum requirement. Only the CRS watches stood in May and June count. The Field Supervisor Watch does **not** count.

- Operator 2 stood only four 12 hour shifts toward the minimum requirement. Only the 12 hour Shift Manager watches stood in April and June. Field Supervisor, Work Control Center SRO, or watch periods of less than 12 hours do **not** count.

- Operator 3 stood five 12 hour shifts that count toward the minimum requirement. The NROATC, BOP and CRS watches stood in May and June satisfies the minimum requirement.

CUES:

EVALUATOR NOTE: In accordance with OAP-110.2, Attachment II, only SM, CRS, RO (NROATC) or BOP watches count for minimum watchstanding for SRO licenses.

COMMENTS:

JPM SETUP SHEET

JPM: JPM: JPA-102-(S)N18

IC SET: N/A

INSTRUCTIONS:

Ensure that current procedures and curve book are available in hard copy or electronically. Provide Handout containing the following:

Name: _____ Date: _____

The following three Operators held Active SRO licenses from March through June of this year and stood the following watches in that same period:

Operator 1

CRS	0730 - 1930	March 20
CRS	0730 - 1930	March 21
SHIFT ENGINEER	0730 - 1930	April 2
CRS	0730 - 1930	May 10
CRS	0730 - 1930	May 11
CRS	0730 - 1930	May 12
FIELD SUPERVISOR	0730 - 1930	June 8
CRS	1930 - 0730	June 18

Operator 2

SHIFT MANAGER	0730 - 1930	March 10
SHIFT MANAGER	0730 - 1930	April 12
SHIFT MANAGER	0730 - 1930	April 18
FIELD SUPERVISOR	0730 - 1930	May 17
SHIFT MANAGER	1230 - 1930	May 18
SHIFT MANAGER	1130 - 1930	June 17
SHIFT MANAGER	1930 - 0730	June 18
SHIFT MANAGER	1930 - 0730	June 19
WORK CONTROL CENTER SRO	0730 - 1930	June 21

Operator 3

SHIFT ENGINEER	0730 - 1930	March 29
NROATC	1930-0730	May 10
NROATC	1930-0730	May 12
SHIFT ENGINEER	0730 - 1930	June 18
CRS	0730 - 1930	June 19
CRS	0730 - 1930	June 24
BOP	0730 - 1930	June 25

Record your answer below:

COMMENTS:

JPM BRIEFING SHEET

SAFETY CONSIDERATIONS: NONE

INITIAL CONDITIONS:

- Today is **July 7**.
- The person scheduled to stand CRS cannot report to work due to illness.
- Three Operator work histories must be evaluated to determine their eligibility to stand on-coming CRS.
    - All three have met Operator Continuing Training requirements.
    - All three meet the Medical requirements to stand watch.

INITIATING CUES:

You are directed to evaluate the work histories in the handout provided to you and determine which, if any, of the operators (Operators 1, 2 or 3) can stand watch in the CRS position.

Justify your answer **for each operator** in the handout provided.

Hand this paper back to your Evaluator when you feel that you have satisfactorily completed the assigned task.

2018 NRC A1-a SRO Only Handout

Name: _____ Date: _____

The following three Operators held Active SRO licenses from March through June of this year and stood the following watches in that same period:

Operator 1

CRS	0730 - 1930	March 20
CRS	0730 - 1930	March 21
SHIFT ENGINEER	0730 - 1930	April 2
CRS	0730 - 1930	May 10
CRS	0730 - 1930	May 11
CRS	0730 - 1930	May 12
FIELD SUPERVISOR	0730 - 1930	June 8
CRS	1930 - 0730	June 18

Operator 2

SHIFT MANAGER	0730 - 1930	March 10
SHIFT MANAGER	0730 - 1930	April 12
SHIFT MANAGER	0730 - 1930	April 18
FIELD SUPERVISOR	0730 - 1930	May 17
SHIFT MANAGER	1230 - 1930	May 18
SHIFT MANAGER	1130 - 1930	June 17
SHIFT MANAGER	1930 - 0730	June 18
SHIFT MANAGER	1930 - 0730	June 19
WORK CONTROL CENTER SRO	0730 - 1930	June 21

Operator 3

SHIFT ENGINEER	0730 - 1930	March 29
NROATC	1930-0730	May 10
NROATC	1930-0730	May 12
SHIFT ENGINEER	0730 - 1930	June 18
CRS	0730 - 1930	June 19
CRS	0730 - 1930	June 24
BOP	0730 - 1930	June 25

Record your answer your answer on the next page.

2018 NRC A1-a SRO Only Handout

Record your answer below:

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPA-135-(S)N18**

2018 NRC A1-b (SRO)

CANDIDATE: _____

EXAMINER: _____

DESCRIPTION: Determine reportability requirements.

TASK: O-341-013-03-02
Report safety limit violations and Reportable occurrences per NL-122

TASK STANDARD: Candidate determines that an 8 hour reporting requirement in accordance with item NL-122, Enclosure A, item E-2 is required due to valid actuation of the Emergency Feedwater System and that the Manager, Operations or the Management Duty Supervisor must be apprised.

TERMINATING CUE: The candidate records the requirement for reportability and notification on the handout and returns it to the examiner.

PREFERRED LOCATION: CLASSROOM

PREFERRED METHOD: PERFORM

REFERENCES:

NL-122, REGULATORY NOTIFICATION AND REPORTING

K/A 2.1.18 Ability to make accurate, clear, and concise logs, records, status boards, and reports.(SRO 3.8)

10CFR55: 45 b(13)

TOOLS: Copy of handout

Access to paper or electronic copies of V.C. Summer procedures

VALIDATION TIME: 15 *Minutes*. ***TIME CRITICAL:*** NO

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

CANDIDATE: _____

EXAMINER: _____

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 CONDITIONS:

- A plant startup was in progress.
- "A" Feedwater pump was running with "B" and "C" Feedwater pumps tripped.
- Operators transferred feed to Main Feedwater in accordance with GOP-4A POWER OPERATION (MODE 1 - ASCENDING).
- All Emergency Feedwater Pumps were secured in accordance with SOP-211, EMERGENCY FEEDWATER SYSTEM.
- "A" Feedwater pump tripped while at 7% reactor power.
- Operators implemented AOP-210.3, FEEDWATER PUMP MALFUNCTION.
- Current conditions:
  - Power is 2% and stable.
  - Steam Generators are 61% and stable.

INITIATING CUES:

You are directed to determine the following:

- All off-site reportability requirements for this event.
- The highest level of plant management that must be apprised for the above condition in accordance with plant procedures.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

CRITICAL: YES	SEQUENCED: NO	SAT		UNSAT	

JPM STEP 1

Determines the reporting item that is required.

STEP STANDARD:

Determines that the telephone notification within 8 hours to NRC-ENS or Operations Ctr. (301) 816-5100 is required in accordance with NL-122, Enclosure A, item E-2 due to a valid actuation of Emergency Feedwater.

CUES:

EVALUATOR NOTES:

Ensure that the candidate has the handout for this JPM.

An LER within 60 days is part of the notification requirement but is not required here since this would be completed by Licensing.

COMMENTS:

CRITICAL: YES	SEQUENCED: NO	SAT		UNSAT	

JPM STEP 2

Determines the highest level of management that must be apprised.

STEP STANDARD:

Determines that only either the Manager, Operations or the Management Duty Supervisor must be apprised.

CUES:

EVALUATOR NOTES:

An LER within 60 days is part of the notification requirement but is not required here since this would be completed by Licensing.

This requirement can be found in either NL-122, section 6.1.1 or OAP-100.4, Section 19.1.

Either is acceptable because when the MDS is apprised, the Operations Manager will be notified.

COMMENTS:

JPM SETUP SHEET

JPM: JPM: JPA-135-(S)N18

IC SET: N/A

INSTRUCTIONS:

Ensure candidates have access to hard-copy or electronic procedures.

Provide a handout that contains the following:

Name: _____ Date: _____

Record your answer below:

COMMENTS:

JPM BRIEFING SHEET

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 CONDITIONS:

- A plant startup was in progress.
- "A" Feedwater pump was running with "B" and "C" Feedwater pumps tripped.
- Operators transferred feed to Main Feedwater in accordance with GOP-4A POWER OPERATION (MODE 1 - ASCENDING).
- All Emergency Feedwater Pumps were secured in accordance with SOP-211, EMERGENCY FEEDWATER SYSTEM.
- "A" Feedwater pump tripped while at 7% reactor power.
- Operators implemented AOP-210.3, FEEDWATER PUMP MALFUNCTION.
- Current conditions:
  - Power is 2% and stable.
  - Steam Generators are 61% and stable.

INITIATING CUES:

You are directed to determine the following:

- All off-site reportability requirements for this event.
- The highest level of plant management that must be apprised for the above condition in accordance with plant procedures.

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: **JPA-041B-(S)N18**

2018 NRC A2 (SRO)

CANDIDATE: _____

EXAMINER: _____

DESCRIPTION: Evaluate the operational impact of a change in EOOS status.

TASK: O-342-002-03-02 Coordinate plant operation to support maintenance activities.

TASK STANDARD: Determines that if the "C" SWP is not restored within 30 days or approval is not obtained from the GMNPO to continue operation above HOT STANDBY, that the plant must be shutdown due to FEP Yellow status.

TERMINATING CUE: The candidate returns JPM briefing sheet and Handout materials provided to the examiner.

PREFERRED LOCATION:	***PREFERRED METHOD:***
CLASSROOM	PERFORM

REFERENCES:
OAP-102.1, CONDUCT OF OPERATIONS SCHEDULING UNIT
OAP-100.5 GUIDELINES FOR CONFIGURATION CONTROL AND OPERATION OF PLANT EQUIPMENT
GTP-702 SURVEILLANCE ACTIVITY TRACKING AND TRIGGERING

K/A 2.2.17 Knowledge of the process for managing maintenance activities during power operations, such as risk assessments, work prioritization, and coordination with the transmission system operator. (SRO 4.3)

10CFR55: 45 b(1)(13)

TOOLS: Copies of 2018 NRC A2 SRO Only Handout1 and Handout 2
Electronic or Hardcopy versions of station procedures

VALIDATION TIME: 15 Minutes. ***TIME CRITICAL:*** NO

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

CANDIDATE: _____

EXAMINER: _____

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 CONDITIONS:

- The plant is in Mode 1.
- EOOS has been updated for a tagout that was hung earlier in the shift.

INITIATING CUES:

You are to review EOOS status and determine any administrative restriction on maintaining the Unit at 100% power.

Indicate on the answer sheet provided if no restriction is present. If there is a restriction, justify your answer on the answer sheet.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

CRITICAL: YES	SEQUENCED: NO	SAT		UNSAT	

JPM STEP 1

Reviews IPCS screen shot to determine FEP Status.

STEP STANDARD:

Determines that there is a FEP risk of Yellow as a result of tagging out "C" SWP.

CUES:

EVALUATOR NOTE: Provide candidate with the 2018 NRC A2 RO Handouts 1 and 2.

COMMENTS:

CRITICAL: NO	SEQUENCED: NO	SAT		UNSAT	

JPM STEP 2

Determines the correct GTP-702 Attachment for managing risk due to FEP equipment availability.

STEP STANDARD:

Refers to OAP-100.5, Enclosure Q and notes reference in item 2 to GTP-702, Attachment VI.OO-2.

CUES:

COMMENTS:

CRITICAL: YES	SEQUENCED: NO	SAT		UNSAT	

JPM STEP 3

Determines requirement for plant shutdown.

STEP STANDARD:

Identifies the required action in accordance with either OAP-100.5, Enclosure Q, Item 2 or GTP-702, Attachment VI.OO-2, Action 1.

Restore the inoperable equipment to FUNCTIONAL status within 30 days after declaration of inoperability or obtain approval from the GMNPO to continue operation above HOT STANDBY. Otherwise, be in at least HOT STANDBY.

CUES:

COMMENTS:

JPM SETUP SHEET

JPM: JPA-041B-(S)N18

IC SET: N/A

INSTRUCTIONS:

Provide:

Handout 2 – Screen shot of EOOS FEP status.

Handout 1 that includes the following:

Name: _____ Date: _____

RECORD YOUR ANSWER BELOW:

COMMENTS:

JPM BRIEFING SHEET

SAFETY CONSIDERATIONS: NONE

INITIAL CONDITIONS:

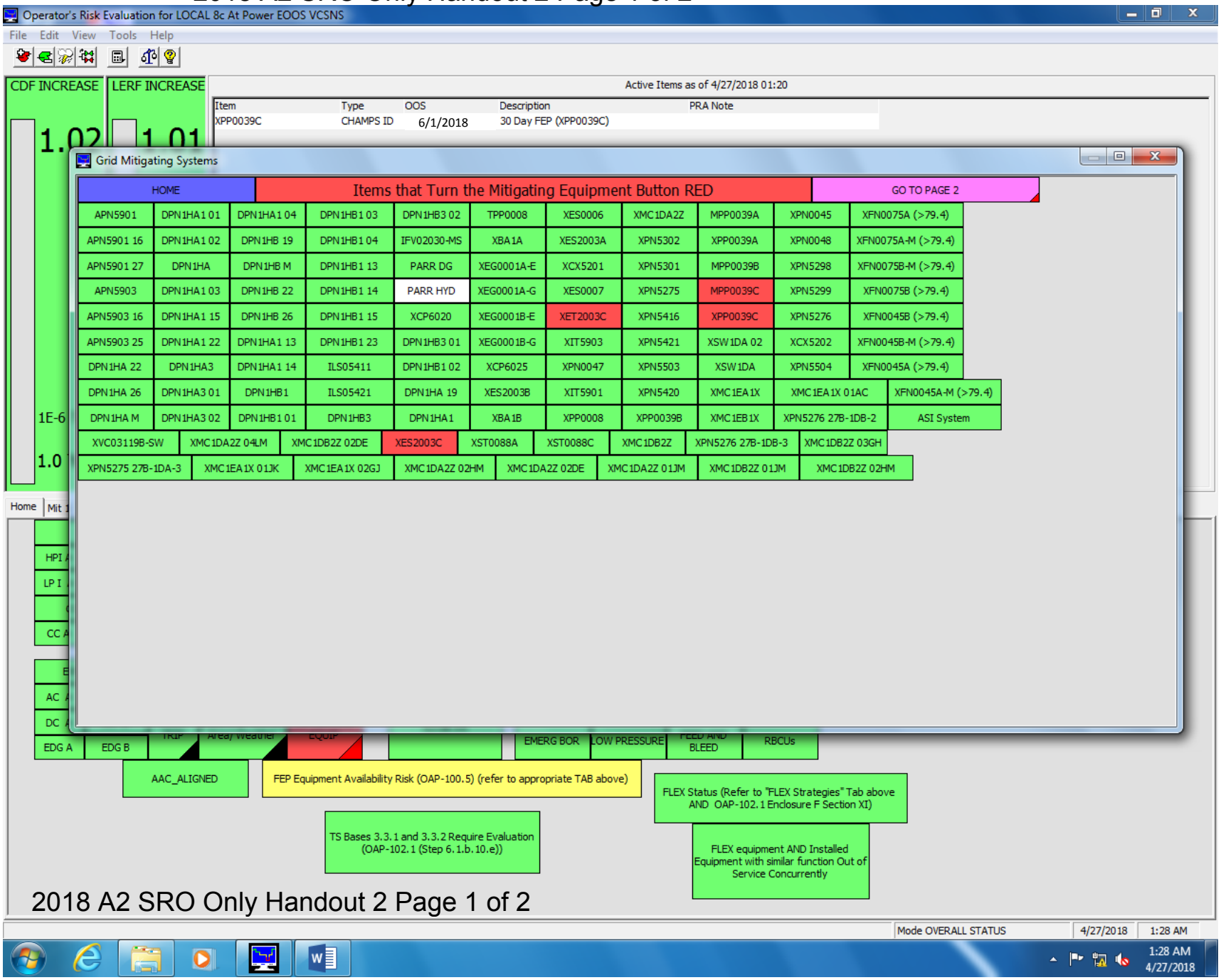
- The plant is in Mode 1.
- EOOS has been updated for a tagout that was hung earlier in the shift.

INITIATING CUES:

You are to review EOOS status and determine any administrative restriction on maintaining the Unit at 100% power.

Indicate on the answer sheet provided if no restriction is present. If there is a restriction, justify your answer on the answer sheet.

Hand this paper back to your Evaluator when you feel that you have satisfactorily completed the assigned task.



2018 A2 SRO Only Handout 2 Page 1 of 2

Operator's Risk Evaluation for LOCAL 8c At Power EOOS VCSNS

File Edit View Tools Help

2018 A2 SRO Only Handout 2 Page 2 of 2

CDF INCREASE	LERF INCREASE
1.02	1.01
1E-6 Time	
1.0 Year	

Active Items as of 4/27/2018 01:20

Item	Type	OOS	Description	PRA Note
XPP0039C	CHAMPS ID	6/1/2018	30 Day FEP (XPP0039C)	

Home | Mit 1 | Mit2 | FEP Risk-72hr RMAs | FEP Risk-30 Day RMAs | No-Impact Tests | FLEX Strategies

SI		EFW		RB COOLING	
HPI A	HPI B	MD A	MD B	SPRAY A	SPRAY B
LP I A	LPI B	TDEFW		RBCU A	RBCU B

ALIGNMENT

CCW		SW		INSTR AIR	
CC A	CC B	SW A	SW B	TRAIN A	TRAIN B

ESF POWER		GRID RISK SENSITIVITY		
AC A	AC B	PLANT TRIP	Impacting Facilities Area/ Weather	MITIGATING EQUIP
DC A	DC B			
EDG A	EDG B			

ECONOMIC RESTRICTION TOUCH NO

ECONOMIC RESTRICTION X2 OR X4 NO

AAC_ALIGNED

FEP Equipment Availability Risk (OAP-100.5) (refer to appropriate TAB above)

TS Bases 3.3.1 and 3.3.2 Require Evaluation (OAP-102.1 (Step 6.1.b.10.e))

DEFENSE IN DEPTH

INITIATORS

LOSP	REACTOR TRIP	LOSS OF SW	LOSS OF CCW

MITIGATION			CONTAINMENT	
SUBCRITICAL	CORE COOLING	HEAT SINK	RB COOLING	CONTAINMENT ISOL
RX TRIP	HIGH PRESSURE	EFW AND SG	SPRAY	
EMERG BOR	LOW PRESSURE	FEED AND BLEED	RBCUs	

FLEX Status (Refer to "FLEX Strategies" Tab above AND OAP-102.1 Enclosure F Section XI)

FLEX equipment AND Installed Equipment with similar function Out of Service Concurrently

2018 A2 SRO Only Handout 2 Page 2 of 2

Finished! Mode OVERALL STATUS 4/27/2018 1:21 AM

1:21 AM 4/27/2018

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPA-190-(S)N18**

2018 NRC A3 (SRO)

CANDIDATE: _____

EXAMINER: _____

DESCRIPTION: Review a release permit prior to approval/ release.

TASK: 341-012-03-02 Approve radioactive waste discharge/release permits (HPP-709 and HPP-710)

TASK STANDARD: Identifies more than 24 hours have passed since the Gas Decay Tank was sampled, BYPASS is incorrectly entered for RM-A3 and RM-A10 and that wind speed is not sufficient for release due to the 10m wind speed.

TERMINATING CUE: The candidate returns JPM briefing sheet and Handout materials provided to the examiner.

PREFERRED LOCATION:	***PREFERRED METHOD:***
CLASSROOM	PERFORM

REFERENCES:

HPP-709 Sampling and Release of Radioactive Gaseous Effluents

SOP-119 WASTE GAS PROCESSING

K/A 2.3.6 Ability to approve release permits (SRO 3.8)

10CFR55: 45 b(1)(10)

TOOLS: Copies of 2018 NRC A3 SRO Only Handouts 1, 2 and 3
Electronic or Hardcopy versions of station procedures

VALIDATION TIME: 25 Minutes. ***TIME CRITICAL:*** NO

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

CANDIDATE: _____

EXAMINER: _____

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 CONDITIONS:

- The plant is in Mode 1.
- The AB Ventilation System is operating normally.
- A release of Gas Decay Tank G7 is to occur during the next shift.
- The DATE and TIME is now 0830, 6/2/18.

INITIATING CUES:

You are to review HPP-709, ATTACHMENT I, GASEOUS WASTE RELEASE PERMIT (GWRP) and approve the GWRP by signing it, if the release can be commenced.

If the release is not allowed to commence, circle all discrepancies that prevent release and explain them on the worksheet provided.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

CRITICAL: YES	SEQUENCED: YES	SAT		UNSAT	

JPM STEP 1

Reviews the SOP-119, ATTACHMENT VA, GASEOUS WASTE RELEASE WORKSHEET-CONTROL ROOM and the HPP-709, ATTACHMENT I, GASEOUS WASTE RELEASE PERMIT (GWRP).

STEP STANDARD:

Notes and records <u>all</u> the following discrepancies and does **<u>not</u>** sign the GWRP:

- More than 24 hours have passed since the Gas Decay Tank was sampled.(HPP-0709, 4.16)
- Notes that BYPASS is incorrectly entered for RM-A3 and RM-A10. (SOP-119, Attachment VA, step 3.b)
- Notes that wind speed is not sufficient for release due to the 10m wind speed being less than the required 6.6 mph for stability class E. (SOP-119 Attachment VA, page 5 of 5)

CUES:

EVALUATOR NOTE: Provide candidate with the 2018 NRC A3 RO Handouts 1, 2 and 3.

COMMENTS:

JPM SETUP SHEET

JPM: JPA-190-(S)N18

IC SET: N/A

INSTRUCTIONS:

Ensure that current procedures are available in hard copy or electronically.

Provide candidates with the following:

Partially completed GWRP and SOP-119, Att. VA (2018 NRC A3 SRO Only Handout 1)

Answer sheet (2018 NRC A3 SRO Only Handout 2)

A screen shot of IPCS METDATA screen (2018 NRC A3 SRO Only Handout 3

COMMENTS:

JPM BRIEFING SHEET

SAFETY CONSIDERATIONS: NONE

INITIAL CONDITIONS:

- The plant is in Mode 1.
- The AB Ventilation System is operating normally.
- A release of Gas Decay Tank G7 is to occur during the next shift.
- The DATE and TIME is now 0830, 6/2/18.

INITIATING CUES:

You are to review HPP-709, ATTACHMENT I, GASEOUS WASTE RELEASE PERMIT (GWRP) and approve the GWRP by signing it, if the release can be commenced.

If the release is not allowed to commence, circle all discrepancies that prevent release and explain them on the worksheet provided.

Hand this paper back to your Evaluator when you feel that you have satisfactorily completed the assigned task.

2018 NRC A3 SRO Only Handout 1

GASEOUS WASTE RELEASE WORKSHEET-CONTROL ROOM

GWRP #: WG-18-02	WGDT #: G7	DATE: 6/1/18

CAUTION 1

During the release of gases, the conditions specified in the Gaseous Waste Release Permit (GWRP) must be adhered to (flow rate, radiation monitor setpoints, meteorological conditions, etc.).

		INITIALS
1.	Gaseous Waste Release Permit (GWRP) is returned from Health Physics with PART I completed and approved.	EC
2.	Ensure the following:	
a.	Gas Decay Tank G(7) or H(8) is not in service.	EC
b.	The AB Ventilation System is operating per SOP-502 with at least one AB Charcoal Exhaust Fan verified running (XFN-19A or XFN-19B).	EC
c.	Wind direction is not from the East Southeast per HPP-709 to prevent activity from being drawn into the AB Ventilation System.	EC

INITIALS

3. Radiation Monitors:

NOTE 3.a

1) The channel check should include a comparison of any local indication.

2) With the number of inoperable meteorological monitoring channels less than that which is required by Technical Specification 3.3.3.4, all gaseous releases must be stopped until the inoperable channel is restored.

a. Perform a channel and source check of RM-A3 Gas Channel and RM-A10: EC

RM-A3 Gas Channel	Channel Check: SAT/UNSAT Source Check: SAT/UNSAT	COMMENTS:
RM-A10	Channel Check: SAT/UNSAT Source Check: SAT/UNSAT	COMMENTS:

NOTE 3.b

If RM-A10 or RM-A3 is not operable, refer to offsite Dose Calculation Manual 1.2.1.1.

INITIALS

b. Verify RM-A10 or RM-A3 is operable and the Interlock Switch(s) on the Radiation Monitoring Panel is (are) in the NORMAL position: EC

RM-A3	NORMAL/BYPASS	COMMENTS:
RM-A10	NORMAL/BYPASS	COMMENTS:

c. Adjust Radiation Monitor setpoints per the Gaseous Waste Release Permit (GWRP). EC

4. Verify meteorological instrumentation is operable and meteorological conditions are satisfactory for the release per TABLE A (next page). EC

5. Mark the chart recorders for RM-A3G and RM-A10 in the Control Room with the following:

a. Tank Name/Number. EC

b. Date/Time. EC

NOTE 6

RM-A11 Point 3 may alarm during Waste Gas Release due to the inability to bypass point 3 locally.

6. Direct the building operator to commence Attachment VB. _____

INITIALS

7. At least once per hour, monitor Control Room meteorological indicators to verify conditions specified in TABLE A (next page) are acceptable for continued release. _____

8. When notified by the local operator that the required volume of gas and nitrogen has been released, verify Radiation Monitors return to normal background. _____

9. If Radiation Monitors do not return to normal, notify the Count Room. _____

10. Reset the RM-A10 alarm setting as specified in the Gaseous Waste Relase Permit (GWRP), (RM-A3 alarm setting to remain at 300 cpm). _____

11. Shift Manager review package and attach worksheet and applicable attachments. _____

Release conducted by: _____ Date: _____

Shift Manager review: _____ Date: _____

REMARKS: _____

TABLE A

ACCEPTABLE METEOROLOGY FOR PLANNED WGDT RELEASES

DIFFERENTIAL TEMPERATURE (ΔT) °F (NOTE 1)		STABILITY CLASS	MINIMUM WIND SPEED (mph) (NOTE 2)
61m - 10m	40m - 10m		
$\Delta T \leq -1.74$	$\Delta T \leq -1.03$	A	*
$-1.74 < \Delta T \leq -1.56$	$-1.03 < \Delta T \leq -0.92$	B	*
$-1.56 < \Delta T \leq -1.38$	$-0.92 < \Delta T \leq -0.81$	C	1.6
$-1.38 < \Delta T \leq -0.46$	$-0.81 < \Delta T \leq -0.27$	D	4.1
$-0.46 < \Delta T \leq 1.38$	$-0.27 < \Delta T \leq 0.81$	E	6.6
$1.38 < \Delta T \leq 3.67$	$0.81 < \Delta T \leq 2.16$	F	14.0
$3.67 < \Delta T$	$2.16 < \Delta T$	G	18.9

NOTES:

1. The ΔT values for 61m - 10m are considered as primary indicators for determination of stability class. The 40m - 10m ΔT values are used only when 61m - 10m values are not available. All ΔT values are listed in °F and are based on values in USNRC Regulatory Guide 1.23.

2. The 10m wind speed is considered the primary indication for wind speed. The 61m wind speed indication should only be used if the 10m indicator is not available.

* No wind is required for planned releases.

2018 NRC A3 SRO Only - Handout 1

GWRP No. WG-18-02

HPP-0709
ATTACHMENT I
PAGE 1 OF 1
REVISION 13

GASEOUS WASTE RELEASE PERMIT (GWRP)
☒ G TANK ☐ H TANK

I. RELEASE AUTHORIZATION (COUNT ROOM)

Date/time Sampled: 6/1/18 0739 Total Noble Gas, (μCi/cc): 1.34 E -03

Maximum WGDT Release Rate, (cfm): 15.0 Initial Tank Pressure, (psig): 22.0

	Background (cpm)	Alarm Set point (cpm)
RM-A3 Gas Channel	100	300
RM-A10 Gas Channel	65	210

Additional Requirements: _____

Count Room: _____ Date/Time: 6/1/18 0900

II. ACTUAL RELEASE DATA (Operations)

Release Approved, SS/CRS: _____ Date/Time: _____

Meteorology Acceptable ☐ or, Unacceptable ☐ Wind Speed, (mph): _____ ΔT: _____

	RM-A3 (CPM)	RM-A10 (CPM)	INITIALS
Alarm Set Point (cpm)	300	210	
Source Check		Sat/Unsat	
Reading @ Release Start (cpm)			
Reading @ 10 mins into Release (cpm)			
Reading @ End of Release (cpm)			
Reading After Purge (cpm)			
Alarm Set Point returned to 2 x ni			

	Start	Finish	Net
Release Date/Time			hours
Flow, (cfm)			
Pressure, (psig)			psig

COMMENTS _____

Release Conducted by: _____ Date/Time: _____

Operations Review: _____ Date/Time: _____

Updated by: _____ Date/Time: _____
(Count Room)

MET - METEOROLOGICAL DATA (METDATA) - Rolls-Royce

2018 NRC A3 SRO Only Handout 3

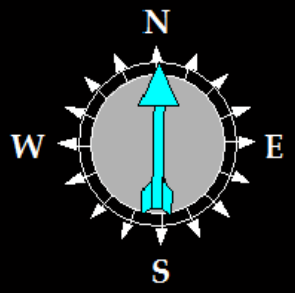
Main Alarms Graphics Trends/Bars/etc Point List Print Help

POWER OPER PRIM/BACK | TBD | ANNUN | TASK_MON | TRENDS | Point Search | Help

SPDS BISI RIL RBU RAOC GRPLIB GRPAS GRPDIS GRPLOG AOP301 AFD CALM HUMMI MAP MENU 2PS1 ZZMENU 4RW1 OPSLIM OPCRIT TRANSIENT RCP SEALS LRATE SPARE

CURRENT FUNCTION: METDATA | D G T | 02-JUN-2018 08:30:13 | ALARM | S C H I C I T

EA - ENVIRONMENTAL ASSURANCE DATA

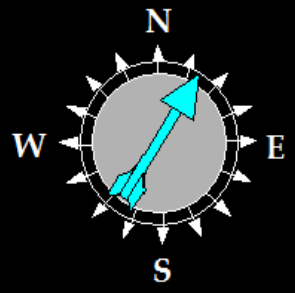


61 Meter Dir.: 2.0 DEGREES

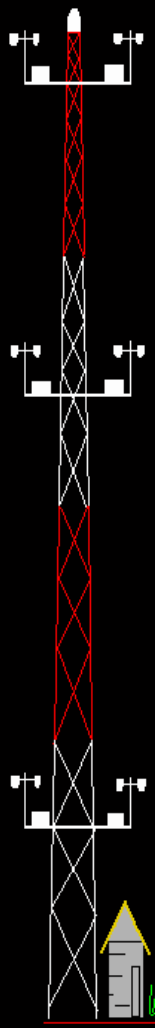
Barometric P: 29.575
Rel Humid...: 51.0
RH Temp.....: 71.1

PRECIP - 15.: 0.0
PRECIP - 60.: 0.0
PRECIP - DA.: 0.0

Stab Class..: E
Stab Class..: E



10 Meter Dir.: 33.0 DEGREES



Batt Volts..: 13.7

61 METER ELEVATION

	ALPHA			BRAVO			PREFERRED		
	INST	-15	-60	INST	-15	-60	INST	-15	-60
DIR	2.0	324.0	310.8	1.0	321.1	309.8	2.0	324.9	311.7
Speed	4.3	5.6	4.0	4.2	6.9	5.6	4.3	5.6	4.0
TEMP	68.9	68.9	67.3	68.1	68.9	66.2	68.9	68.9	67.3
DeltaT	-0.4	-0.0	0.5	-1.3	-0.7	-0.4	-0.4	-0.0	0.5

40 METER ELEVATION

	ALPHA			BRAVO			PREFERRED		
	INST	-15	-60	INST	-15	-60	INST	-15	-60
TEMP	68.9	69.1	67.2	68.9	68.8	66.7	68.9	69.1	67.2
DeltaT	-0.4	0.1	0.4	-0.6	-0.0	0.1	-0.4	0.1	0.4

10 METER ELEVATION

	ALPHA			BRAVO			PREFERRED		
	INST	-15	-60	INST	-15	-60	INST	-15	-60
DIR	33.0	352.6	3.1	29.0	346.4	1.9	33.0	352.6	3.1
Speed	3.8	3.9	3.4	3.5	3.8	3.3	3.8	3.9	3.4
TEMP	69.6	69.0	66.8	70.0	68.9	66.6	69.6	69.0	66.8

NOTE!! ALL WIND DIRECTIONS ARE "FROM" (THAT IS, POINTING INTO THE WIND)

Prev Canc | F1 | F2 PID MENU | F3 HISTORY | F4 | F5 | F6

Ready | VCS InfoServer | CPU L | TT050 | ANONYMOUS | SEC LVL=14

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPA-1008-(S)N18**

2018 NRC A4 (SRO)

TIME CRITICAL JPM

CANDIDATE: _____

EXAMINER: _____

DESCRIPTION: Determine Protective Action Recommendations

TASK: O-344-057-03-02 Make recommendations based on protective action guidelines in the emerg plan (EPP-001.4 AND EPP-005)

TASK STANDARD: The candidate completes the VCS-EPP-0002 Attachment 1 notification form in conformance with the JPM answer key within 15 minutes.

TERMINATING CUE: The candidate returns JPM briefing sheet and Handout materials to the examiner.

PREFERRED LOCATION:	***PREFERRED METHOD:***
CLASSROOM	PERFORM

REFERENCES:

VCS-EPP-0001.4 GENERAL EMERGENCY

VCS-EPP-0002 COMMUNICATION AND NOTIFICATION

K/A 2.4.40 Knowledge of the SRO's responsibilities in emergency plan implementation. (SRO 4.5)

10CFR55: 45 b(1)(12)

TOOLS: Electronic or Hardcopy versions of station procedures.
Hard copy of VCS-EPP-0001.4
EAL and PARs Hardboard or equivalent items if available.

VALIDATION TIME: 15 Minutes. ***TIME CRITICAL:*** YES

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

CANDIDATE: _____

EXAMINER: _____

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 CONDITIONS:

- Reactor power was initially 100%.
- You are the Interim Emergency Director.
- You have declared a General Emergency for security event HG1.1. HOSTILE ACTION resulting in a loss of physical control of the facility.
- **No** prior emergency declarations have been made.
- Law enforcement assistance is in route to the plant but is not yet on site.
- The following plant conditions exist.
  - The reactor tripped and Safety Injection actuated.
  - RM-G7 and RM-G18, CNTMT HI RNG GAMMA both read 2000 R/hr.
  - RM-A3, MAIN PLANT VENT EXHAUST reads 300,000 cpm.
  - RM-A13, MAIN PLANT VENT EXHAUST reads 7 mr/hr.
  - RM-A4, RB PURGE EXHAUST reads 300 cpm.
  - RM-A14, RB PURGE EXHAUST reads 0 mr/hr.
  - RM-G19A, B and C MAIN STEAM LINE read 75 mr/hr.
  - Wind direction is from 105°.
  - Wind speed is 15 mph.
  - Stability class is E.

INITIATING CUES:

You are directed to complete Attachment I of VCS-EPP-0002, C OMMUNICATION AND NOTIFICATION in the handout provided to you.

The time at which the classification was made will be given by the evaluator just prior to beginning this JPM.

Immediately raise your hand when you are finished.

THIS IS A TIME CRITICAL JPM.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

CRITICAL: YES	SEQUENCED: YES	SAT		UNSAT	

JPM STEP 1

Complete VCS-EPP-002, Attachment 1, Nuclear Power Plant Emergency Notification Form.

STEP STANDARD:

Correctly completes VCS-EPP-002 Attachment 1 within 15 minutes after declaration time given as a cue below. See key for correct manner of completing the attachment.

CUES:

CUE: Announce that time of declaration will be the current time by classroom clock.

EVALUATOR NOTE: The VCS-EPP-002 Attachment must be approved within a span of 15 minutes of time after their declaration time. Refer to 2018 NRC A4 SRO Only Key.

COMMENTS:

JPM SETUP SHEET

JPM: JPA-1008-(S)N18

IC SET: N/A

INSTRUCTIONS:

Ensure that current procedures are available in hard copy or electronically.

Provide candidate with the following:

Copy of VCS-EPP-0001.4, GENERAL EMERGENCY.

Copy of VCS-EPP-0002, Attachment 1, page 1 of 12 with Confirmation Phone # entered. (2018 NRC A4 SRO Only Handout)

EAL and PARs hardboards

COMMENTS:

JPM BRIEFING SHEET

SAFETY CONSIDERATIONS: NONE

INITIAL CONDITIONS:

- Reactor power was initially 100%.
- You are the Interim Emergency Director.
- You have declared a General Emergency for security event HG1.1. HOSTILE ACTION resulting in a loss of physical control of the facility.
- **No** prior emergency declarations have been made.
- Law enforcement assistance is in route to the plant but is not yet on site.
- The following plant conditions exist.
  - The reactor tripped and Safety Injection actuated.
  - RM-G7 and RM-G18, CNTMT HI RNG GAMMA both read 2000 R/hr.
  - RM-A3, MAIN PLANT VENT EXHAUST reads 300,000 cpm.
  - RM-A13, MAIN PLANT VENT EXHAUST reads 7 mr/hr.
  - RM-A4, RB PURGE EXHAUST reads 300 cpm.
  - RM-A14, RB PURGE EXHAUST reads 0 mr/hr.
  - RM-G19A, B and C MAIN STEAM LINE read 75 mr/hr.
  - Wind direction is from 105°.
  - Wind speed is 15 mph.
  - Stability class is E.

INITIATING CUES:

You are directed to complete Attachment I of VCS-EPP-0002, C OMMUNICATION AND NOTIFICATION in the handout provided to you.

The time at which the classification was made will be given by the evaluator just prior to beginning this JPM.

Immediately raise your hand when you are finished.

THIS IS A TIME CRITICAL JPM.

Hand this paper back to your Evaluator when you feel that you have satisfactorily completed the assigned task.

2018 NRC A4 SRO Only Handout 1

NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM

MESSAGE#_____ **Confirmation Phone#** 803-334-1234 **AUTHENTICATION#**_____

Lines 1-6 are required for INITIAL Notification

1. **EVENT:** [X] A. DRILL [ ] B. ACTUAL DECLARATION [ ] C. TERMINATION (*ONLY Lines 1, 2, & 4 required*)
2. **AFFECTED SITE:** V.C. SUMMER
3. **EMERGENCY CLASSIFICATION:**
   [ ] A UNUSUAL EVENT [ ] B ALERT [ ] C SITE AREA EMERGENCY [ ] D GENERAL EMERGENCY
4. **EAL#**_____ **Declaration Date**:_____/_____/____Time:_____
   Termination Date:____/_____/_____Time:_____ (mark "N/A" for EAL# & Description)

EAL DESCRIPTION:_____

_____

5. **RELEASE TO THE ENVIRONMENT** (caused by the emergency): [ ] A None [ ] B Is Occurring [ ] C Has Occurred
6. **PROTECTIVE ACTION RECOMMENDATIONS:**
   [ ] A NONE
   [ ] B EVACUATE: _____
   [ ] C SHELTER: _____
   [ ] D Consider the use of KI (potassium iodide) in accordance with ORO plans and policies.
   [ ] E OTHER:_____

Lines 7-11 are NOT required for INITIAL notifications. Lines 7-11 may be provided separately for FOLLOW-UP notifications.

7. **PROGNOSIS**: **Upgrade in classification or PAR change is likely before the next follow-up notification.** [ ] A Yes [ ] B No
8. **SITE UNIT(S) STATUS**:
   AFFECTED UNIT
   [ ] A Yes Unit 1 - _____% Power Shutdown: Date____/____/____Time:_____
   [ ] B Yes Unit 2 - _____% Power Shutdown: Date___/_____/____Time:_____
   [ ] C Yes Unit 3 - _____% Power Shutdown: Date___/_____/____Time:_____
9. **METEOROLOGICAL DATA**:
   Wind direction from: _____degrees Wind Speed: _____mph Precipitation: _____inches
   Stability Class: [ ] A [ ] B [ ] C [ ] D [ ] E [ ] F [ ] G

Lines 10 - 11 are completed for Follow-Up notifications, IF Line 5 IS OCCURING or HAS OCCURRED is selected

10. **AIRBORNE RELEASE CHARACTERIZATION:** [ ] A Ground [ ] B Mixed [ ] C Elevated
    MAGNITUDE UNITS: ☐ Ci ☐ Ci/sec ☐ μCi/sec
    Noble Gases:_____ Iodines:_____ Particulates:_____
11. **DOSE PROJECTION:** Projection period: _____Hours Estimated Release Duration _____Hours

Performed:	DISTANCE	TEDE (mrem)	Thyroid CDE (mrem)
	Site Boundary		
Date: ____/_____/____	2 Miles		
Time: _____	5 Miles		
	10 Miles		

12. **REMARKS (As Applicable)**: _____

_____

13. **APPROVED BY**: _____Title _____ Date___/_____/____ Time:_____
14. **NOTIFIED BY**: _____ Date ___/_____/____ Time:_____
15. **RECEIVED BY** (ORO use only) _____ Date ___/_____/____ Time:_____

**********2018 NRC A4 SRO Only KEY**********

VCS-EPP-0002
ATTACHMENT I
Page 1 of 12
REVISION 2

NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM

MESSAGE# 1 **Confirmation Phone#** 803-334-1234 **AUTHENTICATION#** _____

Lines 1-6 are required for INITIAL Notification

1. **EVENT:** [X] A DRILL [ ] B ACTUAL DECLARATION [ ] C TERMINATION (*ONLY Lines 1, 2, & 4 required*)
2. **AFFECTED SITE:** V.C. SUMMER
3. **EMERGENCY CLASSIFICATION:**
   [ ] A UNUSUAL EVENT [ ] B ALERT [ ] C SITE AREA EMERGENCY *** [X] D GENERAL EMERGENCY
4. **EAL#** HG1.1*** **Declaration Date:** Today*** /___ **Time:**_____
   Termination Date:____/_____/_____**Time:**_____ (mark "N/A" for EAL# & Description)

Declaration Time given in initial cue.

EAL DESCRIPTION: HOSTILE ACTION resulting in a loss of physical control of the facility.***

5. **RELEASE TO THE ENVIRONMENT** (caused by the emergency): [ ] A None *** [X] B Is Occurring [ ] C Has Occurred
6. **PROTECTIVE ACTION RECOMMENDATIONS:**
   [ ] A NONE
   [ ] B EVACUATE: _____
   *** [X] C SHELTER: A-0, A-1, F-1
   *** [X] D Consider the use of KI (potassium iodide) in accordance with ORO plans and policies.
   [ ] E OTHER: _____

Items marked with *** are CRITICAL

Lines 7-11 are NOT required for INITIAL notifications. Lines 7-11 may be provided separately for FOLLOW-UP notifications.

7. **PROGNOSIS: Upgrade in classification or PAR change is likely before the next follow-up notification.** [X] A Yes [X] B No
8. **SITE UNIT(S) STATUS:**
   AFFECTED UNIT
   [X] A Yes Unit 1 - 100 % Power Shutdown: Date Today/___ Time: T-0 minus 15 minutes
   [ ] B Yes Unit 2 - _____% Power Shutdown: Date___/_____/____Time:_____
   [ ] C Yes Unit 3 - _____% Power Shutdown: Date___/_____/____Time:_____

Either Yes or No is acceptable.

9. **METEOROLOGICAL DATA:**
   Wind direction from: 105 degrees Wind Speed: 15 mph Precipitation: _____inches
   Stability Class: [ ] A [ ] B [ ] C [ ] D [X] E [ ] F [ ] G

Note: Lines 7 - 11 are not procedurally required and are not CRITICAL steps.

Lines 10 - 11 are completed for Follow-Up notifications, IF Line 5 IS OCCURING or HAS OCCURRED is selected

10. **AIRBORNE RELEASE CHARACTERIZATION:** [ ] A Ground [ ] B Mixed [ ] C Elevated
    MAGNITUDE UNITS: ☐ Ci ☐ Ci/sec ☐ µCi/sec
    Noble Gases:_____ Iodines:_____ Particulates:_____
11. **DOSE PROJECTION:** Projection period: _____Hours Estimated Release Duration _____Hours

Performed: Date: ____/_____/____ Time: _____	DISTANCE	TEDE (mrem)	Thyroid CDE (mrem)
	Site Boundary		
	2 Miles		
	5 Miles		
	10 Miles		

Approved time must be within a span of 15 minutes after declaration time given as a cue.

12. **REMARKS (As Applicable):** _____

13. **APPROVED BY:** Candidate signature*** Title Shift Manager/IED*** Date___/_____/____ Today*** Time:_____ ***
14. **NOTIFIED BY:** _____ Date ___/_____/____ Time:_____
15. **RECEIVED BY** (ORO use only) _____ Date ___/_____/____ Time:_____

Either is acceptable..

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPA-102-(R)N18**

2018 NRC A1-a (RO)

CANDIDATE: _____

EXAMINER: _____

DESCRIPTION: Verification of Operator Watchstanding Certification

TASK:

TASK STANDARD: Candidate determines that 24 hours in two 12 hour shifts must be stood by September 30th to maintain an active license.

TERMINATING CUE: The candidate enters answers on the handout provided and returns it to the examiner.

PREFERRED LOCATION:	***PREFERRED METHOD:***
CLASSROOM	PERFORM

REFERENCES:

OAP-110.2, OPERATOR WATCHSTANDING CERTIFICATION AND TRACKING

K/A 2.1.4 Knowledge of individual licensed operator responsibilities related to shift staffing, such as medical requirements, "no-solo" operation, maintenance of active license status, 10CFR55, etc. (RO 3.3)

10CFR55: 41 b(10)

TOOLS: Calculator
Access to paper or electronic copies of V.C. Summer procedures

VALIDATION TIME: 20 Minutes. ***TIME CRITICAL:*** NO

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

CANDIDATE: _____

EXAMINER: _____

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 CONDITIONS:

- Today is **September 16**.
- You have been working a special assignment and it is anticipated that you will be permanently assigned to a shift on October 15.
- Your REACTOR OPERATOR license was issued on **June 29** of this year.
- **After** June 29, while on special assignment, you also stood watches on the dates indicated on the handout that has been provided to you.

INITIATING CUES:

You are directed to evaluate the work history provided and determine whether you can stand an RO shift on October 15, in accordance with VCS administrative requirements.

- If so, justify your answer.
- If not, then identify the remaining requirements, if any.

Enter your answers on the Handout.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

CRITICAL: NO	SEQUENCED: NO	SAT		UNSAT	

JPM STEP 1

Refers to OAP-110.2, OPERATOR WATCHSTANDING CERTIFICATION AND TRACKING.

STEP STANDARD:

Refers to either a hard-copy or electronic controlled copy of OAP-110.2.

CUES:

Note(s) to examiner:

The candidate should have the JPM Briefing Sheet and the Handout.

It is not critical for the candidate to refer to the procedure if the candidate can make the correct determination in step 4 from memory.

COMMENTS:

CRITICAL: YES	SEQUENCED: NO	SAT		UNSAT	

JPM STEP 2

Determines the minimum watchstanding requirement for the quarter.

STEP STANDARD:

Determines that the minimum requirement is five 12-hour shifts by the end of the current quarter.

CUES:

COMMENTS:

CRITICAL: YES	SEQUENCED: NO	SAT		UNSAT	

JPM STEP 3

Determines the hours previously stood that count toward the minimum requirement.

STEP STANDARD:

Determines that the CONTROL BUILDING watch on August 8 and the partial watches stood on July 12, August 1, August 20 and September 9 do **not** count toward the minimum requirement.

Determines that the three 12-hour shifts in an RO-licensed position (NROATC or BOP) stood on July 10, July 11 and September 15 do count toward the requirement.

CUES:

COMMENTS:

CRITICAL: YES	SEQUENCED: NO	SAT		UNSAT	

JPM STEP 4

Determines the minimum hours that must be stood to maintain an active license.

STEP STANDARD:

Determines the following:

- 24 hours are left to be stood to maintain an active license.
- The watches must be stood in 12 hour shifts.
- The watches must be stood by the last day in September.

CUES:

COMMENTS:

Evaluator note: 60 hours - 36 hours (three 12-hour shifts) = 24 hours in two 12 hour shifts left to be stood to maintain the license.

JPM SETUP SHEET

JPM: JPM: JPA-102-(R)N18

IC SET: N/A

INSTRUCTIONS:

Ensure that current procedures and curve book are available in hard copy or electronically.

Provide Handout containing the following:

Name: _____ Date: _____

Your Watchstanding History

NROATC	0730 - 1930	July 10
BOP	0730 - 1930	July 11
NROATC	0730 - 1230	July 12
BOP	0730 - 1430	August 1
CONTROL BUILDING	1930 - 0730	August 8
BOP	0730 - 1330	August 20
BOP	1230 - 1930	September 9
NROATC	1930 - 0730	September 15

Record your answer below:

COMMENTS:

JPM BRIEFING SHEET

SAFETY CONSIDERATIONS: NONE

INITIAL CONDITIONS:

- Today is **September 16**.
- You have been working a special assignment and it is anticipated that you will be permanently assigned to a shift on October 15.
- Your REACTOR OPERATOR license was issued on **June 29** of this year.
- **After** June 29, while on special assignment, you also stood watches on the dates indicated on the handout that has been provided to you.

INITIATING CUES:

You are directed to evaluate the work history provided and determine whether you can stand an RO shift on October 15, in accordance with VCS administrative requirements.

- If so, justify your answer.
- If not, then identify the remaining requirements, if any.

Enter your answers on the Handout.

Hand this paper back to your Evaluator when you feel that you have satisfactorily completed the assigned task.

2018 NRC A1-a RO Handout 1

Name: _____ Date: _____

Your Watchstanding History

NROATC	0730 - 1930	July 10
BOP	0730 - 1930	July 11
NROATC	0730 - 1230	July 12
BOP	0730 - 1430	August 1
CONTROL BUILDING	1930 - 0730	August 8
BOP	0730 - 1330	August 20
BOP	1230 - 1930	September 9
NROATC	1930 - 0730	September 15

Record your answer below: