

2010 NRC
INITIAL LICENSED
OPERATOR EXAM
JPM #: RO-Admin-1

Facility: **Calvert Cliffs 1 & 2**

Job Performance Measure No.: **RO-Admin-1**

Task Title: **Respond to a complete loss of SDC with the Refueling Pool available;
(Estimate Time to Boiling and Core Uncovery)**

Task Number: **202.023**

K/A Reference: **2.1.20 (4.6, 4.6)**

Method of testing:

Simulated Performance: ☐

Actual Performance: ☒

Classroom: ☒

Simulator: ☐

Plant: ☐

READ TO THE APPLICANT:

Initial Conditions:

1. **Unit-2 RCS is drained to 39 feet.**
2. **Nozzle Dams are not installed**
3. **RCS temperature is 120 °F.**
4. **The reactor was shut down 20 days ago after an extended period of full power operation.**
5. **Refueling operations, replacing 91 fuel assemblies with fresh assemblies, were completed 30 hours ago.**
6. **A loss of shutdown cooling has occurred.**
7. **You are performing the duties of an extra CRO.**

Initiating Cue:

The Shift Manager directs you to estimate the time to boiling AND core uncovery per AOP-3B, Step IV.B.5. Are there any questions? You may begin.

Task Standard:

Terminating Cue: This JPM is complete when the AOP-3B, ATTACHMENT (11), CALCULATION OF TIME TO BOIL OR CORE UNCOVERY, worksheet has been completed. No further actions are required.

Evaluation Criteria:

1. All critical steps completed (denoted by shading).
2. All sequential steps completed in order.
3. All time-critical steps (denoted by an asterisk) completed within allotted time.
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made.

Required Materials:

1. Procedures and manuals normally available in the plant

General References:

AOP-3B, ABNORMAL SHUTDOWN COOLING CONDITIONS, ATTACHMENTS 8 thru 13

Time critical task:

No

Validation Time:

20 minutes

Simulator Setup:

1. None required

ELEMENT
(* = CRITICAL STEP)

STANDARD

Time Start: _____	
<input type="checkbox"/> Locates AOP-3B, Step IV.B.5	Same as element
CUE:	
1. Calculate Time To Boil.	
a. Determine the Time To Boil at 24 hours after shutdown from the appropriate figure, based on RCS level and RCS temperature:	
<u>Note to evaluator:</u> Completion of this JPM requires interpreting graphs that have the potential to induce minor variations in calculated results.	
<input type="checkbox"/> ATTACHMENT (8), TIME TO START BOILING AFTER LOSDC 24 HOURS AFTER SHUTDOWN.	Determines TTB @ 24 hrs is approximately 11.3 minutes (11 to 11.5 minutes)
<input type="checkbox"/> ATTACHMENT (9), TIME TO START BOILING AFTER LOSDC 24 HOURS AFTER SHUTDOWN SG U-TUBES FULL	Determines this step is N/A
<input type="checkbox"/> b. Obtain the multiplier from ATTACHMENT(10), MULTIPLIER ON TIME TO START BOILING OR CORE UNCOVERY, based on time after shutdown.	Using ATTACHMENT (10), determines multiplier of 3.08
c. Multiply the Time To Boil at 24 hours after shutdown by the multiplier.	
<input type="checkbox"/> Obtain value for Post Refueling Multiplier	Using ATTACHMENT (10), page 1, determines the Post Refueling multiplier is applicable with a value of 1.4
<input type="checkbox"/> TTB @ 24 hrs X multiplier X post refueling multiplier = TTB	Performs calculation $11.3 \times 3.08 \times 1.4 = 48.7$ mins
<input type="checkbox"/> d. Independently verify the calculation.	Requests independent verification
2. Calculate Time To Core Uncovery:	

ELEMENT

STANDARD

(* = CRITICAL STEP)

a. Determine the Time To Core Uncovery at 24 hours after shutdown from the appropriate figure, based on RCS level and RCS temperature:	
<p align="center"><u>Note to evaluator:</u></p> <p align="center">Completion of this JPM requires interpreting graphs that have the potential to induce minor variations in calculated results.</p>	
<input type="checkbox"/> ATTACHMENT(12), TIME TO CORE UNCOVERY AFTER LOSDC 24 HOURS AFTER SHUTDOWN NO NOZZLE DAMS, NO INJECTION, NO COLD LEG HOLE	Determines Time to Core Uncovery @ 24 hrs is approximately 128 minutes (126 – 130 mins)
<input type="checkbox"/> ATTACHMENT(13), TIME TO CORE UNCOVERY AFTER LOSDC 24 HOURS AFTER SHUTDOWN WITH NOZZLE DAMS, NO INJECTION, NO COLD LEG HOLE	Determines this step is N/A
<input type="checkbox"/> b. Obtain the multiplier from ATTACHMENT(10), MULTIPLIER ON TIME TO START BOILING OR CORE UNCOVERY, based on time after shutdown.	Using ATTACHMENT (10), determines multiplier of 3.08
c. Multiply the Time To Core Uncovery at 24 hours after shutdown by the multiplier.	
<input type="checkbox"/> Obtain value for Post Refueling Multiplier	Using ATTACHMENT (10), page 1, determines the Post Refueling multiplier is applicable with a value of 1.4
<input type="checkbox"/> Time to Core Uncovery @ 24 hrs X multiplier X post refueling multiplier = Time to Core Uncovery	Performs calculation $128 \times 3.08 \times 1.4 = 552 \text{ mins or } 9.2 \text{ hrs}$
<input type="checkbox"/> d. Independently verify the calculation.	Requests independent verification

Terminating Cue: This JPM is complete when the AOP-3B, ATTACHMENT (11), CALCULATION OF TIME TO BOIL OR CORE UNCOVERY, worksheet has been completed. No further actions are required.

Time Stop: _____

Verification of Completion

Job Performance Measure Number: RO-ADMIN-1

Applicant: _____

NRC Examiner: _____

Date Performed: _____

Facility Evaluator: _____

Number of Attempts: _____

Time to Complete: _____

Follow up Question: _____

Applicant Response: _____

Result: SAT _____ UNSAT _____

Examiner's Signature and Date: _____

APPLICANT'S CUE SHEET

Initial Conditions:

1. Unit-2 RCS is drained to 39 feet.
2. Nozzle Dams are not installed
3. RCS temperature is 120 °F.
4. The reactor was shut down 20 days ago after an extended period of full power operation.
5. Refueling operations, replacing 91 fuel assemblies with fresh assemblies, were completed 30 hours ago.
6. A loss of shutdown cooling has occurred.
7. You are performing the duties of an extra CRO.

Initiating Cue:

The Shift Manager directs you to estimate the time to boiling AND core uncovering per AOP-3B, Step IV.B.5. Are there any questions? You may begin.

2010 NRC
INITIAL LICENSED
OPERATOR EXAM
JPM #: RO-Admin-2

Facility: **Calvert Cliffs 1 & 2**

Job Performance Measure No.: **RO-Admin-2**

Task Title: **Monitor Azimuthal Power Tilt (Tq) using Excore Nuclear Instrumentation**

Task Number: **204.129**

K/A Reference: **2.1.25 (3.9, 4.2)**

Method of testing:

Simulated Performance: ☐

Actual Performance: ☒

Classroom: ☒

Simulator: ☐

Plant: ☐

READ TO THE APPLICANT:

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

Initial Conditions:

- 1. Unit-1 power was recently reduced to 70% power to facilitate repairs to 11 SGFP.**
- 2. CEAs are currently inserted to 108 inches on Group 5.**
- 3. Channel "D" LRNI is out of service for maintenance. T.S. LCOs 3.3.1.A and 3.3.1.D have been entered.**
- 4. The plant computer has "crashed" and is inoperable.**
- 5. You are performing the duties of the CRO.**
- 6. NI Readings are as follows:**

Channel	Lower	Upper
A	69.9	70.9
B	67.3	68.3
C	68.7	69.7
D	0	0

Initiating Cue:

AOP-7H has been implemented and the CRS directs you to determine the Azimuthal Power Tilt (Tq) using the excore NIs per Section IV.E. Are there any questions? You may begin.

Task Standard:

This JPM is complete when calculated azimuthal power tilt (Tq) is determined to be outside acceptable limits.

Evaluation Criteria:

1. All critical steps completed (denoted by shading).
2. All sequential steps completed in order.
3. All time-critical steps (denoted by an asterisk) completed within allotted time.
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made.

Required Materials:

1. Procedures and manuals normally available in the plant

General References:

1. AOP-7H, Loss of Plant Computer in Mode One or Two.
2. T.S. 3.2.4 Azimuthal Power Tilt - Tq

Time Critical Task:

No

Validation Time:

20 minutes

Simulator Setup:

_____ 1. None

ELEMENT

STANDARD

(* = CRITICAL STEP)

Time Start: _____

CUE: Shift Manager directs you to determine the Azimuthal Power Tilt (Tq) using the excore NIs per AOP-7H, Section IV.E.

- ☐ Locates AOP-7H, Section IV.E. - IF Greater than 50% Rated Thermal Power, Monitor Tq.

Same as element.

- ☐ 1. Calculate upper AND lower Tq using ANY of the following:

- ☐ **IF ALL** four Linear Power Channels are operable,
THEN perform **EITHER** of the following:

Determines Step is N/A

NOTE to Evaluator: If Opscalc is used then steps under a are critical, if Manual Calc is performed then step under b is critical.

CUE: Opscalc is available to use

OR

NOTE

A total of 3 upper and 3 lower Linear detectors are required to be operable. The failed detectors can be on different channels.

- ☐ **IF** only 3 Linear Power Channels are operable
AND Reactor Power is less than 75%,**THEN** perform **EITHER** of the following:

Determines Step is applicable

- ☐ a. Calculate Tq using Opscalc function Tq Calculator.

- ☐ Record the readings on ATTACHMENT (5), Tq CALCULATION USING EXCORE DETECTORS

Records NI values on Attachment 5

- ☐ Selects "Ops Calc" icon

Same as element.

- ☐ Selects "Reactor" from menu bar

Same as element.

ELEMENT
(* = CRITICAL STEP)

STANDARD

<input type="checkbox"/> Selects "1/2 Tq Calculation" from drop down menu	Same as element.
<input type="checkbox"/> Enters data and selects "Calculate"	Enters data from Attachment 5. Calculates Upper Tq .03013 Calculates Lower Tq .02970
CUE: Manual Calc is acceptable	
<input type="checkbox"/> b. Calculate Tq using the method in ATTACHMENT 5), Tq CALCULATION USING EXCORE DETECTORS	
<input type="checkbox"/> Record the readings on ATTACHMENT (5), Tq CALCULATION USING EXCORE DETECTORS	Records Readings on Attachment 5 and performs calculations per formula on Attachment 5 Calculates Upper Tq .03013 Calculates Lower Tq .02970
OR <input type="checkbox"/> • Notify the Reactor Engineering Work Group to provide an alternate method to monitor Tq.	Determines Step is N/A
<input type="checkbox"/> Once every 12 hours, recalculate the Azimuthal Power Tilt using the Excore Detectors PER Step E.1, Page 11.	Determines step is N/A at this time OR Informs CRO to add note to Shift Turnover
<input type="checkbox"/> IF Tq is greater than 0.03, THEN perform the following actions:	Determines Tq is greater than 0.03 and escalates issue to CRS

Terminating Cue: This JPM is complete when calculated azimuthal power tilt (Tq) is determined to be outside acceptable limits. No further actions are required.

Time Stop: _____

Verification of CompletionJob Performance Measure Number: **RO-Admin-2**

Applicant: _____

NRC Examiner: _____

Date Performed: _____

Facility Evaluator: _____

Number of Attempts: _____

Time to Complete: _____

Follow up Question: _____

Applicant Response: _____

Result: SAT _____ UNSAT _____

Examiner's Signature and Date: _____

ATTACHMENT (2)
Page 1 of 2

**EXCORE LHR MONITORING WHEN THE DAS IS OUT OF
SERVICE**

UNIT 1:

Date/Time						
Measured FxyT						
Assumed FxyT from NEOP-13, Figure 1-IV.A.1						
Maximum Allowed Thermal Power from NEOP-13, Figure 1-IV.A.1						
Thermal Power limit from NEOP-13, Figure 1-IV.A.2						
Actual Thermal Power Level						
Complete the following verifications:						
ALL CEAs are above long term steady state insertion limits						
Power Ratio Recorder is correctly adjusted						
Thermal Power is NOT greater than the maximum allowed power						
Initials						
Second Check Initials						

APPLICANT'S CUE SHEET

Initial Conditions:Initial Conditions:

- 1) Unit-1 power was recently reduced to 70% power to facilitate repairs to 11 SGFP.
- 2) CEAs are currently inserted to 108 inches on Group 5.
- 3) Channel "D" LRNI is out of service for maintenance. T.S. LCOs 3.3.1.A and 3.3.1.D have been entered.
- 4) The plant computer has "crashed" and is inoperable.
- 5) You are performing the duties of the CRO.
- 6) NI Readings are as follows:

Channel	Lower	Upper
A	69.9	70.9
B	67.3	68.3
C	68.7	69.7
D	0	0

Initiating Cue:

AOP-7H, LOSS OF PLANT COMPUTER, has been implemented and the CRS directs you to determine the Azimuthal Power Tilt (Tq) using the excore NIs per Section IV.E. Are there any questions? You may begin.

2010 NRC
INITIAL LICENSED
OPERATOR EXAM
JPM #: RO-Admin-3

Facility: **Calvert Cliffs 1 & 2**

Job Performance Measure No.: **RO-Admin-3**

Task Title: **Verify CC system valve operability**

Task Number: **015.004**

K/A Reference: **2.2.21 (2.9, 4.1)**

Method of testing:

Simulated Performance: ☐

Actual Performance: ☒

Classroom: ☒

Simulator: ☐

Plant: ☐

READ TO THE APPLICANT:

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

Initial Conditions:

- 1) Unit-1 is at 100% power**
- 2) Maintenance has just been completed with repacking 11 SDC HX CC DISCH valve 1-CC-3828-CV. The appropriate TS LCOs are in effect.**
- 3) The valve has been stroked and the limit switches adjusted for PMT with all local observations by the Mechanics and IM satisfactory.**
- 4) The CV has been turned over to Operations for PMOT.**
- 5) You are performing the duties of the CRO.**

Initiating Cue:

The CRS has directed you to complete PMOT testing requirements for 1-CC-3828-CV under Work Order C90811426. The CRS has also provided EN-4-108 Attachment (7) and STP-O-65G-1, Component Cooling Valve Quarterly Operability Test. Are there any questions? You may begin.

Task Standard:

This JPM is complete when the CRO has determined that the stroke times for 1-CC-3828-CV are outside of the allowable PMOT deviation, are repeatable, and must be evaluated by the IST Engineer prior to declaring the CV operable. No further actions are required.

Evaluation Criteria:

1. All critical steps completed (denoted by shading).
2. All sequential steps completed in order.
3. All time-critical steps (denoted by an asterisk) completed within allotted time.
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made.

Required Materials:

1. Procedures and manuals normally available in the plant

General References:

1. STP-O-65G-1, Component Cooling Valve Quarterly Operability Test
2. EN-4-108, ASME In-service Testing of Power Operated Valves and Manual Valves

Time Critical Task:

No

Validation Time:

20 minutes

Simulator Setup:

_____ a. None

ELEMENT
(* = CRITICAL STEP)

STANDARD

Time Start: _____	
CUE: Provide the candidate EN-4-108 Attachment (7) and STP-O-65G-1	
<input type="checkbox"/> Locates EN-4-108 Attachment (7)	Same as element.
<input type="checkbox"/> Reviews PMOT Test Requirements	Determines that maintenance performed could affect the stroke time and that Section 1 and Section 2 must be completed and Section 3 may need to be completed based on PMOT stroke results.
CUE: Local observations were completed during PMT by both the Mechanics and IM, with satisfactory results.	
<input type="checkbox"/> Reviews Local/Remote Observations to Assess Valve Performance/Condition During Stroke-Time Baseline Tests	This section may not be referenced if candidate determines observations were performed by Mechanical and IM during PMT. If section is referenced, same as element.
Section 1.0 Determine Allowable PMOT Deviation	
<input type="checkbox"/> PMOT Deviation OPEN	Uses STP O-65G-1 Section 6.3 to determine RV OPEN=23.8 secs, and calculates: PMOT Deviation OPEN= +2.3 secs OR +2.4 secs (depending on how value was truncated)
<input type="checkbox"/> PMOT Deviation CLOSED	Uses STP O-65G-1 to determine RV CLOSED=N/A and calculates: PMOT Deviation CLOSED=N/A
<input type="checkbox"/> OPEN Stroke PMOT Deviation Table	Uses STP O-65G-1 Section 6.3 to determine LVFST OPEN=35.7 secs and completes OPEN Acceptance Criteria table using a combination of STP O-65G-1 values and calculations to determine: <ul style="list-style-type: none"> • LVFST_{max}=35.7 • PMOT_{max}=26.1 OR 26.2 secs • RV=23.8 secs • PMOT_{min}=21.5 OR 21.4 secs • LVFST_{min}=N/A

<input type="checkbox"/> CLOSED Stroke PMOT Deviation Table	Uses STP O-65G-1 Section 6.3 to determine RV LVFST CLOSED=N/A, and calculates completes CLOSED Acceptance Criteria table using a combination of STP O-65G-1 values and calculations to determine: <ul style="list-style-type: none"> • $LVFST_{max}=N/A$ • $PMOT_{max}=N/A$ • $RV=N/A$ • $PMOT_{min}=N/A$ • $LVFST_{min}=N/A$
CUE: When candidate requests 1-CC-3828-CV stroke times or is referring to STP O-65G-1 to perform the valve strokes, provide the following information: Valve opened in 26.4 secs, closed in 26.3 secs, and all local observations and indications were satisfactory.	
Section 2.0 Validate Existing Reference Value	
<input type="checkbox"/> Record PMOT Stroke Time (both directions required)	Records OPEN stroke as 26.4 secs and CLOSED stroke as 26.3 secs
<input type="checkbox"/> Did each PMOT stroke time fall within the allowable PMOT deviation?	Determines stroke time did not fall within the PMOT deviation. Circles N for Open Stroke and N/A for Closed Stroke
<input type="checkbox"/> If the PMOT stroke times(s) fall within the PMOT Deviation, then:	Determines stroke time did not fall within the PMOT deviation. Determines step is N/A and that Section 3.0 must now be performed
Section 3.0 Baseline Stroke-Time Tests	
<input type="checkbox"/> Perform at least three baseline stroke tests in each direction (in addition to the PMOT strokes), regardless of the valves safety function(s)....	Determines that at least 3 more strokes in each direction are required
CUE: When candidate requests 1-CC-3828-CV stroke times or is referring to STP O-65G-1 to perform the additional valve strokes, provide the following information: First Baseline Stroke-Valve opened in 26.5 secs, and valve closed in 26.2 secs. All local observations and indications were satisfactory.	
<input type="checkbox"/> Baseline Stroke #1	Records: Open=26.5, Closed=26.2
CUE: When candidate requests 1-CC-3828-CV stroke times or is referring to STP O-65G-1 to perform the additional valve strokes, provide the following information: Second Baseline Stroke-Valve opened in 26.3 secs, and valve closed in 26.3 secs. All local observations and indications were satisfactory.	
<input type="checkbox"/> Baseline Stroke #2	Records: Open=26.3, Closed=26.3

CUE: When candidate requests 1-CC-3828-CV stroke times or is referring to STP O-65G-1 to perform the additional valve strokes, provide the following information: Third Baseline Stroke-Valve opened in 26.3 secs, and valve closed in 26.3 secs. All local observations and indications were satisfactory.

<input type="checkbox"/> Baseline Stroke #3	Records: Open=26.3, Closed=26.3
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CUE: Only if an additional stroke was performed, when candidate requests 1-CC-3828-CV stroke times or is referring to STP O-65G-1 to perform the additional valve strokes, provide the following information: Additional Baseline Stroke-Valve opened in 26.4 secs, and valve closed in 26.3 secs. All local observations and indications were satisfactory.

<input type="checkbox"/> Additional Strokes	If performed, records: Open=26.4, Closed=26.2
---------------------------------------------	--------------------------------------------------

<input type="checkbox"/> Baseline Stroke Time Average	Regardless of number of strokes, records: Open=26.4, Closed=26.3
-------------------------------------------------------	---------------------------------------------------------------------

<input type="checkbox"/> Are the stroke times in each direction adequately repeatable?	Determines that both OPEN and CLOSED strokes are repeatable and circles Y for both OPEN and CLOSED
----------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------

<input type="checkbox"/> Are all stroke times within the limits established by the LVFST values?	References Section 2.0 or STP O-65G-1 Section 6.3 and determines that only the LVFST in the OPEN direction applies and that the valve strokes were within the LVFST values. Circles Y for OPEN and N/A for CLOSED
--------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

<input type="checkbox"/> Observations/Assessment (include any new Condition Reports)	May note that conditions locally were sat
--------------------------------------------------------------------------------------	-------------------------------------------

CUE: If candidate does not indicate that valve is still inoperable, ask "Can 1-CC-3828-CV now be declared operable?"

<input type="checkbox"/> Determines that IST Engineer must review Attachment (7) results before declaring CV operable.	Same as element
------------------------------------------------------------------------------------------------------------------------	-----------------

Terminating Cue: This JPM is complete when it is determined that the IST Engineer must evaluate the PMOT results in order to declare 1-CC-3828-CV operable. No further actions are required. The evaluator is expected to end the JPM.

Time Stop: _____

Verification of CompletionJob Performance Measure Number: **RO-Admin-3**

Applicant: _____

NRC Examiner: _____

Date Performed: _____

Facility Evaluator: _____

Number of Attempts: _____

Time to Complete: _____

Follow up Question: _____

Applicant Response: _____

Result: SAT _____ UNSAT _____

Examiner's Signature and Date: _____

Attachment 7, Evaluation/Documentation of Stroke-Time Test Results During PMOT
(Page 1 of 4)PMOT Test Requirements

When maintenance is performed on power-operated valves that could affect the stroke-time, Attachment 7 must be completed as follows:

- Complete Section 1, Determine Allowable PMOT Deviation.
- Complete Section 2, Validate Existing Reference Value.
 - If the stroke-time is within the deviation determined in Section 1, no abnormal valve operation was observed, and the maintenance was NOT intended to change the valve stroke time (e.g. replacing solenoid valve with one having a different venting capacity), no further testing or evaluation is required and the valve may be declared operable.

NOTE

Performance of Section 3 requires that the IST Engineer evaluate the stroke time tests PRIOR to declaring the valve operable.

- Complete Section 3, Baseline Stroke-Time Tests for the following conditions:
 - Section 2 stroke time was outside of the allowable deviation determined in Section 1.
 - The maintenance was intended to change the valve stroke time (i.e. modification)

Local/Remote Observations to Assess Valve Performance/Condition During Stroke-Time Baseline Tests

Observe the performance/condition of the valve, actuator, and associated subcomponents/support systems locally (if accessible) and remotely during at least one of the PMT/Baseline strokes. Look for typical symptoms of improper operation or degradation. If none are noted, the possibility that the maintenance may have created any new issues, or that there was any previously unidentified degradation, is reduced. Ensure components that were disturbed by the maintenance are specifically assessed, but do not focus exclusively on only those components:

- a. Verify the valve strokes smoothly with no binding or scoring on stem. Document any flow noises heard.
- b. Verify the actuator operates smoothly with no air leaks or binding.
- c. Verify limit switches function properly and appear to be properly set and secure.
- d. Verify the air system solenoid valve, the pressure regulator, and other subcomponents appear to operate properly with no air leaks. Verify the air pressure regulator appears to be set and operating properly.
- e. Verify the control system appears to be set up and working properly.
- f. Verify the stroke times collected are repeatable, random (i.e. not all rapidly increasing or decreasing), and appear to be representative of valve performance.

Attachment 7, Evaluation/Documentation of Stroke-Time Test Results During PMOT

(Page 2 of 4)

Valve: _____ STP: _____ Maintenance Order(s): _____

1.0 Determine Allowable PMOT Deviation

Enter Reference Value(s) from associated STP for valve being tested in spaces below.

Calculate PMOT Deviation as follows:

For Reference Values (RV) ≤ 10 seconds: PMOT Deviation = 1 secondFor Reference Values (RV) > 10 seconds: PMOT Deviation = $0.1 \times \text{RV}$ = second

PMOT Deviation OPEN = $0.1 \times$ _____ = +/- _____ seconds
(N/A if no OPEN Reference Value) RV

PMOT Deviation CLOSED = $0.1 \times$ _____ = +/- _____ seconds
(N/A if no CLOSED Reference Value) RV

Enter PMOT_{Max} and PMOT_{Min} Deviations in spaces below.

Enter LVFST(s) from associated STP for valve being tested in spaces below.

OPEN Stroke (seconds) (N/A if OPEN Reference Value not assigned)		CLOSED Stroke (seconds) (N/A if CLOSED Reference Value not assigned)	
LVFST	= _____	LVFST	= _____
PMOT _{Max}	= RV + PMOT Dev. _____	PMOT	= RV + PMOT Dev. _____
RV	= _____	RV	= _____
PMOT _{Min}	= RV - PMOT Dev. _____	PMOT _{Min}	= RV - PMOT Dev. _____
LVFST _{Min}	= _____	LVFST	= _____
(N/A if not assigned)		(N/A if not assigned)	

2.0 Validate Existing Reference Value

Record PMOT Stroke Time (both directions required) _____

OPEN stroke CLOSED stroke

Did each PMOT stroke time fall within the allowable PMOT deviation?

OPEN stroke: Y N N/A (Circle one)

CLOSED stroke: Y N N/A (Circle one)

If the PMOT stroke time(s) fall within the PMOT Deviation, then

- The Reference Value has been reconfirmed.
- If no other immediate operability concerns were identified, then the PMOT is satisfactory and the valve may be returned to an Operable status.

Performed By: _____ Date: _____

Approved By: _____ Date: _____

Attachment 7, Evaluation/Documentation of Stroke-Time Test Results During PMOT
(Page 3 of 4)**3.0 Baseline Stroke-Time Tests****NOTE**

Performance of this Section requires that the IST Engineer evaluate the stroke time tests PRIOR to declaring the valve operable.

PERFORM at least three baseline stroke tests in each direction (in addition to the PMOT strokes), regardless of the valve's safety function(s). Allow the valve/actuator to reach equilibrium conditions between each stroke/direction and RECORD the times below.

	Open Strokes (sec)	Closed Strokes (sec)
Baseline Stroke #1 (required)	_____	_____
Baseline Stroke #2 (required)	_____	_____
Baseline Stroke #3 (required)	_____	_____
Additional Strokes (optional)	_____	_____
Baseline Stroke Time Average (sec)	_____	_____

Repeatability

A minimum of three stroke times in both directions is required. The stroke times should be reasonably repeatable and deviations should appear to be random. If they do not, then additional stroke-time data should be collected and documented. A good rule of thumb to assess stroke time repeatability for most valves is that each stroke time should be within approximately $\pm 10\%$ or ± 1 second, whichever is greater, of the average of the stroke times.

Are the stroke times in each direction adequately repeatable?

OPEN stroke: Y N (Circle one)

CLOSED stroke: Y N (Circle one)

Are all stroke times within the limits established by the LVFST value(s)?

OPEN stroke: Y N N/A (Circle one)

CLOSED stroke: Y N N/A (Circle one)

Observations/Assessment (include any new Condition Reports):

Performed By: _____ Date: _____

Approved By: _____ Date: _____

Notification and Disposition

- Notify the IST Program implementer/Designee that a Post-Performance Evaluation is required **prior** to restoring the valve to service.
- Attach the completed form to the STP used for PMOT.

Performed By: _____ Date: _____

Reviewed By (CRS): _____ Date: _____

Attachment 7, Evaluation/Documentation of Stroke-Time Test Results During PMOT

(Page 4 of 4)

4.0 IST Program Requirements:

The IST Program Implementer/Designee is required to perform a Post-Performance Evaluation of this attachment. The evaluation will be done either in support of an impending reference value re-baseline prior to declaring the power-operated valve operable or as a subsequent task following reconfirmation of an existing reference value.

5.0 Post-Performance Evaluation:

Date:

IST Engineer

APPLICANT'S CUE SHEET

Initial Conditions:

- 1) Unit-1 is at 100% power
- 2) Maintenance has just been completed with repacking 11 SDC HX CC DISCH valve 1-CC-3828-CV. The appropriate TS LCOs are in effect.
- 3) The valve has been stroked and the limit switches adjusted for PMT with all local observations by the Mechanics and IM satisfactory.
- 4) The CV has been turned over to Operations for PMOT.
- 5) You are performing the duties of the CRO.

Initiating Cue:

The CRS has directed you to complete PMOT testing requirements for 1-CC-3828-CV under Work Order C90811426. The CRS has also provided EN-4-108 Attachment (7) and STP-O-65G-1, Component Cooling Valve Quarterly Operability Test. Are there any questions? You may begin.

2010 NRC
INITIAL LICENSED
OPERATOR EXAM
JPM #: RO-Admin-4

Facility: **Calvert Cliffs 1 & 2**

Job Performance Measure No.: **RO-Admin-4**

Task Title: **Recall Emergency Response Organization**

Task Number: **204.138**

K/A Reference: **2.4.39 (3.9, 3.8)**

Method of testing:

Simulated Performance: ☐

Actual Performance: ☒

Classroom: ☐

Simulator: ☒

Plant: ☐

READ TO THE APPLICANT:

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

Initial Conditions:

- 1. Unit-2 tripped from 100% power**
- 2. EOP-5, Loss of Coolant Accident, has been implemented**
- 3. The SM has declared an Alert Condition on Unit 2.**
- 4. You are performing the duties of an extra licensed operator.**

Initiating Cue:

You are directed to recall the Emergency Response Organization according to Step B.1 of Attachment 11. Are there any questions? You may begin.

Task Standard:

This JPM is complete when the candidate has completed the recall of the Emergency Response Organization per ATTACHMENT 11 of ERPIP 3.0.

Evaluation Criteria:

1. All critical steps completed (denoted by shading).
2. All sequential steps completed in order.
3. All time-critical steps (denoted by an asterisk) completed within allotted time.
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made.

Required Materials:

1. Procedures and manuals normally available in the plant
2. Completed ERPIP 3.0 Attachment 3
3. ERPIP 3.0, Attachment 11, pages 2 and 3.

General References:

1. ERPIP 3.0, Immediate Actions
2. ERPIP 105, Control Room Communicator, Attachment 1

Time critical task:

No

Validation Time:

20 minutes

Simulator Setup:

1. Simulator not required, however, access to a PC is required

ELEMENT
(* = CRITICAL STEP)

STANDARD

Time Start: _____	
CUE: Provide Candidate with completed ATTACHMENT 3, Initial Notification Form and copy of ATTACHMENT 11, Step B.1.	
<input type="checkbox"/> Locates ERPIP 3.0 Attachment 11, Alert Actions, Step B.1 OR Locates ERPIP 105 Attachment 1, Personnel Notification, Step 1	Same as element
<input type="checkbox"/> a. HAVE the Initial Notification Form immediately available for reference.	
<input type="checkbox"/> b. ACCESS a computer with Internet capability	Same as element
<input type="checkbox"/> 1. IF at any time the Internet cannot be accessed, THEN IMMEDIATELY GO TO step B.2 of this attachment.	Determines step is N/A
<input type="checkbox"/> c. CLICK the Internet Explorer icon AND TYPE the following into the address bar: http://www.envoyprofiles.com/ce/ .	Same as element
<u>CAUTION</u> Username, CCNPP Trainer, and password, Train6^now, <u>MUST</u> be entered as specified. Failure to do so may result in activation of the Emergency Response Organization	
<u>NOTE</u> The user name and password are case sensitive	
<input type="checkbox"/> d. WHEN the NotiFind log in page appears, THEN ENTER: Username: CCNPP Trainer Password: Train6^now Hit "Login"	Same as element
<input type="checkbox"/> e. ON the "Welcome to NotiFind" screen, THEN CLICK on "Activation".	Same as element
<input type="checkbox"/> f. ON the "NotiFind Main Menu" screen, THEN CLICK on "Activate System".	Same as element
<input type="checkbox"/> g. ON the "Create Notification/Select Notification Type" screen, THEN SELECT "ERO Notification System" AND CLICK on "Next".	Same as element

ELEMENT

STANDARD

(* = CRITICAL STEP)

<p>h. ON the Create Notification/Notification Details screen, THEN:</p> <p><input type="checkbox"/> 1. SELECT the “Event” indicated on the Initial Notification Form (Section B)</p>	Determines Drill is correct event
<p><input type="checkbox"/> 2. SELECT the “Unit” indicated on the Initial Notification Form (Section B)</p>	Determines Calvert Cliffs is applicable Unit
<p><input type="checkbox"/> 3. SELECT “Reason for Notification” indicated on the Initial Notification Form (Section B)</p>	Determines Alert is applicable Reason for Notification
<p><input type="checkbox"/> 4. SELECT ERO personnel “Action” indicated on the Initial Notification Form (Section B)</p>	Determines Staff Normal Emergency Facilities for Emergency is correct Action
<p><input type="checkbox"/> 5. VERIFY that the message in the “Message Text” box is correct.</p>	Same as element
<p><input type="checkbox"/> 6. UTILIZE the “Back” button as required to correct errors</p>	
<p style="text-align: center;"><u>NOTE</u></p> <p>The selection under “Polling Options” and “Security Options” are pre-populated and should not be altered.</p>	
<p><input type="checkbox"/> i. UNDER “Sender Information”, THEN ENTER the following:</p> <p style="padding-left: 40px;">Name: leave blank</p> <p style="padding-left: 40px;">Caller ID: 410-495-4444</p> <p style="padding-left: 40px;">Email: CCNPP_EP@constellation.com</p> <p style="padding-left: 40px;">Click on the “Next” button</p>	Same as element
<p style="text-align: center;"><u>CAUTION</u></p> <p style="text-align: center;">Failure to select “Simulator Test” may result in activation of the Emergency Response Organization</p>	
<p><input type="checkbox"/> j. ON the “Create Notification/Notification Lists” screen, THEN CHECK the box next to the “Simulator Test” AND CLICK on the “Next” button.</p>	Same as element
<p><input type="checkbox"/> k. ON the “Create Notification/Notification Verify and Send” Screen, THEN VERIFY information is accurate AND CLICK on the “SEND” button.</p>	Same as element

ELEMENT
(* = CRITICAL STEP)

STANDARD

<input type="checkbox"/> 1. RECORD the time sent from the Track Delivery Summary page: _____ (Time)	Same as element
<input type="checkbox"/> 1. CHECK Status is "Delivery in Progress" from the Track Delivery Summary page.	Same as element
<input type="checkbox"/> m. IF the Status is not "Delivery in Progress", THEN GO TO Step B.2.	
<input type="checkbox"/> n. INFORM Security (4695) that ERONS has been activated.	Same as element

Terminating Cue: This JPM is complete when the Candidate has informed Security that ERONS has been activated to recall the Emergency Response Organization.

Time Stop: _____

Verification of Completion

Job Performance Measure Number: **RO-ADMIN-4**

Applicant: _____

NRC Examiner: _____

Date Performed: _____

Facility Evaluator: _____

Number of Attempts: _____

Time to Complete: _____

Follow up Question: _____

Applicant Response: _____

Result: SAT _____ UNSAT _____

Examiner's Signature and Date: _____

ATTACHMENT 3, INITIAL NOTIFICATION FORM

USE THIS FORM FOR INITIAL NOTIFICATION AND EMERGENCY CLASS
UPGRADING AND DOWNGRADING ONLY

A. COMPLETE ITEMS 1 THROUGH 7		
1.	This <input checked="" type="checkbox"/> is a drill <input type="checkbox"/> is an actual event.	
2.	Facility: Calvert Cliffs Nuclear Power Plant Unit <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> Common/Both/ISFSI	
3.	Emergency Class: <input type="checkbox"/> Unusual Event <input checked="" type="checkbox"/> Alert <input type="checkbox"/> Site Area Emergency <input type="checkbox"/> General Emergency <input type="checkbox"/> None (downgraded)	
4.	EAL Number: <u>H A 5 1 2</u> or <input type="checkbox"/> None (downgraded)	
5.	Radioactivity is/was released to the environment due to the event: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
	a.	Radioactivity released is/was monitored: <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
	b.	Type of Release: <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Airborne <input type="checkbox"/> Liquid
6.	Protective Action Recommendation (Must choose one from b through f for General Emergency)	
	a.	<input checked="" type="checkbox"/> None (for downgrade, unusual event, alert or site area emergency only)
	b.	<input type="checkbox"/> Shelter entire 10 mile EPZ
	c.	<input type="checkbox"/> Evacuate PAZ 1 unless conditions make evacuation dangerous, notify the public in PAZ 1 to take KI, shelter remainder of the 10 mile EPZ.
	d.	<input type="checkbox"/> Evacuate PAZ 1 & 2 unless conditions make evacuation dangerous, notify the public in PAZ 1 & 2 to take KI, shelter remainder of the 10 mile EPZ.
	e.	<input type="checkbox"/> Evacuate PAZ 1 & 3 unless conditions make evacuation dangerous, notify the public in PAZ 1 & 3 to take KI, shelter remainder of the 10 mile EPZ.
	f.	<input type="checkbox"/> Evacuate PAZ 1, 2 & 3 unless conditions make evacuation dangerous, notify the public in PAZ 1, 2 & 3 to take KI, shelter remainder of the 10 mile EPZ.
7.	Time Declared: <u>1245</u> Date: <u>TODAY'S DATE</u>	
B. PERSONNEL NOTIFICATION DETERMINATION		
N/A <input type="checkbox"/> ERO previously recalled, proceed to signature below.		
EVENT	REASON FOR NOTIFICATION	ACTION
<input checked="" type="checkbox"/> Drill	<input type="checkbox"/> Unusual Event	<input type="checkbox"/> None
<input type="checkbox"/> Actual Event	<input checked="" type="checkbox"/> Alert	<input checked="" type="checkbox"/> Staff Normal Emergency Response Facilities
UNIT	<input type="checkbox"/> Site Area Emergency	<input type="checkbox"/> Staff Alternate Emergency Facilities
<input checked="" type="checkbox"/> Calvert Cliffs	<input type="checkbox"/> General Emergency	<input type="checkbox"/> Staff Normal Emergency Facilities as a Precaution
	<input type="checkbox"/> Event Termination	<input type="checkbox"/> Staff EOF and JIC Only
		<input type="checkbox"/> Staff TSC and OSC Only
		<input type="checkbox"/> Staff EOF with ED and RAD Only
ED Name (print) <u>E. DIRECTOR</u>		Signature: <u>E. Director</u>

ATTACHMENT 11, ALERT ACTIONS (CONTINUED)

B.1. ACTIVATE the Emergency Response Organization Notification System (ERONS).

- a. HAVE the Initial Notification Form immediately available for reference.
- b. ACCESS a computer with Internet capability.
 1. IF at any time the Internet cannot be accessed, THEN IMMEDIATELY GO TO step B.2 of this attachment.
- c. CLICK the Internet Explorer icon AND TYPE the following into the address bar: <http://www.envoyprofiles.com/cc/>.

NOTE

The user name and password are case sensitive.

- d. WHEN the NotiFind log in page appears, THEN ENTER:
Username: **CCNPP Trainer**
Password: **Train6^now**
Hit "Login"
- e. ON the "Welcome to NotiFind" screen, THEN CLICK on "Activation".
- f. ON the "NotiFind Main Menu" screen, THEN CLICK on "Activate System".
- g. ON the "Create Notification/Select Notification Type" screen, THEN SELECT "**ERO Notification System**" AND CLICK on "Next".
- h. ON the Create Notification/Notification Details screen, THEN:
 1. SELECT the "Event" indicated on the Initial Notification Form (Section B)
 2. SELECT the "Unit" indicated on the Initial Notification Form (Section B)
 3. SELECT "Reason for Notification" indicated on the Initial Notification Form (Section B)
 4. SELECT ERO personnel "Action" indicated on the Initial Notification Form (Section B)
 5. VERIFY that the message in the "Message Text" box is correct.
 6. UTILIZE the "Back" button as required to correct errors

NOTE

The selection under "Polling Options" and "Security Options" are pre-populated and should not be altered.

ATTACHMENT 11, ALERT ACTIONS (CONTINUED)

- i. **UNDER** "Sender Information", **THEN ENTER** the following:
 - Name: leave blank
 - Caller ID: 410-495-4444
 - Email: CCNPP_EP@constellation.com
 - Click on the "Next" button
- j. **ON** the "Create Notification/Notification Lists" screen, **THEN CHECK** the box next to the "Simulator Test" **AND CLICK** on the "Next" button.
- k. **ON** the "Create Notification/Notification Verify and Send" Screen, **THEN VERIFY** information is accurate **AND CLICK** on the "SEND" button.
 - 1. **RECORD** the time sent from the Track Delivery Summary page:
_____ (Time)
 - 1. **CHECK** Status is "Delivery in Progress" from the Track Delivery Summary page.
 - m. **IF** the Status is not "Delivery in Progress", **THEN GO TO** Step B.2.
 - n. **INFORM** Security (4695) that ERONS has been activated.

NOTE

The following actions are steps which activate ERONS if the Internet is non-functional. This method does **NOT** have all the selection features as the Internet-based ERONS.

B.2. **IF** the internet is non-functional, **THEN ACTIVATE** the Backup Process for ERONS:

- a. **USING** the initial notification form, **THEN NOTIFY** the ERO **AND DETERMINE** which of the following actions should be performed:
 - 1. **NOTIFY** the ERO of an emergency and direct them to staff the normal emergency facilities.
 - 2. **NOTIFY** the ERO of an emergency and direct them to staff the alternate emergency facilities.
- b. **DIAL** the following number on **ANY** working telephone: **8-1-800-735-0318**
 - 1. **WHEN** prompted, **THEN PRESS** "2" for Scenario Activation Line.
 - 2. **WHEN** prompted, **THEN ENTER** the Account Number for Calvert- 4955201#.
 - 3. **WHEN** prompted, **THEN ENTER** the PIN number as follows:
00000#.

ATTACHMENT 11, ALERT ACTIONS (CONTINUED)

4. **WHEN** prompted, **THEN ENTER** the access code as follows:

- (a) To direct the ERO to staff normal emergency facilities, enter access code: 5555#
- (b) To direct the ERO to staff alternate emergency facilities, enter access code: 6666#
- (c) To notify ERO of an emergency, but no response is required, enter access code: 7777#

c. **WHEN** ERONS reads the "Subject" line of the message, **THEN PRESS** "1" to accept the message.

d. **WHEN** prompted, **THEN PRESS** "1" to send the message

e. **RECORD** the time that you completed step B.2.d. above _____ (TIME).

f. **INFORM** Security (4695) that ERONS has been activated.

C.1. **NOTIFY** Offsite Agency (Within 15 minutes).

a. **USING** the dedicated phone, **DEPRESS** the "OFFSITE CONFERENCE" button to simultaneously call the 5 Agencies.

- 1. **IF** not working, **THEN USE** B/U OFFSITE CONFERENCE button. (**REFER** to ERPIP 105 if further issues occur with agency contact.)

NOTE:

During off hours MDE is not staffed. No answer from them is satisfactory.

b. **AS** each agency answers, **THEN SAY** " This is Calvert Cliffs. Standby for an emergency message. Please report your agency and your name."

c. **RECORD** time, name, and method of contact in Contact Table below.

d. **AFTER** all agencies are on line, **THEN SAY** " Please get an Initial Notification Form."

e. **WHEN** all agencies have the form **OR** 1 minute has elapsed, **THEN SAY** "I will give out the information on the form completely once". Page 4 of 5

f. **GIVE OUT** the form information.

g. **ASK** each agency if the full message was received. (**REFER** to ERPIP 105 if problems occur transmitting the form information.)

C.2. **VERIFY** the Control Room pager activation via ERONS. IF the pager in the Control Room does not receive the intended ERO notification within 5 minutes of the message being sent then repeat steps B.1 or B.2 as appropriate

ATTACHMENT 11, ALERT ACTIONS (CONTINUED)

C.3 NOTIFY NRC (Within 1 Hour).

- a. **USING** the NRC Emergency Notification System (ENS) phone, **DIAL** the phone number listed on the label attached to the phone.

(1) **IF** there are any issues using the NRC Emergency Notification System (ENS) phone, **THEN USE** another phone.

- b. **IDENTIFY** yourself **AND ASK** for the name of who you are talking with.
c. **RECORD** time, name and method of contact in Contact Table below.
d. **PROVIDE** all form information **AND VERIFY** they received it.
e. **STAY** on line with the NRC until released **AND** to respond to any inquiries.

C.4. TRANSMIT completed Attachment 3, Initial Notification Form.

- a. **SIGN** Table below.
b. **FAX** Attachment 3 form to the Plant Parameters Communicators for the TSC.
c. **FAX** Attachment 3 form to EOF and JIC when manned.
d. **KEEP** completed forms with communication records.

Contact Table					
Location	*Time	Received by:	Method of Contact		
Calvert			DP	Rad	OL
St Mary's			DP	Rad	OL
Dorchester			DP	Rad	OL
MEMA			DP	Rad	OL
MDE			DP	Rad	OL
NRC			DP		OL

DP = dedicated phone

Rad = Radio

OL = outside line

*Record Time that all calls to the above agencies were completed.

Printed Name and Signature: _____

APPLICANT'S CUE SHEET

Initial Conditions:

1. Unit -2 tripped from 100% power
2. EOP-5, Loss of Coolant Accident, has been implemented
3. The SM has declared an Alert Condition on Unit 2.
4. You are performing the duties of an extra licensed operator.

Initiating Cue:

You are directed to recall the Emergency Response Organization according to Step B.1 of Attachment 11. Are there any questions? You may begin.

2010 NRC
INITIAL LICENSED
OPERATOR EXAM
JPM #: SRO-Admin-1

Facility: **Calvert Cliffs 1 & 2**

Job Performance Measure No.: **SRO-Admin-1**

Task Title: **Ability to implement plant procedures for a Condenser Tube Leak**

Task Number: **202.008**

K/A Reference: **2.1.34 (2.7, 3.5)**

Method of testing:

Simulated Performance: ☐

Actual Performance: ☒

Classroom: ☒

Simulator: ☐

Plant: ☐

READ TO THE APPLICANT:

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

Initial Conditions:

- 1) Unit-1 was in Mode-1 at 100% power when AOP-10 was implemented for a Condenser Tube Leak. Power was reduced to 88% to remove 12A Waterbox from service**
- 2) At 0015, 12A Waterbox was secured IAW AOP-10, Abnormal Secondary Chemistry Conditions, due to a condenser tube leak.**
 - a. Condensate Demineralizers are in service with full flow**
 - b. Condenser High Level Dump is manually isolated**
 - c. S/G Blowdown flow has been maximized**
- 3) At 0045, Chemistry notifies the Control Room exceeded Action Level 2 values for sodium in the Steam Generators, 52 ppb in 11 S/G & 55 ppb in 12 S/G.**
- 4) At 1800, Chemistry notifies the Control Room we are still exceeding Action Level 2 values that sodium levels are lowering slowly. Chemistry anticipates exiting Action Level 2 at 0330**
- 5) You are performing the duties of an extra SRO.**

Initiating Cue:

The Shift Manager directs you to evaluate continued operation per AOP-10, Section VI. Are there any questions? You may begin.

Task Standard:

This JPM is complete when it is determined a reactor trip is required. No further actions are required. The evaluator is expected to end the JPM.

Evaluation Criteria:

1. All critical steps completed (denoted by shading).
2. All sequential steps completed in order.
3. All time-critical steps (denoted by an asterisk) completed within allotted time.
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made.

Required Materials:

1. Procedures and manuals normally available in the plant

General References:

1. AOP-10, Abnormal Secondary Chemistry Conditions.
2. CP-217, Specifications and Surveillance – Secondary Chemistry

Time Critical Task:

No

Validation Time:

20 minutes

Simulator Setup:

_____ a. None

ELEMENT
(* = CRITICAL STEP)

STANDARD

Time Start: _____	
CUE: The Shift Manager directs you to evaluate continued operation per AOP-10, Section VI	
<input type="checkbox"/> Locates AOP-10, Section VI	Same as element.
<input type="checkbox"/> A. Determine if a reactor trip is required.	Reviews step and determines step is N/A at this time
CUE: The CRS is directing the Crew in the performance of AOP-10, Section VI.B	
<input type="checkbox"/> B. Determine required plant conditions.	Determines required actions are in progress
<u>NOTE:</u> If SG chemistry levels are reduced below the Action Level 3 value, before or during the power reduction, power level is still required to be reduced below 5%.	
C. Actions with power greater than or equal to 30%	
<input type="checkbox"/> 1. IF Plant Chemistry determines SG Chemistry is in Action Level 3, as a result of a Condenser tube leak, THEN commence an orderly plant shutdown to be less than 5% power as quickly as safe operation permits PER OP-3 and OP-4.	Determines step is N/A at this time
2. IF Plant Chemistry determines that SG Chemistry is in Action Level 2, as a result of a Condenser tube leak, THEN perform the following actions:	
<input type="checkbox"/> a. Within 24 hours of initiating Action Level 2, reduce power to less than 30% PER OP-3, NORMAL POWER OPERATION .	Determines power must be reduced to less than 30% by 0045
<input type="checkbox"/> b. WHEN the following conditions exist: <ul style="list-style-type: none"> • The source of the impurity ingress is controlled • SG Chemistry is less than the value for Action Level 2 THEN the power reduction may be terminated and power stabilized.	Determines step is N/A at this time

ELEMENT

STANDARD

(* = CRITICAL STEP)

<input type="checkbox"/> c. IF the SG chemistry level has NOT been reduced to less than Action Level 1 within 300 hours of entering Action Level 2 THEN consider the SG Chemistry level to be in Action Level 3, AND commence an orderly plant shutdown to be less than 5% power as quickly as safe operation permits PER OP-3 and OP-4.	Determines step is N/A at this time
CUE: 12A Waterbox is secured for leak location/repair	
<input type="checkbox"/> 3. Attempt to locate and repair the tube leak.	Determines actions already in progress
CUE: Chemistry reports SG sodium has exceeded Action Level 3 values	
Note to evaluator: Candidate will have to refer back to Step VI.C.1	
<input type="checkbox"/> VI.C.1. IF Plant Chemistry determines SG Chemistry is in Action Level 3, as a result of a Condenser tube leak, THEN commence an orderly plant shutdown to be less than 5% power as quickly as safe operation permits PER OP-3 and OP-4.	Determines a plant shutdown to <5% power is required.
CUE: Chemistry reports Condensate and Feedwater Sodium levels are 210 ppb and rising rapidly. The source appears to be 13B Waterbox.	
<input type="checkbox"/> VI.A. Determine if a reactor trip is required.	
<input type="checkbox"/> 1. IF Feedwater Sodium is greater than 200 ppb AND Condensate Sodium is greater than 200 ppb, THEN perform the following: a. Trip the Reactor.	Determines reactor trip is required

Terminating Cue: This JPM is complete when it is determined a reactor trip is required. No further actions are required. The evaluator is expected to end the JPM.

Time Stop: _____

Verification of CompletionJob Performance Measure Number: **SRO-Admin-1**

Applicant: _____

NRC Examiner: _____

Date Performed: _____

Facility Evaluator: _____

Number of Attempts: _____

Time to Complete: _____

Follow up Question: _____

Applicant Response: _____

Result: SAT _____ UNSAT _____

Examiner's Signature and Date: _____

APPLICANT'S CUE SHEET

Initial Conditions:

- 1) Unit-1 is in Mode-1 at 88% power.
- 2) At 0015, 12A Waterbox was secured IAW AOP-10, Abnormal Secondary Chemistry Conditions, due to a condenser tube leak.
 - a. Condensate Demineralizers are in service with full flow
 - b. Condenser High Level Dump is manually isolated
 - c. S/G Blowdown flow has been maximized
- 3) At 0045, exceeded Action Level 2 values for sodium in the Steam Generators, 52 ppb in 11 S/G and 55 ppb in 12 S/G.
- 4) At 1800, Chemistry notifies the Control Room we are still exceeding Action Level 2 values and sodium levels are lowering slowly. Chemistry anticipates exiting Action Level 2 at 0330
- 5) You are performing the duties of an extra SRO.

Initiating Cue:

The Shift Manager directs you to evaluate continued operation per AOP-10 step VI. Are there any questions? You may begin.

2010 NRC

INITIAL LICENSED

OPERATOR EXAM

JPM #: SRO-Admin-2

Facility: **Calvert Cliffs 1 & 2**

Job Performance Measure No.: **SRO-Admin-2**

Task Title: **Verify an Estimated Critical Condition Calculation**

Task Number: **202.247**

K/A Reference: **2.1.25 (3.9, 4.2)**

Method of testing:

Simulated Performance: ☐

Actual Performance: ☒

Classroom: ☒

Simulator: ☐

Plant: ☐

READ TO THE APPLICANT:

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

Initial Conditions:

- 1. Unit-2 is in MODE 3 at normal operating temperature and pressure. Current time is 0800.**
- 2. The reactor tripped while performing RPS testing 32 hours ago. Preparations are underway for a quick trip recovery startup to begin within the next 30 minutes with criticality anticipated in 2 hours at 10am.**
- 3. The following conditions exist:**
 - a. Unit-2 tripped from 100% power 32 hours ago.**
 - b. Power history: Prior to the trip, Unit-2 operated at 100% for the previous 68 days.**
 - c. Burnup from the plant computer point "CEBURNUP" is 14,400 MWD/MTU.**
 - d. Nuclear Fuels has provided a Xenon Worth Calculation and a B-10 Correction factor of 0.971.**
- 4. An ECC has been prepared by an extra licensed operator.**

Initiating Cue:

The Shift Manager has directed you to Verify the Estimated Critical Concentration calculation per NEOP-302, Estimated Critical Condition, Step 6.1.23. Do not verify the ± 1 hr or the ± 2 hr values. Do not verify the ECC tolerance band values. Are there any questions? You may begin.

Task Standard:

Verify an Estimated Critical Condition Calculation.

Evaluation Criteria:

1. All critical steps completed (denoted by shading).
2. All sequential steps completed in order.
3. All time-critical steps (denoted by an asterisk) completed within allotted time.
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made.

Required Materials:

1. Procedures and manuals normally available in the plant

General References:

NEOP302, Estimated Critical Condition
NEOP-23, Technical Data Book (Unit-2)

Time critical task:

No

Validation Time:

20 minutes

Simulator Setup:

_____ 1. None required

ELEMENT
(* = CRITICAL STEP)

STANDARD

Time Start: _____	
<input type="checkbox"/> Locates NEOP-302, Step 6.1.23	Same as element
<input type="checkbox"/> 6.1.23. The Shift SRO shall perform the following:	
<input type="checkbox"/> 6.1.23.1. Verify the previous critical condition is correct	Same as element
<input type="checkbox"/> 6.1.23.2. Verify that criticality is expected within the ± 2 hour window bounded by the time points-2h and ± 2 h.	Same as element
<input type="checkbox"/> 6.1.23.3 Independently verify the ECC is calculated correctly	
Note to Evaluator: Candidate will complete independent verification of the calculation using NEOP-302, Section 6.1	
<input type="checkbox"/> 6.1.1 Complete the previous critical conditions section of Attachment 2, Four Hour Window With Same Boron:	
<input type="checkbox"/> 6.1.1. Verify correct Unit and cycle numbers	Same as element
<input type="checkbox"/> 6.1.2. Verify correct date and time the unit shut down	Same as element
CUE: Burnup from the plant computer point "CEBURNUP" is 14,400 MWD/MTU	
<input type="checkbox"/> 6.1.3. Verify correct burnup, for the cycle, has been recorded	Determines correct Burnup is 14,400 MWD/MTU. Verifies correctly entered on Attachment 2
<input type="checkbox"/> 6.1.2 Complete the "Current Conditions" section of Attachment 2:	
CUE: Candidate will reference	
<input type="checkbox"/> 6.1.2.1. Verify correct value for Excess Reactivity has been determined and entered on Attachment 2.	Determines correct value for Excess Reactivity is 9.9375 % $\Delta\rho$. Verifies correctly entered on Attachment 2.
<input type="checkbox"/> 6.1.2.2. Verify correct HZP Inverse Boron Worth (IBW) has been determined and entered on Attachment 2.	Determines correct value for HZP IBW is 116.2 ppm/% $\Delta\rho$. Verifies correctly entered on Attachment 2.
<input type="checkbox"/> 6.1.2.3. Verify correct B-10 Correction Factor has been determined and entered on Attachment 2.	Verifies B-10 Correction Factor has been entered as .971 on Att 2
<input type="checkbox"/> 6.1.3 Verify correct estimated date and time of reactor criticality entered on Attachment 2 for the time point "0h"	Verifies correct estimated date and time of reactor criticality entered on Attachment 2 for the time point "0h"

ELEMENT
(* = CRITICAL STEP)

STANDARD

<input type="checkbox"/> 6.1.4 Verify correct elapsed time from reactor shutdown to the estimated time of criticality, as "Hours After Shutdown", is entered on Attachment 2 for time point "0h".	Verifies correct elapsed time from reactor shutdown to the estimated time of criticality, as "Hours After Shutdown", is entered on Attachment 2 for time point "0h".
<input type="checkbox"/> 6.1.5 Verify correct shutdown xenon worth, at the estimated time of criticality, is entered on Attachment 2.	Determines correct xenon worth is 1.120 % Δ p. Verifies correctly entered on Attachment 2
Note to Evaluator: Steps 6.1.6 and 6.1.7 are not performed during verification	
<input type="checkbox"/> 6.1.8 Verify correct CEA position for criticality is determined and entered on Attachment 2.	<p>Determines correct CEA heights are:</p> <ul style="list-style-type: none"> • Group 3 @ 135 inches • Group 4 @ 90" • Group 5 @ 0" <p>Verifies correctly entered on Attachment 2</p>
<input type="checkbox"/> 6.1.9 Verify correct CEA reactivity worth has been determined and entered on Attachment 2.	Determines correct CEA worth is .6808 % Δ p. Verifies correctly entered on Attachment 2
<input type="checkbox"/> 6.1.10 Verify Corrected HZP IBW has been calculated and entered on Attachment 2	Determines a math error exists in the calculation (HZP IBW multiplied by B-10 Correction Factor. HZP IBW should be divided by the B-10 Correction Factor). Determines Correct value for Corrected HZP IBW = 119.67 ppm/% Δ p
<input type="checkbox"/> 6.1.11 Verify correct Boron Worth has been determined and entered on Attachment 2	Determine Boron Worth value of 8.1367 % Δ p. Verifies correctly entered on Attachment 2
<input type="checkbox"/> 6.1.12 Verify correct Estimated Critical Boron Concentration has been determined and entered on Attachment 2	Determine Estimated Critical Boron Concentration value of 974 ppm.
<input type="checkbox"/> 6.1.23. (continued) The Shift SRO shall perform the following:	
CUE: Verification of the ECC Upper and Lower bounds are beyond the scope of this JPM	
<input type="checkbox"/> 6.1.23.4. Verify the ECC Upper and Lower bounds are calculated correctly and the established bounds are between 135 inches withdrawn on Reg Group 5 and the Zero Power PDIL	No actions are required

ELEMENT
(* = CRITICAL STEP)

STANDARD

- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| <input type="checkbox"/> 6.1.23.5. If an error is found, Then instruct the preparer to make the necessary corrections and repeat the review | Returns ECC Calculation worksheet to the preparer for correction |
|---------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|

Terminating Cue: This JPM is complete when errors in the Estimated Critical Boron Concentration calculation have been identified & corrected and the Estimated Critical Boron Concentration has been correctly determined. No further actions are required.

Time Stop: _____

Verification of CompletionJob Performance Measure Number: **SRO-ADMIN-2**

Applicant: _____

NRC Examiner: _____

Date Performed: _____

Facility Evaluator: _____

Number of Attempts: _____

Time to Complete: _____

Follow up Question: _____

Applicant Response: _____

Result: SAT _____ UNSAT _____

Examiner's Signature and Date: _____

XENON WORTH CALCULATOR

Revision 3 Change 0

Unit 2 Cycle 18
Burnup = 14,400 MWD/MTU

Trip from Equilibrium at 99.5% Power
At 07/09/2010 00:00
Calculation performed 05/13/2010 15:52

<u>Hours After Trip (Date/Time)</u>	<u>Xenon Worth</u>
0 (07/09/2010 00:00) -----	2.531 % $\Delta\rho$
1 (07/09/2010 01:00) -----	2.904 % $\Delta\rho$
2 (07/09/2010 02:00) -----	3.172 % $\Delta\rho$
3 (07/09/2010 03:00) -----	3.372 % $\Delta\rho$
4 (07/09/2010 04:00) -----	3.513 % $\Delta\rho$
5 (07/09/2010 05:00) -----	3.604 % $\Delta\rho$
6 (07/09/2010 06:00) -----	3.654 % $\Delta\rho$
7 (07/09/2010 07:00) -----	3.668 % $\Delta\rho$
8 (07/09/2010 08:00) -----	3.652 % $\Delta\rho$
9 (07/09/2010 09:00) -----	3.612 % $\Delta\rho$
10 (07/09/2010 10:00) -----	3.552 % $\Delta\rho$
11 (07/09/2010 11:00) -----	3.476 % $\Delta\rho$
12 (07/09/2010 12:00) -----	3.386 % $\Delta\rho$
13 (07/09/2010 13:00) -----	3.286 % $\Delta\rho$
14 (07/09/2010 14:00) -----	3.179 % $\Delta\rho$
15 (07/09/2010 15:00) -----	3.065 % $\Delta\rho$
16 (07/09/2010 16:00) -----	2.948 % $\Delta\rho$
17 (07/09/2010 17:00) -----	2.829 % $\Delta\rho$
18 (07/09/2010 18:00) -----	2.708 % $\Delta\rho$
19 (07/09/2010 19:00) -----	2.588 % $\Delta\rho$
20 (07/09/2010 20:00) -----	2.468 % $\Delta\rho$

XENON WORTH CALCULATOR

Revision 3 Change 0

<u>Hours After Trip (Date/Time)</u>	<u>Xenon Worth</u>
21 (07/09/2010 21:00) -----	2.350 % $\Delta\rho$
22 (07/09/2010 22:00) -----	2.235 % $\Delta\rho$
23 (07/09/2010 23:00) -----	2.122 % $\Delta\rho$
24 (07/10/2010 00:00) -----	2.012 % $\Delta\rho$
25 (07/10/2010 01:00) -----	1.905 % $\Delta\rho$
26 (07/10/2010 02:00) -----	1.802 % $\Delta\rho$
27 (07/10/2010 03:00) -----	1.703 % $\Delta\rho$
28 (07/10/2010 04:00) -----	1.608 % $\Delta\rho$
29 (07/10/2010 05:00) -----	1.517 % $\Delta\rho$
30 (07/10/2010 06:00) -----	1.430 % $\Delta\rho$
31 (07/10/2010 07:00) -----	1.346 % $\Delta\rho$
32 (07/10/2010 08:00) -----	1.267 % $\Delta\rho$
33 (07/10/2010 09:00) -----	1.192 % $\Delta\rho$
34 (07/10/2010 10:00) -----	1.120 % $\Delta\rho$
35 (07/10/2010 11:00) -----	1.052 % $\Delta\rho$
36 (07/10/2010 12:00) -----	0.987 % $\Delta\rho$
37 (07/10/2010 13:00) -----	0.926 % $\Delta\rho$
38 (07/10/2010 14:00) -----	0.868 % $\Delta\rho$
39 (07/10/2010 15:00) -----	0.814 % $\Delta\rho$
40 (07/10/2010 16:00) -----	0.762 % $\Delta\rho$
41 (07/10/2010 17:00) -----	0.714 % $\Delta\rho$
42 (07/10/2010 18:00) -----	0.668 % $\Delta\rho$
43 (07/10/2010 19:00) -----	0.625 % $\Delta\rho$
44 (07/10/2010 20:00) -----	0.584 % $\Delta\rho$

XENON WORTH CALCULATOR

Revision 3 Change 0

<u>Hours After Trip (Date/Time)</u>	<u>Xenon Worth</u>
69 (07/11/2010 21:00) -----	0.100 % Δ p
70 (07/11/2010 22:00) -----	0.093 % Δ p
71 (07/11/2010 23:00) -----	0.087 % Δ p
72 (07/12/2010 00:00) -----	0.081 % Δ p
73 (07/12/2010 01:00) -----	0.075 % Δ p
74 (07/12/2010 02:00) -----	0.070 % Δ p
75 (07/12/2010 03:00) -----	0.065 % Δ p
76 (07/12/2010 04:00) -----	0.060 % Δ p
77 (07/12/2010 05:00) -----	0.056 % Δ p
78 (07/12/2010 06:00) -----	0.052 % Δ p
79 (07/12/2010 07:00) -----	0.048 % Δ p
80 (07/12/2010 08:00) -----	0.045 % Δ p
81 (07/12/2010 09:00) -----	0.042 % Δ p
82 (07/12/2010 10:00) -----	0.039 % Δ p
83 (07/12/2010 11:00) -----	0.036 % Δ p
84 (07/12/2010 12:00) -----	0.033 % Δ p

_____/_____
Prepared by

Date

_____/_____
Reviewed by

Date

Estimated Critical Condition

Units 1 & 2
NEOP-302
Revision 0700
Page 27 of 33

Attachment 2, ECC – Four Hour Window With Same Boron

Previous Critical Conditions

Unit	Cycle	Date	Time	Burnup, MWD/MTU
2	18	8/2/10	0000	14,400

Current Conditions

Excess Reactivity, %) Δ [A]	HZP IBW, (ppm/%) Δ [B]	B-10 Correction [C]
9.9375	116.2	0.971

Estimated Critical Conditions

Time Point	Date	Time	Hours After Shutdown	Xenon Worth, %) Δ [D]	Group 3, inches	Group 4, inches	Group 5, inches	CEA Worth, %) Δ [E] (for 0h) or [E] = A-(D+G)	Corrected HZP IBW, ppm/%) Δ [F] = B/C	Boron Worth, %) Δ [G] = A-(D+E)	Critical Boron Conc., ppm [H] = F*G
-2h	8/3/10	0800	32	1.267	135	104.25	14.25	.5410	112.83	8.1367	918
-1h	8/3/10	0900	33	1.192	135	97.5	7.5	.6160	112.83	8.1367	918
0h	8/3/10	1000	34	1.120	135	90	0	.6808	112.83	8.1367	918
+1h	8/3/10	1100	35	1.052	135	78.75	0	.7560	112.83	8.1367	918
+2h	8/3/10	1200	36	0.987	135	67.5	0	.8210	112.83	8.1367	918

ECC Tolerance Band

Time Point	Date	Time	Lower CEA Bound (ECC Worth + 0.5 %) Δ				Upper CEA Bound (ECC Worth - 0.5 %) Δ			
			Bounding Worth	Group 3, inches	Group 4, inches	Group 5, inches	Bounding Worth	Group 3, inches	Group 4, inches	Group 5, inches
-2h	8/4/10	0800	1.0410	30	120	0	.0410	135	135	117.75
-1h	8/4/10	0900	1.1160	24.75	114.75	0	.1160	135	135	104.25
0h	8/4/10	1000	1.1808	19.5	109.5	0	.1808	135	135	91.5
+1h	8/4/10	1100	1.2560	15	105	0	.2560	135	135	68.25
+2h	8/4/10	1200	1.3210	99.75	9.75	0	.3210	135	126	36

Excess Reactivity Source: NEOP-23, Figure 2-II.A.7

B-10 Source: Isotopic sample analysis

Prepared by: _____ / _____

Signature

Date

IBW Source: NEOP-23, Figure 2-II.A.2

CEA Worth Source: NEOP-23, Figure 2-II.B.1

SRO Verification by: _____ / _____

Signature

Date

APPLICANT'S CUE SHEET

Initial Conditions:

1. Unit-2 is in MODE 3 at normal operating temperature and pressure. Current time is 0800.
2. The reactor tripped while performing RPS testing 32 hours ago. Preparations are underway for a quick trip recovery startup to begin within the next 30 minutes with criticality anticipated in 2 hours at 10am.
3. The following conditions exist:
 - a. Unit-2 tripped from 100% power 32 hours ago.
 - b. Power history: Prior to the trip, Unit-2 operated at 100% for the previous 68 days.
 - c. Burnup from the plant computer point "CEBURNUP" is 14,400 MWD/MTU.
 - d. Nuclear Fuels has provided a Xenon Worth Calculation and a B-10 Correction factor of 0.971.
4. An ECC has been prepared by an extra licensed operator.

Initiating Cue:

The Shift Manager has directed you to Verify the Estimated Critical Concentration calculation per NEOP-302, Estimated Critical Condition, Step 6.1.23. Do not verify the ± 1 hr or the ± 2 hr values. Do not verify the ECC tolerance band values. Are there any questions? You may begin.

2010 NRC
INITIAL LICENSED
OPERATOR EXAM
JPM #: SRO-Admin-3

Facility: **Calvert Cliffs 1 & 2**

Job Performance Measure No.: **SRO-Admin-3**

Task Title: **Monitor Azimuthal Power Tilt (Tq) using Excore Nuclear Instrumentation**

Task Number: **204.129**

K/A Reference: **2.2.42 (3.9, 4.6)**

Method of testing:

Simulated Performance: ☐

Actual Performance: ☒

Classroom: ☒

Simulator: ☐

Plant: ☐

READ TO THE APPLICANT:

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

Initial Conditions:

- 1. Unit-1 power was recently reduced to 70% power to facilitate repairs to 11 SGFP.**
- 2. CEAs are currently inserted to 108 inches on Group 5.**
- 3. Channel "D" LRNI is out of service for maintenance. T.S. LCOs 3.3.1.A and 3.3.1.D have been entered.**
- 4. The plant computer has "crashed" and is inoperable.**
- 5. Last "good" values for F_{xyT} and F_{rT} were:**
 - a. $F_{xyT} = 1.72$**
 - b. $F_{rT} = 1.64$**
- 6. You are performing the duties of the STA.**
- 7. NI Readings are as follows:**

Channel	Lower	Upper
A	69.9	70.9
B	67.3	68.3
C	68.7	69.7
D	0	0

Initiating Cue:

AOP-7H, LOSS OF PLANT COMPUTER, has been implemented and the Shift Manager directs you to determine the Azimuthal Power Tilt (Tq) using the excore NIs per Section IV.E. Are there any questions? You may begin.

Task Standard:

This JPM is complete when calculated azimuthal power tilt (Tq) is determined to be outside acceptable limits with T.S. component appropriately addressed. No further actions are required.

Evaluation Criteria:

1. All critical steps completed (denoted by shading).
2. All sequential steps completed in order.
3. All time-critical steps (denoted by an asterisk) completed within allotted time.
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made.

Required Materials:

1. Procedures and manuals normally available in the plant

General References:

1. AOP-7H, Loss of Plant Computer in Mode One or Two.
2. T.S. 3.2.4 Azimuthal Power Tilt – Tq
3. Unit-1, Cycle 19, Core Operating Limits Report

Time Critical Task:

No

Validation Time:

20 minutes

Simulator Setup:

_____ 1. None

ELEMENT

STANDARD

(* = CRITICAL STEP)

Time Start: _____	
CUE: CRS directs you to determine the Azimuthal Power Tilt (Tq) using the excore NIs per Section IV.E.	
<input type="checkbox"/> Locates AOP-7H, Section IV.E. - IF Greater than 50% Rated Thermal Power, Monitor Tq.	Same as element.
<input type="checkbox"/> 1. Calculate upper AND lower Tq using ANY of the following:	
<input type="checkbox"/> IF ALL four Linear Power Channels are operable, THEN perform EITHER of the following:	Determines Step is N/A
NOTE to Evaluator: If Opscalc is used then steps under a are critical, if Manual Calc is performed then step under b is critical.	
CUE: Opscalc is available to use	
<p>OR</p> <p style="text-align: center;"><u>NOTE</u></p> <p>A total of 3 upper and 3 lower Linear detectors are required to be operable. The failed detectors can be on different channels.</p> <p><input type="checkbox"/> *IF only 3 Linear Power Channels are operable AND Reactor Power is less than 75%,THEN perform EITHER of the following:</p>	Determines Step is applicable
<input type="checkbox"/> a. Calculate Tq using Opscalc function Tq Calculator.	
<input type="checkbox"/> Record the readings on ATTACHMENT (5), Tq CALCULATION USING EXCORE DETECTORS	Records NI values on Attachment 5
<input type="checkbox"/> Selects "Ops Calc" icon	Same as element.
<input type="checkbox"/> Selects "Reactor" from menu bar	Same as element.

ELEMENT
(* = CRITICAL STEP)

STANDARD

<input type="checkbox"/> Selects "1/2 Tq Calculation" from drop down menu	Same as element.
<input type="checkbox"/> Enters data and selects "Calculate"	Enters data from Attachment 5. Calculates Upper Tq .03013 Calculates Lower Tq .02970
CUE: Manual Calc is acceptable	
<input type="checkbox"/> b. Calculate Tq using the method in ATTACHMENT 5), Tq CALCULATION USING EXCORE DETECTORS	
<input type="checkbox"/> Record the readings on ATTACHMENT (5), Tq CALCULATION USING EXCORE DETECTORS	Records Readings on Attachment 5 and performs calculations per formula on Attachment 5 Calculates Upper Tq .03013 Calculates Lower Tq .02970
OR <input type="checkbox"/> • Notify the Reactor Engineering Work Group to provide an alternate method to monitor Tq.	Determines Step is N/A
CUE:	
<input type="checkbox"/> 2. Once every 12 hours, recalculate the Azimuthal Power Tilt using the Excore Detectors PER Step E.1, Page 11.	Determines step is N/A at this time OR Informs CRO to add note to Shift Turnover
<input type="checkbox"/> 3. IF Tq is greater than 0.03, THEN perform the following actions:	Determines Tq is greater than 0.03
NOTE The Reactor Engineering Work Group will determine what actions are necessary to correct Tq. <input type="checkbox"/> a. Notify the Reactor Engineering Work Group and GS-NPO of actual Tq.	

<p style="text-align: center;">NOTE</p> <p>If Tq is greater than 0.10, a two hour action applies.</p> <p><input type="checkbox"/> *b. Enter the following Technical Specifications as applicable:</p>	<p>Determines Tq is less than .10</p>
<p><input type="checkbox"/> 3.2.2 Total Planar Radial Peaking Factor - Fxy T</p>	<p>Determines T.S. 3.2.2 limits have not been exceeded per COLR Figure 3.2.2. Verifies CEAs are withdrawn to or above the Long Term Steady State Insertion Limits of Figure 3.1.6</p>
<p><input type="checkbox"/> 3.2.3 Total Integrated Radial Peaking Factor – FrT</p>	<p>Determines T.S. 3.2.3 limits have not been exceeded per COLR Figure 3.2.3.</p>
<p><input type="checkbox"/> 3.2.4 Azimuthal Power Tilt - Tq</p>	<p>Determines T.S. LCO 3.2.4.A is applicable</p>
<p><input type="checkbox"/> c. Record Fxy T and FrT on ATTACHMENT (3), VERIFICATION OF FxyT AND FrT.</p>	

Terminating Cue: This JPM is complete when calculated azimuthal power tilt (Tq) is determined to be outside acceptable limits with T.S. component appropriately addressed. No further actions are required.

Time Stop: _____

Verification of CompletionJob Performance Measure Number: **SRO-Admin-3**

Applicant: _____

NRC Examiner: _____

Date Performed: _____

Facility Evaluator: _____

Number of Attempts: _____

Time to Complete: _____

Follow up Question: _____

Applicant Response: _____

Result: SAT _____ UNSAT _____

Examiner's Signature and Date: _____

APPLICANT'S CUE SHEET

Initial Conditions:

1. Unit-1 power was recently reduced to 70% power to facilitate repairs to 11 SGFP.
2. CEAs are currently inserted to 108 inches on Group 5.
3. Channel "D" LRNI is out of service for maintenance. T.S. LCOs 3.3.1.A and 3.3.1.D have been entered.
4. The plant computer has "crashed" and is inoperable.
5. Last good values for F_{xyT} and F_{rT} :
 - a. $F_{xyT} = 1.72$
 - b. $F_{rT} = 1.64$
6. You are performing the duties of the STA.
7. NI Readings are as follows:

Channel	Lower	Upper
A	69.9	70.9
B	67.3	68.3
C	68.7	69.7
D	0	0

Initiating Cue:

AOP-7H, LOSS OF PLANT COMPUTER, has been implemented and the Shift Manager directs you to determine the Azimuthal Power Tilt (Tq) using the excore NIs per Section IV.E. Are there any questions? You may begin.

2010 NRC

INITIAL LICENSED

OPERATOR EXAM

JPM #: SRO-Admin-4

Facility: **Calvert Cliffs 1 & 2**

Job Performance Measure No.: **SRO-Admin-4**

Task Title: **Approve a Liquid Waste Discharge Permit**

Task Number: **064.040**

K/A Reference: **2.3.6 (2.0, 3.8)**

Method of testing:

Simulated Performance: ☐

Actual Performance: ☒

Classroom: ☒

Simulator: ☐

Plant: ☐

READ TO THE APPLICANT:

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

Initial Conditions:

- 1) Unit-1 is in Mode 3 with 11A and 13B Waterboxes removed from service for cleaning**
- 2) Unit-2 is at 88% power with 21A Waterbox removed from service for cleaning**
- 3) 12 RCWMT discharge has been risk assessed and is on the schedule for today.**
- 4) You are performing the duties of the CRS.**

Initiating Cue:

The Shift Chemistry Technician has delivered a permit for the discharge of 12 RCWMT for your review and approval. Are there any questions? You may begin.

Task Standard:

This JPM is complete when the candidate rejects the permit because the required numbers of Circulating Water Pumps are not operating and RMS values are inconsistent. No further actions are required.

Evaluation Criteria:

1. All critical steps completed (denoted by shading).
2. All sequential steps completed in order.
3. All time-critical steps (denoted by an asterisk) completed within allotted time.
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made.

Required Materials:

1. Procedures and manuals normally available in the plant

General References:

1. CP-601, Liquid Radioactive Waste Release Permit

Time Critical Task:

No

Validation Time:

20 minutes

Simulator Setup:

1. None

ELEMENT
(* = CRITICAL STEP)

STANDARD

Time Start: _____

CUE: Provide the candidate the prepared copy of CP-601, Attachment 2 (12 RCWMT Discharge Permit)

<input type="checkbox"/> Release Criteria is understood:	Same as element.
<input type="checkbox"/> Discharge Point	Determines Unit 1 is checked.
<input type="checkbox"/> Min # Circ Water Pumps Required	Determines 5 CW Pps are required
<input type="checkbox"/> Dilution Flow Rate Pre-Release:	Determines 1,000,000 GPM is consistent with 5 CW Pps running
<input type="checkbox"/> Maximum Release Flow Rate: 120 GPM	
<input type="checkbox"/> RMS Number: 0-RE-2201	
CUE: If checked, RMS reads as stated on permit.	
<input type="checkbox"/> RMS Background:	Checks RMS reading for agreement with permit value
<input type="checkbox"/> Expected RMS Reading:	Notes value is above RMS background
<input type="checkbox"/> Adjustable Setpoint:	Notes that Adjustable Setpoint is lower then Expected Reading
Note to Evaluator: Candidate may determine permit criteria not met when reviewing Min # of Circ Water Pumps required.	
<input type="checkbox"/> Required plant configuration for conducting release has been established	Determines Unit 1 has only 4 CW Pps running and does not meet permit conditions
<input type="checkbox"/> Chemistry Tech discussed permit with SRO/SM.	Informs Chemistry Tech of mistakes found on permit and does not approve permit.

Terminating Cue: This JPM is complete when the candidate rejects the permit because the required numbers of Circulating Water Pumps are not operating and RMS values are inconsistent. No further actions are required. The evaluator is expected to end the JPM.

Time Stop: _____

Verification of CompletionJob Performance Measure Number: **SRO-Admin-4**

Applicant: _____

NRC Examiner: _____

Date Performed: _____

Facility Evaluator: _____

Number of Attempts: _____

Time to Complete: _____

Follow up Question: _____

Applicant Response: _____

Result: SAT _____ UNSAT _____

Examiner's Signature and Date: _____



LIQUID RADIOACTIVE WASTE RELEASE PERMIT

CP 601
Rev. 01403
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CHEMISTRY

ATTACHMENT 2

12 RCWMT

LIQUID RADIOACTIVE WASTE BATCH RELEASE PERMIT

PERMIT #: 90110

Recirc Start Date/Time:	8/4/2010 0127	Pre-Release Gamma Scan#:	310100
Release Source Level:	27.1 feet	Release Volume:	2.362E5 liters

RELEASE CRITERIA

Discharge Point:	Unit 1 <input checked="" type="checkbox"/> Unit 2 <input type="checkbox"/>	Min # Circ Water Pumps Required:	5
Dilution Flow Rate Pre-Release:	1EG		gpm
Maximum Release Flow Rate:	120		gpm
RMS Number:	0-RE-2201		
RMS Background:	28,000		cpm
Expected RMS Reading:	227,055		cpm
Adjustable Setpoint:	225,668		cpm

APPROVAL (Release Criteria is within ODCM Requirements)

Independent Verification for Calculations:	JF Jaeger		
Prepared By:	Flavato		
Compositor Setup	JF Jaeger	Date/Time	8/4/2010 1936
Compositor Setup Peer Check By:	Flavato	Date/Time	8/4/2010 1940
SCO Approval:	WP Burrey	Date/Time	8/4/2010 2000
Release Criteria is understood, Plant Systems are in operation, Required plant configuration for conducting release has been established. Chemistry Tech discussed permit with SRO/SM.			
SM/CRS:		Date/Time	
If discharging RCWMT, tank has been flushed thru 0-RI-2201, and response reported to Chemistry. RMS Pre-Op checks have been completed and release criteria reviewed.			
Correct Setpoints entered in computer and Peer Checked.			
CRO:		Date/Time	
Independent Verification of Alarm Setpoints			
CRO:		Date/Time	

RELEASE DATA

Release Start Date/Time:	Chemistry Informed	Initial Level:	feet
Release End Date/Time:	Chemistry Informed	Final Level:	feet
RMS Reading Near Start of Discharge	cpm	Time:	
RMS Reading at Midpoint of Discharge	cpm	Time:	
RMS Reading Near End of Discharge	cpm	Time:	
Background Count Rate 0-RE-2201 During DI Flush cpm			
# Circ Water Pps Operating During Release:		# Saltwater Pps Operating During Release:	

POST RELEASE DATA AND REVIEW

PERMIT COMPLETE. Release Criteria and Discharge Procedure Requirements Satisfied.	
CRO:	
Post Release Gamma Scan #:	Post Release Volume: liters
Post Release Dilution Flow Rate: gpm	Sample Composited (init/date):
Independent Verification for Calculations:	
Permit Closed Out (sign/date):	SCO Approval/Date:

APPLICANT'S CUE SHEET

Initial Conditions:

- 1) Unit-1 is in Mode 3 with 11A and 13B Waterboxes removed from service for cleaning
- 2) Unit-2 is at 88% power with 21A Waterbox removed from service for cleaning
- 3) You are performing the duties of the CRS.

Initiating Cue:

The Shift Chemistry Technician has delivered a permit for the discharge of 12 RCWMT for your review and approval. Are there any questions? You may begin.

2010 NRC
INITIAL LICENSED
OPERATOR EXAM
JPM #: SRO-Admin-5

Facility: **Calvert Cliffs 1 & 2**

Job Performance Measure No.: **SRO-Admin-5**

Task Title: **Emergency Response Plan Implementation Procedures for a General Emergency (Time Critical)**

Task Number: **204.101**

204.032

K/A Reference: **2.1.41 (2.9, 4.6)**

Method of testing:

Simulated Performance: ☐

Actual Performance: ☒

Classroom: ☒

Simulator: ☐

Plant: ☐

READ TO THE APPLICANT:

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

Initial Conditions:

- 1. Unit-1 was at 100% power when the letdown line radiation monitor alarmed.**
- 2. RCS sample analysis indicated RCS activity of 650 μ ci/cc Dose Equivalent Iodine.**
- 3. A plant shutdown, to comply with Technical Specification requirements, was begun.**
- 4. At 97% power, 11 SG was diagnosed with a SG tube leak. Pressurizer level was rapidly lowering. A manual trip was initiated due to Pressurizer level <101" and continuing to lower.**
- 5. On the trip, a S/G safety lifted and has not yet reset. During EOP-0, the leaking safety was identified as being on 11 S/G.**
- 6. You are performing the duties of the Shift Manager and have not yet referenced the ERPIP.**

Initiating Cue:

Per EOP-8, you are to determine the appropriate emergency response actions per the ERPIP. Are there any questions? You may begin.

Task Standard:

This JPM is complete when an EAL classification is determined based on given plant conditions, initial notification form completed, and Protection Action Recommendation is completed.

Evaluation Criteria:

1. All critical steps completed (denoted by shading).
2. All sequential steps completed in order.
3. All time-critical steps (denoted by an asterisk) completed within allotted time.
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made.

Required Materials:

1. Procedures and manuals normally available in the plant

General References:

ERPIP 3.0, Immediate Actions

Time critical task:

Yes

Validation Time:

10 minutes

Simulator Setup:

Not required

ELEMENT
(* = CRITICAL STEP)

STANDARD

Time Start: _____	
<input type="checkbox"/> Locate ERPIP 3.0	Same as element
<input type="checkbox"/> Refers to Immediate Actions, identifies the category from the listing and goes to the appropriate Attachment.	Determines ATTACHMENT 2 is applicable
ATTACHMENT 2, EMERGENCY CLASSIFICATION	
<input type="checkbox"/> A. CLASSIFY the Event	
<input type="checkbox"/> 1. WHEN an event is in progress potentially requiring emergency response, THEN CONDUCT the following actions in parallel:	
<input type="checkbox"/> a. DETERMINE if existing conditions warrant implementation of one of emergency response attachments: <ul style="list-style-type: none"> • Personnel Emergency, Att 15 • Fire, Att 16,17,18 • Radiological Event, Att 19 • Severe Weather, Att 20,21 • Hazardous Material Release, Att 22 • Containment Evacuation, Att 23 • Security, Att 24 • Large Area Loss, Att 25 • Large Steam Leak, Att 26 • Extensive Damage Mitigation Guidelines, Att 27 • S/G Level Monitoring During Extensive Damage Mitigation, Att 28 	May determines a Radiological Event exists
NOTE to Evaluator: 15 minute clock starts when Candidate determine criteria is met for a GE. TIME: _____	

ELEMENT
(* = CRITICAL STEP)

STANDARD

<p><input type="checkbox"/> b. EVALUATE the existing conditions against Attachment 1, Emergency Action Level (EAL) Criteria, to determine if an EAL threshold has been met.</p>	<p>Determines a GENERAL EMERGENCY classification is warranted under FISSION PRODUCT BARRIER DEGRADATION, based on a loss of all 3 barriers-H.G.5.1.4</p> <p><u>Fuel Clad Barrier</u>- Coolant activity is > 600 $\mu\text{Ci/cc}$ DEQ I-131</p> <p><u>RCS Barrier</u>- SGTR > available charging pump capacity.</p> <p><u>Containment Barrier</u>- Ruptured SG is also faulted outside of containment</p>
<p>CUE: U-2 CRS will handle Attachment 19 for a Radiological Event</p>	
<p><input type="checkbox"/> B. IMPLEMENT Emergency Response Actions</p> <p><input type="checkbox"/> 1. IF existing conditions warrant implementation of an emergency response attachment, in parallel, THEN GO TO that attachment AND begin response actions.</p>	<p>Determines that U-2 CRS will handle the Radiological Event attachment.</p>
<p><input type="checkbox"/> 2. IF an EAL condition is met, THEN OBTAIN an Attachment 3, Initial Notification Form, AND GO TO the appropriate EAL Declaration attachment:</p> <ul style="list-style-type: none"> • General Emergency Actions, Att 4 • Site Area Emergency Actions, Att 9 • Alert Actions, Att 11 • Unusual Event Actions, Att 13 	<p>Determines from previous evaluation that an EAL is satisfied and obtains an Initial Notification form. Identifies General Emergency Actions as the appropriate declaration attachment and goes to Attachment 4.</p>
<p>CUE: Candidate commences actions per Attachment 4, General Emergency</p>	
<p><input type="checkbox"/> A.1 COMPLETE Attachment 3, Initial Notification Form.</p>	<p>Refers to Attachment 3, Initial Notification Form.</p>
<p>NOTE TO EVALUATOR: Page 2 of ATTACHMENT 3 contains instructions for completing the form and may or may not be referred to as the Candidate completes page 1.</p>	
<p>CUE: Candidate completes Attachment 3 Initial Notification Form, following instructions provided on the back of the form</p>	
<p><input type="checkbox"/> 1. Emergency Director (ED) completes items A.1 through A.7. Items not mentioned are self-explanatory.</p>	<p>Determines that items A.1. through A.7 must be completed.</p>

ELEMENT
(* = CRITICAL STEP)

STANDARD

<input type="checkbox"/> a. Item A4: Retrieve this information from the EAL chart in ERPIP-3.0, Immediate Actions, Attachment 1, Emergency Action Level Criteria	Enters H.G.5.1.4 on Attachment 3.
CUE: SG BD RMS showed rising trends prior to blowdown being isolated. The Main Steam Effluent Radiation Monitor for 11 S/G continues to increase and currently reads 3.2E-4 mr/hr. Blowdown was going overboard prior to the event.	
<input type="checkbox"/> b. Item A5: Radioactivity is being released if there is a breach in the RCS barrier OR a rise in indication occurs on any of the following effluent monitors as a result of the event: <ul style="list-style-type: none"> • WRNMG (RIC-5415) [MCC-114 / MCC-204 P-panels] • Main steam Effluent (RI-5421, [1/2Y01]) (RI-5422 [1/2Y02]) • Main Vent (RI-5415) [1Y10, 2Y10] • Waste Processing (RI-5410) [1Y10] • Fuel Handling Area Vent (RI-5420) • Access Control Area Vent (RI-5425) [1Y10] • ECCS PP Room Vent (RI-5406) [1Y10, 2Y10] • Liquid Waste Disch (RE-2201) [1Y10] • SGBD Recovery (RI-4095) [MCC-103 / MCC203 P-panel] • SGBD Tank (RI-4014) [1Y09, 2Y09] 	Determines that radioactivity is being released.
<input type="checkbox"/> c. Item A5a: Radioactivity release is unmonitored if the release bypasses all of the above effluent monitors, such as a containment breach to the outside atmosphere, or an RWT rupture to a storm drain.	Determines release is monitored since S/G safety valve lifting is being monitored by the MSLRM.

ELEMENT
(* = CRITICAL STEP)

STANDARD

<p><input type="checkbox"/> d. Item A6: IF General Emergency is checked in Item 3, THEN DETERMINE appropriate Protective Action Recommendation and PAZs from ERPIP 3.0, Attachment 5, General Emergency Protective Action Recommendations, AND CHECK corresponding box (check one box only). IF General Emergency is not checked in Item 3, THEN CHECK "None." IF downgrading from General Emergency, THEN CHECK "None."</p>	<p>Determines that Protective Action Recommendations are necessary and refers to Attachment 5.</p>
<p><input type="checkbox"/> 2. ED completes items in Section B.</p>	<p>Determines items in Section B must be completed.</p>
<p><input type="checkbox"/> a. IF ERO has already been notified, THEN check "N/A."</p>	<p>Determines step is not required, leaves box unchecked, and proceeds to Step 2.b.</p>
<p><input type="checkbox"/> b. CHOOSE Notification message from list in Section B.</p>	<p>Identifies: Drill General Emergency Staff Normal Emergency Response Facilities.</p>
<p><input type="checkbox"/> c. ED must sign form.</p>	<p>Signs Attachment 3 after Section B is completed.</p>
<p>Attachment 3; Page-1 Section -A</p>	
<p>___ 1. Complete Item A1.</p>	<p>Checks "is" a drill</p>
<p>___ 2. *Complete Item A2.</p>	<p>Checks "Unit 1"</p>
<p>___ 3. *Complete Item A3.</p>	<p>Checks "General Emergency"</p>
<p>___ 4. *Complete Item A4.</p>	<p>Enters "H.G.5.1.4"</p>
<p>___ 5. *Complete Item A5.</p>	<p>Checks "Yes"</p>
<p>___ 5a. Complete Item A5a.</p>	<p>Checks "Yes"</p>
<p>___ 5b. Complete Item A5b.</p>	<p>Checks "Airborne"</p>

ELEMENT
(* = CRITICAL STEP)

STANDARD

Note to Evaluator: Attachment 5 should be referenced to complete Item 6.

ATTACHMENT 5 GENERAL EMERGENCY PROTECTIVE ACTION
RECOMMENDATIONS

☐ A. SELECT A PROTECTIVE ACTION
RECOMMENDATION

1.0 **IF** a controlled release of radioactive material from containment is to be commenced in less than 2 hours **AND** there is assurance that the release will be a short term puff release lasting no more than 2 hours:

Determines step is N/A.

NOTE: **If using the meteorological data screen (DRDT), then the DIR “60” indication is to be used for a release from the main vent. The “DIR 10” indication will be used for any other release. If using a backup meteorological data source, then the direction the wind is “from” is to be used.**

CUE: When DRDT screen checked, DIR10 is 90° and DIR60 is 80°.

☐ 1.1 When DRDT screen checked, DIR10 is 90° and DIR60 is 80°.

Determines step is applicable

☐ If “From” wind direction is between 168.75-303.75, then:

Determines recommendation is N/A due to DIR10.

☐ If “From” wind direction is between 303.75-33.75, then:

Determines recommendation is N/A due to DIR10.

☐ If “From” wind direction is between 33.75-56.25, then:

Determines recommendation is N/A due to DIR10.

☐ * If “From” wind direction is between 56.25-168.75, then Evacuate PAZ 1 & 2 unless conditions make evacuation dangerous, notify the public in PAZ 1 & 2 to take KI, shelter remainder of the 10 mile EPZ.

Determines recommendation is applicable using DIR10. Selects “Evacuate PAZ 1 & 2 unless conditions make evacuation dangerous, notify the public in PAZ 1 & 2 to take KI, shelter remainder of the 10 mile EPZ.”

ELEMENT
(* = CRITICAL STEP)

STANDARD

ATTACHMENT 3, Page 1, Section A

☐ * 6. Complete Item A6.

Checks "d"

☐ *7. Complete Item A7.

Completes A.7 only after items 1 through 6 are completed, and within 15 minutes of determining an EAL is met.

ATTACHMENT 3, Page 1, Section B

☐ B. Complete Section B.

Selects blocks for:
Drill
General Emergency
Staff Normal Emergency Response
Facilities.
Prints name and signs (only after
Section A is completed)

Terminating Cue: This JPM is complete when an EAL classification is determined based on given plant conditions, the Initial Notification Form is completed, and a Protection Action Recommendation is completed. No further actions are required.

Time Stop: _____

Verification of CompletionJob Performance Measure Number: SRO-ADMIN-5

Applicant: _____

NRC Examiner: _____

Date Performed: _____

Facility Evaluator: _____

Number of Attempts: _____

Time to Complete: _____

Follow up Question: _____

Applicant Response: _____

Result: SAT _____ UNSAT _____

Examiner's Signature and Date: _____

APPLICANT'S CUE SHEET

Initial Conditions:

1. Unit-1 was at 100% power when the letdown line radiation monitor alarmed.
2. RCS sample analysis indicated RCS activity of 650 $\mu\text{ci/cc}$ Dose Equivalent Iodine¹³¹.
3. A plant shutdown, to comply with Technical Specification requirement, was begun.
4. At 97% power, 11 SG was diagnosed with a SG tube leak. Pressurizer level was rapidly lowering. A manual trip was initiated due to Pressurizer level <101" and continuing to lower.
5. On the trip, a S/G safety lifted and has not yet reset. During EOP-0, the leaking safety was identified as being on 11 S/G.
6. You are performing the duties of the Shift Manager and have not yet referenced the ERPIP.

Initiating Cue:

Per EOP-8, you are to determine the appropriate emergency response actions per the ERPIP. Are there any questions? You may begin.

2010 NRC
INITIAL LICENSED
OPERATOR EXAM

JPM #: Sim-1

Facility: **Calvert Cliffs 1 & 2**

Job Performance Measure No.: **Sim-1 (Alt Path)**

Task Title: **Respond to CEA(s) Misaligned by 15" or more**

Task Number: **202.008**

K/A Reference: **001 A2.11 (4.4, 4.7)**

Method of testing:

Simulated Performance: ☐

Actual Performance: ☒

Classroom: ☐

Simulator: ☒

Plant: ☐

READ TO THE APPLICANT:

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

Initial Conditions:

- 1. Unit 1 is in Mode 1 at 100% power.**
- 2. STP O-29-1, MONTHLY CEA PARTIAL MOVEMENT TEST, was in progress. When CEA 01 was being exercised, it became misaligned from its group.**
- 3. AOP-1B has been implemented and all stabilizing actions have been performed.**
- 4. You are performing the duties of the Unit 1 RO.**
- 5. You have been assigned the trip criteria of 'If Any CEAs continue to move without operator action, then trip the Reactor.'**

Initiating Cue:

The CRS directs you to realign CEA 01 per AOP-1B step VI.B. Are there any questions? You may begin.

Task Standard:

This JPM is complete when the reactor is manually tripped due to 2 dropped CEAs.

Evaluation Criteria:

1. All critical steps completed (denoted by shading).
2. All sequential steps completed in order.
3. All time-critical steps (denoted by an asterisk) completed within allotted time.
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made.

Required Materials:

1. Procedures and manuals normally available in the plant

General References:

1. AOP-1B, CEA Malfunction

Time Critical Task:

No

Validation Time:

20 minutes

Simulator Setup:

- _____ 1. Reset to IC-24 (both units at 100%)
- _____ 2. Enter Triggers:
 - _____ a. CEA #01 on bottom; **T1**:ceds_cea01
- _____ 3. Enter malfunctions:
 - _____ a. Dropped CEA #01; ceds012_1 on **F1**
 - _____ b. Dropped CEA #64; ceds012_64 on **F2**
- _____ 4. Place CEA #01 in desired condition:
 - _____ a. Manually insert CEA #01 to 110" withdrawn.
 - _____ b. Place CEDS control panel in OFF
 - _____ c. Place the Group 5 inhibit Bypass to OFF
 - _____ d. Select Group 4 and the individual CEA button for CEA #35
 - _____ e. Allow plant to stabilize.

ELEMENT
(* = CRITICAL STEP)

STANDARD

Time Start: _____	
CUE: The CRS directs you to realign CEA 01 per AOP-1B step VI.B.	
<input type="checkbox"/> Locates AOP-1B, Section VI.B	Same as element.
<input type="checkbox"/> 1. IF at any time the CEA is realigned, THEN perform the subsequent actions in Section IV., PRELIMINARY, Step B, Page 16.	Determines step is currently N/A
CUE: CEA alignment time expires in 45 minutes.	
<input type="checkbox"/> 2. IF the CEA alignment time has expired, THEN PROCEED to Step B.4, Page 24.	Determines step is N/A
CAUTION: CEA movement should be minimized until the cause of the misalignment has been determined.	
CUE: The electric shop discovered and replaced a faulty power supply during the troubleshooting. The CRS directs you to continue the procedure.	
CUE: The CRS has directed the CRO to maintain power level no higher than the present level via boration.	
<input type="checkbox"/> 3. Attempt to realign the affected CEA(s):	Same as element
<input type="checkbox"/> a. Maintain Reactor Power as required by: <ul style="list-style-type: none"> • <u>Boration PER OI-2B, CVCS BORATION, DILUTION AND MAKEUP OPERATIONS.</u> OR <ul style="list-style-type: none"> • Adjust Regulating CEAs. 	Determines CRO will maintain power with no action necessary on his part
<input type="checkbox"/> b. Select the desired group.	Selects Group 5
<input type="checkbox"/> c. Select the desired CEA.	Selects CEA 01
<input type="checkbox"/> d. elect Manual Individual Mode.	Same as element
<input type="checkbox"/> e. IF CMI is in effect, THEN override CMI as follows:	Determines CMI is in effect
NOTE: CMI will be bypassed to the affected group and applied to all other groups, and CMI bypass annunciation will alarm.	

ELEMENT
(* = CRITICAL STEP)

STANDARD

<input type="checkbox"/> (1) Depress the Group Inhibit Bypass pushbutton.	Same as element
<input type="checkbox"/> (2) Depress and hold the Motion Inhibit Bypass pushbutton for at least 5 seconds before AND 5 seconds after CEA motion.	Same as element
CAUTION: Do NOT allow Reactor Power to rise above the power the unit was stabilized at in Section IV. <u>PRELIMINARY</u>, Step A.2, while the CEA is being realigned. Turbine load shall NOT be raised until the CEA is within its alignment requirements.	
f. Realign the CEA.	
<input type="checkbox"/> 1. IF the CEA must be withdrawn, THEN withdraw the CEA using the "Pull and Wait" method: <input type="checkbox"/> For shutdown CEA's, pull 3.75 inches and wait 10 seconds <input type="checkbox"/> For regulating CEAs, pull 5.25 inches and wait 15 seconds	Determines S/D CEA rates are N/A. Determines Regulating CEA rates are appropriate. Commences recovery of CEA using the shim stick on 1C05. (Pull no more than 6.75" on CEA #01 each time CEA is withdrawn).
<input type="checkbox"/> 2. IF the CEA must be inserted, THEN insert the CEA.	Determines step is N/A
NOTE TO EVALUATOR: The intent of the JPM going forward is for the student to recognize that a Rx trip is required when two CEAs become misaligned by >15" per Step V.A.1.	
CUE: Cue the Booth Operator to initiate F1 to drop the two CEAs into the core when either CEA 01 is within 7.5 inches of its respective group OR when cued by the Evaluator.	
1C05 alarms DROPPED CEA PI, PRIMARY PPDIL, PRIMARY PDIL, SECONDARY PPDIL, SECONDARY PDIL, and the CEA deviation alarms annunciate	Candidate secures attempts to withdraw CEA. Observes alarms. Reviews the 1C05 indications and determines that two CEAs have fallen into the core, using CEAPDS and the CEA mimic display.
<input type="checkbox"/> Locates AOP-1B, Section V	Same as element
<input type="checkbox"/> 1. IF two or more CEAs are misaligned from the other CEAs in their respective group by greater than 15 inches, THEN perform the following actions:	Determines 2 CEAs have dropped.

ELEMENT

STANDARD

(* = CRITICAL STEP)

CUE: If the candidate recommends tripping the reactor to the CRS, Acknowledge and Direct the RO to trip the reactor and implement EOP-0.

☐ a. Trip the Reactor

Depresses the two manual reactor trip buttons on 1C05.

☐ b. Implement EOP-0, Post Trip Immediate Actions

No action required

Terminating Cue: This JPM is complete when the manual reactor trip PB's are depressed. No further actions are required. The evaluator is expected to end the JPM.

Time Stop: _____

Verification of CompletionJob Performance Measure Number: Sim-1

Applicant: _____

NRC Examiner: _____

Date Performed: _____

Facility Evaluator: _____

Number of Attempts: _____

Time to Complete: _____

Follow up Question: _____

Applicant Response: _____

Result: SAT _____ UNSAT _____

Examiner's Signature and Date: _____

APPLICANT'S CUE SHEET

Initial Conditions:

- 1) Unit 1 is in Mode 1 at 100% power.
- 2) STP O-29-1, MONTHLY CEA PARTIAL MOVEMENT TEST, was in progress. When CEA 01 was being exercised, it became misaligned from its group.
- 3) AOP-1B has been implemented and all stabilizing actions have been performed.
- 4) You are performing the duties of the Unit-1 RO.
- 5) You have been assigned the trip criteria of 'If Any CEAs continue to move without operator action, then trip the Reactor.'

Initiating Cue:

The CRS directs you to realign CEA 01 per AOP-1B step VI.B. Are there any questions? You may begin.

2010 NRC
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OPERATOR EXAM
JPM #: Sim-2

Facility: **Calvert Cliffs 1 & 2**

Job Performance Measure No.: **Sim-2**

Task Title: **Restart RCPs**

Task Number: **201.028**

K/A Reference: **022 A4.01 (3.6, 3.6)**

Method of testing:

Simulated Performance: ☐

Actual Performance: ☒

Classroom: ☐

Simulator: ☒

Plant: ☐

READ TO THE APPLICANT:

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

Initial Conditions:

- 1. Unit-1 is shut down for a short maintenance outage.**
- 2. The Unit is expected to be maintained in Mode 3 per OP-4.**
- 3. A short time ago RCP Feeder Breaker, 252-1201, tripped.**
- 4. AOP-3E has been implemented.**
- 5. The cause of the tripped breaker was determined to be personnel error. There is no common mode failure. RCP Feeder Breaker, 252-1201, has been reclosed.**
- 6. It has been determined that no RCP CBO temperatures exceeded 250 °F.**
- 7. You are performing the duties of the Unit 1 RO.**

Initiating Cue:

The CRS has directed you to start Reactor Coolant Pumps per AOP-3E Step IV.I.5. Are there any questions? You may begin.

Task Standard:

This JPM is complete when 11A and 11B RCPs have been started. No further actions are necessary

Evaluation Criteria:

1. All critical steps completed (denoted by shading).
2. All sequential steps completed in order.
3. All time-critical steps (denoted by an asterisk) completed within allotted time.
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made.

Required Materials:

1. Procedures and manuals normally available in the plant

General References:

1. AOP-3E- LOSS OF ALL RCP FLOW, MODES 3, 4, OR 5

Time Critical Task:

No

Validation Time:

15 minutes

Simulator Setup:

- ____ 1. IC-11
- ____ 2. Cool down to approximately 520 °F Tc.
- ____ 3. Place TBV controller in Auto with a setpoint of 810#
- ____ 4. Freeze simulator.

ELEMENT
(* = CRITICAL STEP)

STANDARD

Time Start: _____	
<input type="checkbox"/> Locate AOP-3E, Step IV.I.5	Same as element.
CUE: T_{COLD} indicates approx 520 °F	
<input type="checkbox"/> 5. Reduce T _{COLD} to less than 525 °F using the ADVs or TBVs	Checks loop T _{COLD} indications (1C06) and/or average T _{COLD} (1C05).
CUE: PZR level indicates 160 inches	
<input type="checkbox"/> 6. Raise PZR level to between 155 and 170 inches.	Checks in-service PZR level control channel (1C06)
CUE: T_{COLD} indicates approx 520 °F	
<input type="checkbox"/> 7. IF T _{COLD} is less than 369 °F, THEN perform the following:	Checks loop T _{COLD} indications (1C06) and/or average T _{COLD} (1C05). Determines step is N/A
CUE: RCP restart criteria are met	
<input type="checkbox"/> 8. Verify that ALL of the following RCP restart criteria are met:	
<input type="checkbox"/> Verify electrical power is available to the RCPs <input type="checkbox"/> RCP BUS <input type="checkbox"/> MCC-115 (ALL RCPs) <input type="checkbox"/> MCC-105 (11A/11B RCP)	Checks 12 SERV BUS VOLTS ~13.8KV Checks lights for 12A/B RCP Oil Lift Pps on or contacts ABO to verify Checks lights for 11A/B RCP Oil Lift Pps on or contacts ABO to verify
<input type="checkbox"/> 12/22 SERV BUS VOLTS is less than 14.8 KV	Checks 12 SERV BUS VOLTS (1C20)
<input type="checkbox"/> 4KV bus voltage is greater than 4100 volts	Checks 11,12,13,14,15/16 4KV bus volts (1C17,18,19)
<input type="checkbox"/> RCP CBO temperatures are less than 200 °F	Checks CBO temps on the plant computer
<input type="checkbox"/> RCS subcooling is greater than 30 °F based on CET temperatures	Checks CET SCM indicators (1C05)

ELEMENT
(* = CRITICAL STEP)

STANDARD

<ul style="list-style-type: none"> <input type="checkbox"/> At least ONE S/G available for heat removal <input type="checkbox"/> S/G level greater than (-)170 inches <input type="checkbox"/> capable of being supplied with feedwater <input type="checkbox"/> capable of being steamed 	<p>Checks S/G levels (1C03)</p> <p>Checks Main or Aux Feedwater in operation and feeding S/G (1C03/1C04)</p> <p>Checks ADVs or TBVs in operation (1C03) and controlling RCS temp (1C06)</p>
<ul style="list-style-type: none"> <input type="checkbox"/> PZR level is greater than 155 inches and NOT lowering 	<p>Checks PZR level on in-service level control channel or PZR level recorder (1C06).</p>
<ul style="list-style-type: none"> <input type="checkbox"/> T_{COLD} is less than 525 °F 	<p>Checks loop T_c indications (1C06) and or average T^{COLD} (1C05)</p>
<ul style="list-style-type: none"> <input type="checkbox"/> RCS temperature and pressure are greater than the minimum operating limits PER Attachment (1), RCP PRESSURE / TEMPERATURE LIMITS of the EOP ATTACHMENTS. 	<p>Refers to EOP Attachment (1)</p>
<p style="text-align: center;"><u>NOTE</u></p> <p>If 11 RCS loop is available, then a RCP in that RCS loop should be started to restore Main Spray capability.</p> <p style="text-align: center;"><u>NOTE</u></p> <p>The second RCP in the same loop should be started within 5 minutes of starting the first RCP. This should be done due to the NPSH requirements for two RCPs in the same loop being less restrictive than NPSH requirements for single RCP operation.</p>	<p>Determines 11A & B RCPs will be started first.</p>
<p>9. WHEN RCP restart is desired, AND RCP restart criteria are met, THEN start one RCP in a loop with a SG available for heat removal as follows:</p>	
<ul style="list-style-type: none"> <input type="checkbox"/> a. On 1C07, verify that the RCP BLEED-OFF ISOL valves are open: <ul style="list-style-type: none"> <input type="checkbox"/> 1-CVC-505-CV <input type="checkbox"/> 1-CVC-506-CV 	<p>Same as element</p>

ELEMENT
(* = CRITICAL STEP)

STANDARD

CUE: "CCW FLOW LO" alarms are clear on all RCPs

- ☐ b. Verify that the "CCW FLOW LO" alarm is clear.

Checks alarm on 11A RCP alarm panel (1C07)

CUE: 11A RCP Oil Lift Pp indicates running

- ☐ c. Start the associated Oil Lift Pump.

Places HS for 11A RCP to Start and checks Oil Lift Pp running

CUE: "OIL LIFT PP PRESS LO" alarm is clear

- ☐ d. Verify that the "OIL LIFT PP PRESS LO" alarm is cleared.

Checks RCP alarm on 11A RCP alarm panel (1C07)

CUE: Oil Lift Pp has been operating for 60 seconds

- ☐ e. Operate the Oil Lift Pump for at least 60 seconds before starting the RCP.

Same as element

- ☐ f. Insert the RCP sync stick.

Inserts Sync Stick in HS for 252-11P02

CUE: Synchroscope is not rotating

- ☐ g. On panel 1C19, verify that the synchroscope is **NOT** rotating.

Same as element

CUE: 11A RCP is running with normal starting amps indicated

CAUTION

Starting an RCP may cause a Pressurizer level transient. The potential for a pressure transient exists if an RCP is started in a loop in which no S/G is available for heat removal.

- ☐ h. Start the RCP.

Places HS for 11A RCP to start and check lights and motor amps

CUE: 11A RCP running motor amps are steady at the normal operating value

- ☐ i. Verify that the RCP is NOT cavitating by observing that running current is steady.

Checks motor amps at RCP HS

CUE: CVCS is operating to restore PZR level to 160 inches

- ☐ 10. Operate Charging and Letdown to restore and maintain PZR level between 101 and 180 inches.

Checks in-service PZR level control channel, on 1C06. Checks L/D flow and Chg Pps are consistent restoration of PZR level.

ELEMENT
(* = CRITICAL STEP)

STANDARD

CUE: 11A RCP seal pressures indicate normal seal operation

- | | |
|----------------------------------------------------------------------------------|------------------------------------------------------------------|
| <input type="checkbox"/> 11. Monitor RCP seal parameters following pump restart. | Checks 11A RCP Middle and Upper seal pressure indicators on 1C06 |
|----------------------------------------------------------------------------------|------------------------------------------------------------------|

CUE: Loop temperatures are equalized

- | | |
|--------------------------------------------------------------------------------------------|--------------------------------------------|
| <input type="checkbox"/> 12. Allow backflow to equalize temperatures in the opposite loop. | Checks loop temperature indicators on 1C06 |
|--------------------------------------------------------------------------------------------|--------------------------------------------|

13. Start a second RCP in the same loop by performing the following actions:

CUE: RCP parameters meet NPSH requirements for starting a second RCP

- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <input type="checkbox"/> a. Ensure RCP NPSH requirements are maintained PER ATTACHMENT (1), RCP PRESSURE / TEMPERATURE LIMITS of the EOP ATTACHMENTS. | Refers to EOP Attachment (1) |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|

- | | |
|------------------------------------------------------------------------|------------------------|
| <input type="checkbox"/> b. Start an RCP PER Step I.9, Page 21. | Refers back to Step 9. |
|------------------------------------------------------------------------|------------------------|

9. **WHEN** RCP restart is desired, **AND** RCP restart criteria are met, **THEN** start one RCP in a loop with a SG available for heat removal as follows:

CUE: CVC 505 & 506 indicate open

- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <input type="checkbox"/> a. On 1C07, verify that the RCP BLEED-OFF ISOL valves are open: <div style="margin-left: 20px;"> <input type="checkbox"/> 1-CVC-505-CV
 <input type="checkbox"/> 1-CVC-506-CV </div> | Same as element |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|

CUE: "CCW FLOW LO" alarms are clear on all RCPs

- | | |
|---------------------------------------------------------------------------|-----------------------------------|
| <input type="checkbox"/> b. Verify that the "CCW FLOW LO" alarm is clear. | Checks 11B RCP alarm panel (1C07) |
|---------------------------------------------------------------------------|-----------------------------------|

CUE: 11B RCP Oil Lift Pp indicates running

- | | |
|-----------------------------------------------------------------|------------------------------------------------------------------|
| <input type="checkbox"/> c. Start the associated Oil Lift Pump. | Places HS for 11B RCP Oil Lift Pp to Start and checks Pp running |
|-----------------------------------------------------------------|------------------------------------------------------------------|

ELEMENT
(* = CRITICAL STEP)

STANDARD

CUE: "OIL LIFT PP PRESS LO" alarm is clear

- ☐ d. Verify that the "OIL LIFT PP PRESS LO" alarm is cleared.

Checks 11B RCP alarm panel (1C07)

CUE: Oil Lift Pp has been operating for 60 seconds

- ☐ e. Operate the Oil Lift Pump for at least 60 seconds before starting the RCP.

Same as element

- ☐ f. Insert the RCP sync stick.

Inserts Sync Stick in HS for 252-13P02

CUE: Synchroscope is not rotating

- ☐ g. On panel 1C19, verify that the synchroscope is **NOT** rotating.

Same as element

CUE: 11B RCP is running with normal starting amps indicated

CAUTION

Starting an RCP may cause a Pressurizer level transient. The potential for a pressure transient exists if an RCP is started in a loop in which no S/G is available for heat removal.

- ☐ h. Start the RCP.

Places HS for 11B RCP to start and check lights and motor amps

CUE: 11B RCP running motor amps are normal

- ☐ i. Verify that the RCP is **NOT** cavitating by observing that running current is steady.

Checks motor amps at RCP HS

CUE: 11B RCP seal pressure indicate normal seal operation

- ☐ 13.c. Monitor RCP seal parameters following pump restart.

Checks 11A RCP Middle and Upper seal pressure indicators on 1C06

Terminating Cue: This JPM is complete when 11A and 11B RCPs have been started.

Time Stop _____

Verification of CompletionJob Performance Measure Number: **Sim-2**

Applicant: _____

NRC Examiner: _____

Date Performed: _____

Facility Evaluator: _____

Number of Attempts: _____

Time to Complete: _____

Follow up Question: _____

Applicant Response: _____

Result: SAT _____ UNSAT _____

Examiner's Signature and Date: _____

APPLICANT'S CUE SHEET

Initial Conditions:

- 1) Unit-1 is shut down for a short maintenance outage.
- 2) The Unit is expected to be maintained in Mode 3 per OP-4.
- 3) A short time ago RCP Feeder Breaker, 252-1201, tripped.
- 4) AOP-3E has been implemented.
- 5) The cause of the tripped breaker was determined to be personnel error. There is no common mode failure. RCP Feeder Breaker, 252-1201, has been reclosed.
- 6) It has been determined that no RCP CBO temperatures exceeded 250 °F.
- 7) You are performing the duties of the Unit 1 RO.

Initiating Cue:

The CRS has directed you to start Reactor Coolant Pumps per AOP-3E Step IV.I.5. Are there any questions? You may begin.

2010 NRC
INITIAL LICENSED
OPERATOR EXAM
JPM #: Sim-3

Facility: **Calvert Cliffs 1 & 2**

Job Performance Measure No.: **Sim-3 (Alt Path)**

Task Title: **Monitor RCS Depressurization**

Task Number: **201.059**

K/A Reference: **013 A4.01 (4.5, 4.8)**

Method of testing:

Simulated Performance: ☐

Actual Performance: ☒

Classroom: ☐

Simulator: ☒

Plant: ☐

READ TO THE APPLICANT:

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

Initial Conditions:

- 1. A LOCA occurred on Unit-1 20 minutes ago.**
- 2. SIAS has automatically initiated.**
- 3. EOP-5 has been implemented.**
- 4. RCS pressure has lowered to 600 – 700 PSIA.**
- 5. You are performing the duties of the Unit-1 CRO.**

Initiating Cue:

The CRS directs you to perform EOP-5, Block Step D, Monitor RCS Depressurization. Are there any questions? You may begin.

Task Standard:

This JPM is complete when 12 HPSI Pump has been started and HPSI flows have been compared to RCS pressure to verify adequate safety injection system operation.

Evaluation Criteria:

1. All critical steps completed (denoted by shading).
2. All sequential steps completed in order.
3. All time-critical steps (denoted by an asterisk) completed within allotted time.
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made.

Required Materials:

1. Procedures and manuals normally available in the plant

General References:

1. EOP-5
2. EOP Attachment (10)

Time critical task:

No

Validation Time:

20 minutes

Simulator Setup:

- _____ 1. IC-24, both units at 100% power
- _____ 2. Insert Malfunction RCS 002 at 10,000 gpm
- _____ 3. Run simulator until reactor trips.
- _____ 4. Trip RCPs and allow RCS pressure to stabilize at approximately 600 - 700 PSIA.
- _____ 5. Start 13 AFW Pp
- _____ 6. Insert Malfunction SI002_03, 13 HPSI PP Breaker failure
- _____ 7. Throttle 11 HPSI PP Discharge valve, 1-SI-428, to obtain a flow of 400 – 500 GPM (approximately .15 turns open).
- _____ 8. Insert trigger attached to 12 HPSI PP start, SI_12HPSI, to open 11 HPSI Discharge valve, 1-SI-428, to .35 turns open

ELEMENT
(* = CRITICAL STEP)

STANDARD

Time Start: _____

☐ Identifies and locates EOP-5, Block Step "D"

Same as element

CUE: When checked,

- **RCS pressure is 600 - 700 PSIA**
- **Actuation SYS SIAS TRIPPED ALARM (G-5) is in.**

☐ 1. **IF** Pressurizer pressure is less than or equal to 1725 PSIA **OR** containment pressure is greater than 2.8 PSIG, **THEN** verify SIAS actuation.

Verifies SIAS Alarm in, HPSI PP running and HPSI Header Valves open. May note 13 HPSI PP failure at this time.

☐ 2. **IF** Pressurizer pressure is greater than 1725 PSIA **AND** containment pressure is less than 2.8 PSIG

Determines step is N/A.

☐ 3. **IF** SIAS has actuated, **THEN** perform the following actions:

Determines step is applicable

CUE: When checked, 11 HPSI Pump; 11 and 12 LPSI Pumps; and 11, 12, and 13 CHG Pps are operating. 13 HPSI Pump did not start.

a. Verify the following pumps are running:

- ☐ 11 HPSI PP
- ☐ 13 HPSI PP

Checks 11 HPSI Pp running at 1C08
Determines 13 HPSI PP failed to start. May note "U-1 4KV ESF MOTOR OVERLOAD" alarm on 1C18

- ☐ 11 LPSI PP
- ☐ 12 LPSI PP

Checks both LPSI Pumps running at 1C08 and 1C09

- ☐ ALL available Charging PPs

Checks all 3 Charging Pumps running at 1C07.

b. Verify safety injection flow:

CUE: When checked: Total HPSI flow is ~ 500 GPM (totals from FI-311, 321, 331 & 341) or per 1-FI-351, at 1C09, reads ~ 500 GPM.

- ☐ **HPSI flow PER ATTACHMENT (10), HIGH PRESSURE SAFETY INJECTION FLOW, when pressure is below 1270 PSIA.**

Refers to Att (10) and determines HPSI flow should be ~ 600 GPM. Attempts to verify HPSI flow using FIs-311/321/331/341 or FI-351. Determines HPSI flow is insufficient.

ELEMENT
(* = CRITICAL STEP)

STANDARD

Alternate Actions begin

NOTE TO EVALUATOR:

It is anticipated the candidate will start 12 HPSI PP due to the failure of 13 HPSI PP to start. However, the procedure leaves room for possible determination that 11 HPSI has failed due to less than adequate flow. The candidate **MUST** start 12 HPSI to complete the critical element. If candidate chooses to start 12 HPSI due to the failure of 11 HPSI he will complete the first asterisked element. If candidate chooses to start 12 HPSI due to the failure of 13 HPSI he will complete the second, third and fourth asterisked elements.

NOTE TO EVALUATOR:

An alternative to unthrottling 11 HPSI discharge, to ensure 2 PP curves on ATT (10) is met when 12 HPSI is started would, be to trip 11 HPSI

CUE: When 12 HPSI PP is started HPSI flow will slowly raise to meet requirements of Attachment (10) for 2 HPSI Pumps running. (Cue Booth Operator to open 11 HPSI Pump Discharge valve, 1-SI-428, simultaneous with the start of 12 HPSI Pump)

b.1 Perform the following actions as necessary:

☐ If 11 HPSI PP failed, then start 12 HPSI PP

Determines step is N/A
OR
Starts 12 HPSI PP due to failure of 11 HPSI PP

☐ If 13 HPSI PP failed, Then align 12 HPSI PP as follows:

Determines step is applicable

☐ Start 12 HPSI PP

Determines step is N/A
OR
Starts 12 HPSI PP due to failure of 13 HPSI PP

☐ Open HPSI HDR XCONN valve, 1-SI-653-MOV

Same as element

☐ Shut HPSI HDR XCONN valve, 1-SI-655-MOV

Same as element

Alternate Actions complete

☐ HPSI flow **PER ATTACHMENT (10), HIGH PRESSURE SAFETY INJECTION FLOW**, when pressure is below 1270 PSIA.

Refers to Attachment (10) and determines HPSI flow should be ~ 1200 GPM for 2 HPSI operation. Notes HPSI flow meets requirements of ATT (10) by totaling header flows using FIs-311/321/331/341 or FI-351.

ELEMENT
(* = CRITICAL STEP)

STANDARD

☐ LPSI flow **PER** ATTACHMENT (11),
LOW PRESSURE SAFETY INJECTION
FLOW, when pressure is below 185 PSIA.

Determines step is N/A

Terminating Cue: This JPM is complete when 12 HPSI Pump has been started and HPSI flows have been compared to RCS pressure to verify adequate safety injection system operation.

Time Stop: _____

Verification of CompletionJob Performance Measure Number: **Sim-3**

Applicant: _____

NRC Examiner: _____

Date Performed: _____

Facility Evaluator: _____

Number of Attempts: _____

Time to Complete: _____

Follow up Question: _____

Applicant Response: _____

Result: SAT _____ UNSAT _____

Examiner's Signature and Date: _____

APPLICANT'S CUE SHEET

Initial Conditions:

- a. A LOCA occurred on Unit-1 20 minutes ago.
- b. SIAS has automatically initiated.
- c. EOP-5 has been implemented.
- d. RCS pressure has lowered to 600 - 700 PSIA.
- e. You are performing the duties of the Unit-1 CRO.

Initiating Cue:

The CRS directs you to perform EOP-5, Block Step D, Monitor RCS Depressurization.
Are there any questions? You may begin.

2010 NRC
INITIAL LICENSED
OPERATOR EXAM
JPM #: Sim-4

Facility: **Calvert Cliffs 1 & 2**

Job Performance Measure No.: **Sim-4 (Alt Path)**

Task Title: **Respond to RCS leakage exceeding one Charging Pump, Modes 1 and 2**

Task Number: **202.015**

K/A Reference: **004 K1.15 (3.8, 4.0)**

Method of testing:

Simulated Performance: ☐

Actual Performance: ☒

Classroom: ☐

Simulator: ☒

Plant: ☐

READ TO THE APPLICANT:

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

Initial Conditions:

- 1. Unit 1 is at 100% power and operating with steady state conditions.**
- 2. Pressurizer level begins to steadily lower and the backup charging pumps automatically start.**
- 3. Pressurizer level is still slowly lowering.**
- 4. You are performing the duties of the Unit 1 CRO.**

Initiating Cue:

The CRS directs you to perform Steps VI.B thru VI.E of AOP-2A. Are there any questions? You may begin.

Task Standard:

This JPM is complete when AOP-2A Block Steps VI.B thru VI.E are completed. No further actions are required.

Evaluation Criteria:

1. All critical steps completed (denoted by shading).
2. All sequential steps completed in order.
3. All time-critical steps (denoted by an asterisk) completed within allotted time.
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made.

Required Materials:

1. Procedures and manuals normally available in the plant

General References:

1. AOP-2A, Excessive Reactor Coolant Leakage

Time Critical Task:

No

Validation Time:

20 minutes

Simulator Setup:

- _____ 1. IC-24, 100%.
- _____ 2. Insert malfunction CVCS 020 (Charging header break inside Containment) with a value of 22.5%.
- _____ 3. Run simulator until the second backup charging pump starts. Lower leak size to ~5% so that PZR level is still lowering, but charging header pressure is > RCS pressure. Ensure both Pressurizer Level channels indicate greater than a 15 inch deviation from program level.
- _____ 4. Makeup to VCT to ensure level is high in the band when the simulator is taken out of freeze.
- _____ 5. Shut 1-CVC-183 when requested.

ELEMENT
(* = CRITICAL STEP)

STANDARD

Time Start: _____	
<input type="checkbox"/> Locate AOP-2A, Section VI.	Same as element
B. Verify the event is not challenging RPS	
CUE: The RO will be responsible for monitoring for trip criteria.	
<input type="checkbox"/> B.1 IF, at ANY time, PZR pressure reaches the TM/LP pretrip setpoint, THEN, with the permission of the SM/CRS, perform the following actions:	Determines RO will be assigned to monitor trip criteria
C. Control Pressurizer Level	
CUE: When checked, Pressurizer level is slowly lowering.	
<input type="checkbox"/> C.1 Verify that Charging Pumps are maintaining PZR level within 15 inches of programmed level.	Monitors Pressurizer level (LI-110X-1 and LI-110Y-1 and/or LR-110, on 1C06). Notes that Pressurizer level is slowly lowering with all backup charging pumps running.
CUE: When checked, CVC-515 and CVC-516 indicate shut.	
<input type="checkbox"/> C.1.1 IF PZR level is NOT being maintained by ALL available Charging Pumps, THEN shut the L/D CNTMT ISOL valves: <input type="checkbox"/> 1-CVC-515-CV <input type="checkbox"/> 1-CVC-516-CV	Same as element
CUE: RO will initiate makeup to VCT if (as) required. (Cue Booth Operator to initiate makeup to VCT if necessary).	
<input type="checkbox"/> C.1.2 Makeup to the VCT to maintain level as necessary.	Determines no action required at this time.
D. Check for a S/G Tube Leak	
CUE: Condenser Off Gas, S/G B/D & Main Steam Line Rad Monitors all indicate normal readings. Preliminary check of S/G samples indicate no tube leakage. S/G levels are normal.	

ELEMENT
(* = CRITICAL STEP)

STANDARD

<input type="checkbox"/> D.1 Determine if a SG Tube Leak exists by observing a rise in ANY of the following: <ul style="list-style-type: none"> <input type="checkbox"/> SG sample activities <input type="checkbox"/> Condenser Off-Gas radiation levels at 1-RI-1752 <input type="checkbox"/> SG Blowdown radiation levels at 1-RI-4095 or 1-RI-4014 <input type="checkbox"/> MAIN STEAM EFFL RAD MONITOR radiation levels at 1-RIC-5421 or 1-RIC-5422 <input type="checkbox"/> MAIN STM N-16 RAD MONITOR levels at 1-RIC-5421A or 1-RIC-5422A <input type="checkbox"/> SG water level (Unexplained) <input type="checkbox"/> Feed flow mismatch 	<p>Monitors RI-1752, RI-4014 and/or RI-4095 on 1C22, and RIC-5421 and 5422, on 2C24B. Monitors LIA-1105 and LIA-1106 and/or LR-1111 and LR-1121, on 1C03. Chemistry acknowledges samples requested.</p>
<input type="checkbox"/> D.2 IF a SG Tube Leak is indicated, THEN perform the following actions:	<p>Determines step is N/A</p>
<p>E. Attempt to Isolate the Leak</p>	
<input type="checkbox"/> E.1 Verify that the L/D CNTMT ISOL valves are shut: <ul style="list-style-type: none"> <input type="checkbox"/> 1-CVC-515-CV <input type="checkbox"/> 1-CVC-516-CV 	<p>Same as element</p>
<p>CUE: When checked, Quench Tank parameters, discharge piping temperatures and acoustic monitor indications are normal.</p>	
<input type="checkbox"/> E.2 Check there is NO PORV leakage by the following indications: <ul style="list-style-type: none"> <input type="checkbox"/> Quench Tank Parameters <input type="checkbox"/> PORV discharge piping temperatures, computer points T107 and T108 <input type="checkbox"/> Acoustic Monitor indication 	<p>Monitors Quench Tank parameters (LIA-116, PA-116 and PA-116A and TIA-116, on 1C06). Monitors computer point T107 and T108. Monitors acoustic monitor indication.</p>
<p>CUE: When checked, PS-5464 indicates shut.</p>	
<input type="checkbox"/> E.3 Verify that RCS SAMPLE ISOL valve, 1-PS-5464-CV, is shut.	<p>Same as element</p>

ELEMENT
(* = CRITICAL STEP)

STANDARD

CUE: When checked, RC-103 and RC-104 indicate shut.	
<input type="checkbox"/> E.4 Verify that the Reactor Vessel Vent valves are shut: <input type="checkbox"/> 1-RC-103-SV <input type="checkbox"/> 1-RC-104-SV	Same as element
CUE: When checked, RC-105 and RC-106 indicate shut.	
<input type="checkbox"/> E.5 Verify that the Reactor Vessel Vent valves are shut: <input type="checkbox"/> 1-RC-105-SV <input type="checkbox"/> 1-RC-106-SV	Same as element
<p style="text-align: center;"><u>NOTE:</u></p> <p>A leak on the Charging header which exceeds the capacity of the charging pumps can be identified by Charging header pressure indicating less than RCS pressure. Identification of the leak may be missed if more than one charging pump is running.</p>	
CUE: When checked, charging header pressure is ~ 650 PSIG with one charging pump, ~1850 PSIG (2 charging pumps running) or 2280 PSIG (3 charging pumps running).	
<input type="checkbox"/> E.6 Determine if the leak is on the Charging header by performing the following actions:	
<input type="checkbox"/> a. Stop all but ONE CHG PP.	Same as element
<input type="checkbox"/> b. IF Charging header pressure is less than RCS Pressure, THEN assume the leak is on the Charging header.	Determines charging header pressure is less than RCS pressure, verifies leak is on the charging header.
<input type="checkbox"/> c. IF the leak is NOT on the Charging header, THEN start any CHG PPs that were stopped.	Determines step is N/A
CUE: When checked, charging header pressure is 1700 PSIG (2 charging pumps running) or 2280 PSIG (3 charging pumps running).	
<input type="checkbox"/> E.7 IF the leak is on the Charging header, THEN perform the following actions:	Determines step is applicable
<input type="checkbox"/> a. Place all Chg Pps in Pull To Lock.	Same as element

ELEMENT
(* = CRITICAL STEP)

STANDARD

<input type="checkbox"/> b. Dispatch an operator to determine the location of the leak.	Dispatches an operator to determine the location of the leak.
NOTE: CHG PP HDR XCONN, 1-CVC-182, is located near 12 Charging Pump.	
CUE: ABO reports no leakage in CHG PP Room. RadCon reports video surveillance indicates no abnormal leakage anywhere in the Aux Building.	
<input type="checkbox"/> c. IF the leak is upstream of CHG PP HDR XCONN, 1-CVC-182, THEN shut 1-CVC-182, AND start 12 or 13 CHG PP as required.	Determines leak is downstream of 1-CVC-182 and this step is N/A.
<input type="checkbox"/> d. IF the leak is downstream of 1-CVC-182, THEN align Charging to the Auxiliary HPSI Header:	Determines step is applicable
CUE: When checked, 1-CVC-517, 518 and 519 indicate shut.	
<input type="checkbox"/> (1) Verify that the following valves are shut:	
<input type="checkbox"/> AUX SPRAY valve, 1-CVC-517-CV	Same as element
<input type="checkbox"/> 1-CVC-518-CV <input type="checkbox"/> 1-CVC-519-CV	Same as element
NOTE: The Auxiliary HPSI Header is out of service and T.S. 3.5.2 applies when 1-SI-656-MOV is shut.	
CUE: The CRS will handle all TS entries. When checked, SI-656 indicates shut.	
<input type="checkbox"/> (2) Shut the HPSI AUX HDR ISOL valve, 1-SI-656-MOV:	Same as element
CUE: Selected valve indicates open.	
<input type="checkbox"/> (3) Open ONE of the following AUX HPSI HDR valves: <input type="checkbox"/> 1-SI-617-MOV <input type="checkbox"/> 1-SI-627-MOV <input type="checkbox"/> 1-SI-637-MOV <input type="checkbox"/> 1-SI-647-MOV	Same as element

ELEMENT
(* = CRITICAL STEP)

STANDARD

CUE: When checked, 1-CVC-269 indicates open.	
<input type="checkbox"/> (4) Open the SI TO CHG HDR valve, 1-CVC-269-MOV.	Obtains key from locker & opens 1-CVC-269-MOV
<u>NOTE:</u> REGEN HX CHG INLET, 1-CVC-183, is located in the 27 foot West Penetration Room.	
<u>CAUTION:</u> When a Charging Pump is started, Reactor power will lower due to the concentration of Boric Acid in the Auxiliary HPSI header being 2300 PPM or greater.	
CUE: ABO reports no leakage in either the 5' or 27' West Penetration rooms, concurring with RadCons earlier report. Containment parameters clearly indicate the leak is inside containment. When dispatched, ABO reports 1-CVC-183 is shut. (Cue booth operator to shut 1-CVC-183)	
<input type="checkbox"/> (5) IF the leak is downstream of the REGEN HX CHG INLET valve, 1-CVC-183, THEN shut 1-CVC-183, AND start any available CHG PP.	Determines leak is downstream of CVC-183. Dispatches ABO to shut CVC-183.
<input type="checkbox"/> (6) IF the leak is upstream of 1-CVC-183,	Determines step is N/A
CUE: CRS will review LCO actions	
<input type="checkbox"/> (7) Declare the Auxiliary HPSI Header out of service and refer to T.S. 3.5.2 <u>ECCS-Operating</u> .	Informs CRS of need to refer to T.S 3.5.2
<u>NOTE:</u> If charging via the Auxiliary HPSI header, the Reactor power reduction will result in an initial PZR level reduction.	
CUE: When checked, Pressurizer level is lowering as is Tcold and generator output (due to boron just injected from SI line.	
NOTE TO EVALUATOR: Cue the booth operator to lower turbine load and restore T_{COLD} to program as necessary. Once turbine load is being reduced, PZR level starts to rise.	
<input type="checkbox"/> e. Verify charging flow by observing a rise in PZR level.	Determines that PZR level is lowering due to boron addition from SI line. When turbine load is being reduced, determines PZR level is increasing.
CUE: When checked, Containment humidity, sump level alarm frequency, Containment gaseous and particulate activity has risen. WRNGM and Main Vent Gaseous alarms are clear.	

ELEMENT
(* = CRITICAL STEP)

STANDARD

<input type="checkbox"/> E.8 IF the leak is determined to be occurring inside Containment by checking the following indications:	Monitors TI-5309 and 5311, on 1C10. Monitors PI-5308, on 1C10. Monitor MI-5310 and 5312, on 1C10. Monitors sump level alarm frequency.
<input type="checkbox"/> Rise in Containment temperature, pressure, humidity or sump level alarm frequency	Determines leak is in Containment.
<input type="checkbox"/> Rise in Containment gaseous or particulate activity	Monitors RI-5281 and 5280, on 1C22.
<input type="checkbox"/> "U-1 WR NOBLE GAS RAD MON" and "UNIT 1 MAIN VENT GASEOUS" alarms clear	Monitors window J8, on 1C10 and RI-5415, on 1C22.
<input type="checkbox"/> THEN perform the following actions:	
CUE: All available Containment air coolers are running in high.	
<input type="checkbox"/> a. Start ALL available CNTMT AIR CLR's in HIGH.	Starts all available Containment air coolers in high.
CUE: When checked, all CNTMT CLR EMR OUT valves indicate open.	
<input type="checkbox"/> b. Open the CNTMT CLR EMER OUT valves for the operating CNTMT AIR CLR's.	Same as element
<input type="checkbox"/> E.9 IF the leak is NOT occurring inside of Containment,	Determines step is N/A
CUE: RI-3819 indicates normal.	
<input type="checkbox"/> E.10 Determine that NO leakage into the Component Cooling System is indicated by:	
<input type="checkbox"/> NO rising trends on Component Cooling Radiation Monitor, 1-RI-3819.	Monitors RI-3819, on 1C22.
<input type="checkbox"/> "CC HEAD TK LEVEL" high alarm clear	Determines there is no leak into the CC system.

Terminating Cue: This JPM is complete when AOP-2A Block Steps VI.B thru VI.E are completed. No further actions are required.

Time Stop: _____

Verification of Completion

Job Performance Measure Number: **Sim-4 (Alt Path)**

Applicant: _____

NRC Examiner: _____

Date Performed: _____

Facility Evaluator: _____

Number of Attempts: _____

Time to Complete: _____

Follow up Question: _____

Applicant Response: _____

Result: SAT _____ UNSAT _____

Examiner's Signature and Date: _____

APPLICANT'S CUE SHEET

Initial Conditions:

1. Unit 1 is at 100% power and operating with steady state conditions.
2. Pressurizer level begins to steadily lower and the backup charging pumps automatically start.
3. Pressurizer level is still slowly lowering.
4. You are performing the duties of the Unit-1 CRO.

Initiating Cue:

The CRS directs you to perform Block Steps VI.B thru VI.E of AOP-2A. Are there any questions? You may begin.

2010 NRC
INITIAL LICENSED
OPERATOR EXAM
JPM #: Sim-5

Facility: **Calvert Cliffs 1 & 2**

Job Performance Measure No.: **Sim-5 (Alt Path)**

Task Title: **Verify the Containment Environment Safety Function is satisfied**

Task Number: **201.016**

K/A Reference: **022 A3.01 (4.1, 4.3)**

Method of testing:

Simulated Performance: ☐

Actual Performance: ☒

Classroom: ☐

Simulator: ☒

Plant: ☐

READ TO THE APPLICANT:

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

Initial Conditions:

- 1. A transient resulting in a Reactor trip has occurred on Unit-1.**
- 2. EOP-0, Post Trip Immediate Actions, has been implemented.**
- 3. You are performing the duties of the CRO.**

Initiating Cue:

The CRS directs you to verify the Containment Environment Safety Function. Are there any questions? You may begin.

Task Standard:

The JPM is complete when the CRS is informed of the status of the Containment Environment Safety Function. No further actions are required.

Evaluation Criteria:

1. All critical steps completed (denoted by shading).
2. All sequential steps completed in order.
3. All time-critical steps (denoted by an asterisk) completed within allotted time.
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made.

Required Materials:

1. Procedures and manuals normally available in the plant

General References:

1. EOP-0, Post Trip Immediate Actions

Time Critical Task:

No

Validation Time:

20 minutes

Simulator Setup:

- _____ 1. IC-24, Unit 1, 100% power
- _____ 2. Insert the following Malfunctions:
 - _____ a. ESFA001_01
 - _____ b. ESFA001_02
 - _____ c. SIAS auto failure
 - _____ d. RCS001 cold leg rupture
- _____ 3. Run simulator for 2 minutes then freeze.
- _____ 4. Override Containment Narrow Range pressure on 1C10, 1-PI-5308, to 0#.

ELEMENT
(* = CRITICAL STEP)

STANDARD

Time Start: _____

F. VERIFY THE CONTAINMENT ENVIRONMENT SAFETY FUNCTION IS SATISFIED.

CUE: When checked: Containment pressure is 0 PSIG as read on PI-5308 (NR), 35 PSIG as read on both WR indications (PI-5307/5310), and Rx Cavity humidity is 100%.

<input type="checkbox"/> 1. Check containment pressure is less than 0.7 PSIG.	<p>Checks containment pressure indication on 1C09 and determines that containment pressure is greater than 0.7 PSIG based on WR indication. Though not critical, identifies that NR pressure indicator is suspect and makes report to CRS that Alternate Actions are being taken for Containment Environment due to high pressure.</p>
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NOTE TO EVALUATOR:

- The report of "Taking Alternate Actions" can be made at the direction of the candidate but should be reported as soon as practical.
- The candidate may manually initiate SIAS early if it is recognized SIAS has not automatically actuated. Equipment may already be in its desired condition when Containment Environment is checked.

1.1 IF containment pressure exceeds 0.7 PSIG,
THEN perform the following:

CUE: All available Containment Air Coolers are operating.

<input type="checkbox"/> a. Verify ALL available CNTMT AIR CLR's are operating:	<p>Checks all four containment air coolers on 1C09/10 to determine if all available coolers are operating, starts any not running, or may recognize that SIAS failed to initiate and may manually initiate SIAS.</p>
---------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

CUE: All containment cooler emergency outlet valves are open.

<input type="checkbox"/> b. Open the CNTMT CLR EMER OUT valves for the operating CNTMT AIR CLR's.	<p>Checks valve indication on 1C10 and places the valves in open or may recognize that SIAS failed to initiate and may manually initiate SIAS</p>
---------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------

1.2 IF containment pressure exceeds 2.8 PSIG,
THEN verify ESFAS actuation of the following:

ELEMENT
(* = CRITICAL STEP)

STANDARD

CUE: SIAS has NOT actuated. SIAS alarm not actuated, 11 & 13 HPSI pumps are not operating and HPSI header MOVs are shut.	
<input type="checkbox"/> SIAS	Determines that SIAS has failed to actuate.
CUE: After SIAS is manually actuated: SIAS alarm "ACTUATION SYS SIAS TRIPPED" actuated, 11 & 13 HPSI pumps are operating normally, and HPSI header valves are open	
<input type="checkbox"/> Manually initiates SIAS	Channel A & B SIAS manual actuation pushbuttons are depressed on 1C09/10. Checks SIAS alarm "ACTUATION SYS SIAS TRIPPED" has actuated, 11 & 13 HPSI pumps are operating and HPSI header valves are open.
CUE: CIS alarm "ACTUATION SYS CIS TRIPPED" has actuated, CCW isolations to containment are shut.	
<input type="checkbox"/> CIS	Checks CIS alarm "ACTUATION SYS CIS TRIPPED" has actuated and Containment CCW isolation valves are shut.
CUE: RCPs are tripped	
<input type="checkbox"/> 1.3 IF CIS has actuated, THEN trip ALL RCPs.	Trips all RCPs at 1C06.
CUE: CSAS alarm "ACTUATION SYS CSAS TRIPPED" has actuated, Containment Spray pumps are operating normally, spray CVs are open and 1400 GPM of spray flow is indicated.	
<input type="checkbox"/> 1.4 IF containment pressure exceeds 4.25 PSIG, THEN verify CSAS actuation.	Verifies CSAS has actuated by CSAS alarm "ACTUATION SYS CSAS TRIPPED" has actuated, Containment Spray pumps are operating and spray discharge valves are open. Verifies CS flow and that the CBP's are not running.
CUE: All containment temperatures are >235 °F	
<input type="checkbox"/> 2. Check containment temperature is less than 120 °F.	Checks containment temperature indication on 1C09 and determines that temperature is greater than 120 °F.

ELEMENT
(* = CRITICAL STEP)

STANDARD

NOTE TO EVALUATOR: Actions in step F.2.1 may not be performed because these actions were taken earlier in the JPM.

2.1 **IF** containment temperature exceeds 120 °F,
THEN perform the following:

CUE: All available Containment Air Coolers are operating.

- ☐ a. Verify **ALL** available CNTMT AIR CLR
are operating.

Checks all four Containment Air
Coolers on 1C09/10 to determine
that all available coolers are
operating.

CUE: The containment cooler emergency outlet valves are open.

- ☐ b. Open the CNTMT CLR EMER OUT valves
for the operating CNTMT AIR CLR.

Checks valve indication 1C10 to
ensure they are open

CUE: Containment gaseous RMS indicates 7000 CPM and the Particulate RMS reads 3000 CPM. Both are above normal and slowly increasing, though not in alarm. The Containment Hi-Range monitors are indicating normal. The IRUs started if the SIAS was initiated earlier or start if manually started.

- ☐ 3. Check containment radiation monitor alarms are
clear with **NO** unexplained rise.

Verifies alarms clear on 1C10 and
uses indications at 1C22 to identify
that the containment RMS have a
rising trend. Starts IRUs if not
already running. *May take actions
based on temperature affects to the
Cntmt High Range Monitors
depending on interpretation of
Containment RMS*

- ☐ Report status of the Containment Environment
Safety Function to the CRS.

Reports to the CRS that the
Containment Environment Safety
Function **CANNOT BE MET** due to
high containment pressure and
temperature, and rising Containment
RMS indications.

TERMINATING CUE: The JPM is complete when the CRS is informed of the status of the Containment Environment Safety Function. No further actions are required.

Time Stop: _____

Verification of CompletionJob Performance Measure Number: **Sim-5 (Alt Path)**

Applicant: _____

NRC Examiner: _____

Date Performed: _____

Facility Evaluator: _____

Number of Attempts: _____

Time to Complete: _____

Follow up Question: _____

Applicant Response: _____

Result: SAT _____ UNSAT _____

Examiner's Signature and Date: _____

APPLICANT'S CUE SHEET

Initial Conditions:

1. A transient resulting in a Reactor trip has occurred on Unit-1.
2. EOP-0, Post Trip Immediate Actions, has been implemented.
3. You are performing the duties of the CRO.

Initiating Cue:

The CRS directs you to verify the Containment Environment Safety Function. Are there any questions? You may begin.

2010 NRC
INITIAL LICENSED
OPERATOR EXAM
JPM #: Sim-6

Facility: **Calvert Cliffs 1 & 2**

Job Performance Measure No.: **Sim-6**

Task Title: Respond to a Fuel Handling incident in the Containment

Task Number: 202.051

K/A Reference: **036 AA1.01 (3.3, 3.8)**

Method of testing:

Simulated Performance: ☐

Actual Performance: ☒

Classroom: ☐

Simulator: ☒

Plant: ☐

READ TO THE APPLICANT:

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

Initial Conditions:

- 1. Unit-1 is in Mode-6 with refueling operations in progress.**
- 2. The FHS has informed the Control Room, via the RCRO, that a fuel assembly has been dropped in the reactor vessel. The FHS reports there is obvious damage to the fuel assembly.**
- 3. You are performing the duties of an extra licensed operator.**

Initiating Cue:

AOP-6D, FUEL HANDLING INCIDENT has been implemented. The CRS directs you to perform AOP-6D, Step V.A. Are there any questions? You may begin.

Task Standard:

This JPM is complete when the available Penetration Room Exhaust Filter trains have been placed in service. No further actions are required.

Evaluation Criteria:

1. All critical steps completed (denoted by shading).
2. All sequential steps completed in order.
3. All time-critical steps (denoted by an asterisk) completed within allotted time.
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made.

Required Materials:

1. Procedures and manuals normally available in the plant

General References:

1. AOP-6D, FUEL HANDLING INCIDENT

Time Critical Task:

No

Validation Time:

20 minutes

Simulator Setup:

- _____ 1. Reset simulator to IC-5
- _____ 2. Place Containment Purge in operation.
 - _____ a. Open Purge Supply & Exhaust Valves
 - _____ b. Start Purge Exhaust Fan
 - _____ c. Secure 3 Cntmt Clrs, place the fourth in "SLOW"

ELEMENT

STANDARD

(* = CRITICAL STEP)

Time Start: _____	
<input type="checkbox"/> Locate AOP-6D, Section V, Step A.	Same as element
A. Control the Potential for a Radiological Release:	
1. Isolate Containment Purge:	
<input type="checkbox"/> a. Stop 11 CNTMT PURGE SUPPLY and EXH FANS <input type="checkbox"/> 1-HS-5290 <input type="checkbox"/> 1-HS-5289	Places 1-HS-5289 & 5290 in STOP and verifies green lights illuminate
<input type="checkbox"/> b. Close 11 CNTMT PURGE SUPP and EXH valves: <input type="checkbox"/> 1-HS-1410 <input type="checkbox"/> 1-HS-1412	Places 1-HS-1410 & 1412 in CLOSE and verifies red lights extinguish and green lights illuminate
CUE: No Containment Closure Deviations exist.	
2. Restore any Containment Closure Deviations per NO-114, <u>CONTAINMENT CLOSURE</u> .	
CAUTION: Mini-flow requirements for the SRW Pumps is 1700 GPM. Ensure operating SRW Pump differential pressure remains less than 87 PSID	
<input type="checkbox"/> 3. IF the SRW system is aligned for reduced load operation, THEN start a second SRW Pump	Determines step is N/A.
<input type="checkbox"/> 4. Open the CAC EMERGENCY OUT valves on ALL available Containment Air Coolers: <input type="checkbox"/> 11 CAC 1-HS-1582 <input type="checkbox"/> 12 CAC 1-HS-1585 <input type="checkbox"/> 13 CAC 1-HS-1590 <input type="checkbox"/> 14 CAC 1-HS-1593	Places 1-HS-1582, 1585, 1590 and 1593 in OPEN and verifies open indications.
<input type="checkbox"/> 5. Verify SRW flow through all available CACs	Verifies SRW flow increases to all CACs

ELEMENT
(* = CRITICAL STEP)

STANDARD

<input type="checkbox"/> 6. Start ALL available CAC(s) in HIGH speed: <input type="checkbox"/> 11 CAC 1-HS-5299 <input type="checkbox"/> 12 CAC 1-HS-5300 <input type="checkbox"/> 13 CAC 1-HS-5301 <input type="checkbox"/> 14 CAC 1-HS-5302	Places 1-HS-5299, 5300, 5301 and 5302, not running in FAST speed, to FAST and verifies all are running in fast.
<input type="checkbox"/> 7. Start ALL available IODINE FILT FANS: <input type="checkbox"/> 11 FAN 1-HS-5293 <input type="checkbox"/> 12 FAN 1-HS-5295 <input type="checkbox"/> 13 FAN 1-HS-5297	Places 1-HS-5293, 5295 and 5297 in START and verifies running indications.
<input type="checkbox"/> 8. Log the start time of the Iodine Filter Fans	Logs start time for each fan
9. Start the available Penetration Room Exhaust Filter trains:	
<input type="checkbox"/> a. Verify open 11 and 12 Penetration Room FILT ISOL DMPRS <input type="checkbox"/> 11 Damper 1-HS-5285 <input type="checkbox"/> 12 Damper 1-HS-5287	Verifies the Unit-1 Dampers are open
<input type="checkbox"/> b. Start 11 and 12 PENET RM EXH FANS <input type="checkbox"/> 11 Fan 1-HS-5283 <input type="checkbox"/> 12 Fan 1-HS-5284	Places 1-HS-5283 and 5284 in START and verifies running indications.
<input type="checkbox"/> c. Log the start time of the Penetration Room Exhaust Fans.	Logs start time for each fan

Terminating Cue: This JPM is complete when the available Penetration Room Exhaust Filter trains have been placed in service. No further actions are required.

Time Stop: _____

Verification of CompletionJob Performance Measure Number: **Sim-6**

Applicant: _____

NRC Examiner: _____

Date Performed: _____

Facility Evaluator: _____

Number of Attempts: _____

Time to Complete: _____

Follow up Question: _____

Applicant Response: _____

Result: SAT _____ UNSAT _____

Examiner's Signature and Date: _____

APPLICANT'S CUE SHEET

Initial Conditions:

1. Unit-1 is in Mode-6 with refueling operations in progress.
2. The FHS has informed the Control Room, via the RCRO, that a fuel assembly has been dropped in the reactor vessel. The FHS reports there is obvious damage to the fuel assembly.
3. You are performing the duties of an extra licensed operator.

Initiating Cue:

AOP-6D, FUEL HANDLING INCIDENT has been implemented. The CRS directs you to perform AOP-6D, Step V.A. Are there any questions? You may begin.

2010 NRC
INITIAL LICENSED
OPERATOR EXAM
JPM #: Sim-7

Facility: **Calvert Cliffs 1 & 2**

Job Performance Measure No.: **Sim-7 (Alt Path)**

Task Title: **Recovery from Automatic Feedwater Isolation**

Task Number: **201.033**

K/A Reference: **059 A4.11 (3.1, 3.3)**

Method of testing:

Simulated Performance: ☐

Actual Performance: ☒

Classroom: ☐

Simulator: ☒

Plant: ☐

READ TO THE APPLICANT:

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

Initial Conditions:

- 1. A total loss of all feedwater has occurred on Unit 1.**
- 2. The reactor is tripped and EOP-0 is complete.**
- 3. The CRS directed the RCPs be secured and a cooldown started prior to the EOP-3 brief.**
- 4. You are performing the duties of the Unit 1 CRO.**

Initiating Cue:

The CRS directs you to establish natural circulation and cooldown the RCS per EOP-3, Step IV.G. Are there any questions? You may begin.

Task Standard:

This JPM is complete when SGIS is reset and a Condensate Booster Pump is started. No further actions are required.

Evaluation Criteria:

1. All critical steps completed (denoted by shading).
2. All sequential steps completed in order.
3. All time-critical steps (denoted by an asterisk) completed within allotted time.
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made.

Required Materials:

1. Procedures and manuals normally available in the plant

General References:

1. EOP-3, Loss of All Feedwater.

Time Critical Task:

No

Validation Time:

20 minutes

Simulator Setup:

- _____ 1. Reset simulator to IC-24, 100% power
- _____ 2. Insert Malfunctions AFW005, AFW001_01, AFW001_02 for the trip of 13, 11 and 12 AFW Pps
- _____ 3. Trip the Reactor, the Main Feed Pumps and the RCPs, cooldown using the TBVs until just before SGIS actuates. Leave ADV controller output at ~ 100%. SGIS should actuate shortly after the candidate "assumes" the watch providing them with feedback indicating alternate actions are required.

ELEMENT
(* = CRITICAL STEP)

STANDARD

Time Start: _____	
Note to EVALUATOR: SGIS should actuate shortly after the candidate “assumes” the watch (simulator is placed in RUN) providing them with feedback indicating alternate actions are required.	
<input type="checkbox"/> Locate EOP-3, Step IV.G.	Same as element
<input type="checkbox"/> PERFORM the following:	Same as element
CUE: Both S/G levels are currently -200 inches and T_{cold} is ~ 505 °F and steady.	
<input type="checkbox"/> 1. IF , at ANY time, BOTH S/G levels are less than (-)350 inches OR T _{COLD} rises uncontrollably 5° F or greater, THEN initiate Once-Through-Cooling concurrently PER step J.	Verifies S/G levels on 1C03 or SPDS. Verifies T _{COLD} is not rising uncontrollably.
2. Block SGIS as follows:	
CUE: SGIS has already actuated.	
<input type="checkbox"/> a. WHEN the "SGIS A BLOCK PERMITTED" alarm is received THEN block SGIS A:	Determines step is N/A. Initiates Alternate Actions.
ALTERNATE PATH	
CUE: SGIS actuated as a result of the cooldown.	
<input type="checkbox"/> 2.1 IF SGIS actuates as a result of the cooldown AND the Non-Vital 4KV buses are energized, THEN reset the SGIS as follows:	Verifies loss of power has not occurred.
<input type="checkbox"/> a. Place the COND BSTR PPs in PULL TO LOCK.	Places Condensate booster pump control switches in PTL.
<input type="checkbox"/> b. Match handswitch positions PER ATTACHMENT (7), <u>SGIS VERIFICATION CHECKLIST</u> .	Places MSIV handswitches in SHUT. Places Feedwater isolation valve handswitches in SHUT.
<input type="checkbox"/> c. Block SGIS.	Places 11 and 12 S/G SGIS keyswitches in BLOCK. Checks that Annunciators C59 and C60 (SGIS A (B) BLOCKED) actuate.
<input type="checkbox"/> d. Reset the SGIS signal.	Places 11 and 12 S/G SGIS keyswitches in RESET. Checks that Annunciators G09 and G10 (ACTUATION SYS SGIS A (B) TRIPPED) are clear.
<input type="checkbox"/> e. Open the MSIV(s).	Same as element

ELEMENT
(* = CRITICAL STEP)

STANDARD

<input type="checkbox"/> f. Open the SG FW ISOL valve(s): <ul style="list-style-type: none">▪ 1-FW-4516-MOV▪ 1-FW-4517-MOV	Same as element
<input type="checkbox"/> g. Start a COND BSTR PP.	Same as element

Terminating Cue: This JPM is complete when SGIS is reset and a Condensate Booster Pump is started. No further actions are required.

Time Stop: _____

Verification of CompletionJob Performance Measure Number: Sim-7

Applicant: _____

NRC Examiner: _____

Date Performed: _____

Facility Evaluator: _____

Number of Attempts: _____

Time to Complete: _____

Follow up Question: _____

Applicant Response: _____

Result: SAT _____ UNSAT _____

Examiner's Signature and Date: _____

APPLICANT'S CUE SHEET

Initial Conditions:

1. A total loss of all feedwater has occurred on Unit 1.
2. The reactor is tripped and EOP-0 is complete.
3. The CRS directed the RCPs be secured and a cooldown started prior to the EOP-3 brief.
4. You are performing the duties of the Unit 1 CRO.

Initiating Cue:

The CRS directs you to establish natural circulation and cooldown the RCS per EOP-3, Step IV.G. Are there any questions? You may begin.

2010 NRC
INITIAL LICENSED
OPERATOR EXAM
JPM #: Sim-8

Facility: **Calvert Cliffs 1 & 2**

Job Performance Measure No.: **Sim-8**

Task Title: **Transfer 11/17 4KV Bus Loads from 1A DG to Offsite Power Source**

Task Number: **024.007**

K/A Reference: **064 A2.09 (3.1, 3.3)**

Method of testing:

Simulated Performance: ☐

Actual Performance: ☒

Classroom: ☐

Simulator: ☒

Plant: ☐

READ TO THE APPLICANT:

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

Initial Conditions:

- 1. 4KV Bus 11 was on its alternate feed, for maintenance on the normal feeder breaker, when the alternate feeder breaker tripped. The 1A DG started, loaded on and is supplying 4KV Bus 11.**
- 2. Maintenance has been completed on the normal feeder breaker.**
- 3. You are performing the duties of the Unit 1 CRO.**

Initiating Cue:

The CRS directs you to Transfer 11/17 4KV Bus Loads from 1A DG to Offsite Power Source in preparation to shut down the 1A Diesel Generator. Are there any questions? You may begin.

Task Standard:

This JPM is complete when offsite power is paralleled with the 1A DG at approximately 2 MW and 4.0 KV. No further actions are required.

Evaluation Criteria:

1. All critical steps completed (denoted by shading).
2. All sequential steps completed in order.
3. All time-critical steps (denoted by an asterisk) completed within allotted time.
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made.

Required Materials:

1. Procedures and manuals normally available in the plant

General References:

1. OI-21A, 1A Diesel Generator

Time Critical Task:

No

Validation Time:

20 minutes

Simulator Setup:

- _____ 1. Reset simulator to IC-24, 100% power
- _____ 2. Override the 1C18B Synchroscope to the 12 o'clock position
- _____ 3. Override the 1C18B Synchroscope lights to "OFF"
- _____ 4. Open the 11 4KV Bus normal feeder breaker causing the 1A to start and load on the Bus
- _____ 5. Stabilize plant and clear associated alarms
- _____ 6. Place Alternate feeder breaker in PTL and place a "pinkie" on it to denote off-normal position.

ELEMENT

STANDARD

(* = CRITICAL STEP)

Time Start: _____	
CUE: General Precautions and Initial Conditions are met.	
<input type="checkbox"/> Identify and locate OI-21A, Step 6.4.B.1.	Same as element
CUE: 11 4KV Bus normal feeder 152-1115 is expected to remain available.	
<input type="checkbox"/> 1. CHECK the selected 11/17 4KV Bus offsite power source is expected to remain available: <ul style="list-style-type: none"> • 11 4KV BUS ALT FDR, 152-1101 OR <ul style="list-style-type: none"> • 11 4KV BUS NORMAL FDR, 152-1115 	Same as element
<input type="checkbox"/> 2. VERIFY DC control power is available by observing the 11/17 4KV Bus Normal OR Alternate Feeder breaker position light being illuminated at the control switch.	Same as element
3. PLACE 1A DG in the TRANSFER MODE by performing the following:	
<input type="checkbox"/> a. DEPRESS 1A DG EMERGENCY START, 1-HS-1707, pushbutton.	Same as element
<input type="checkbox"/> b. INSERT the Sync Stick for 1A DG OUT BKR, 1-CS-152-1703.	Inserts Sync Stick for 1-CS-152-1703 at 1C18A.
<input type="checkbox"/> c. DEPRESS 1A DG SLOW START, 1-HS-1708, pushbutton.	Same as element
<input type="checkbox"/> d. MOMENTARILY PLACE 1A DG SPEED CONTR, 1-CS-1705, to RAISE OR LOWER.	Same as element
<input type="checkbox"/> e. MAINTAIN 1A DG at approximately 60 Hz using 1A DG SPEED CONTR, 1-CS-1705.	Same as element
<input type="checkbox"/> f. REMOVE the Sync Stick from 1A DG OUT BKR, 1-CS-152-1703.	Same as element

ELEMENT
(* = CRITICAL STEP)

STANDARD

CUE: CRS directs to close normal feeder.	
<input type="checkbox"/> g. INSERT the Sync Stick for the 11/17 4KV Bus Normal OR Alternate Feeder breaker handswitch: <ul style="list-style-type: none"> • 11 4KV BUS ALT FDR, 1-CS-152-1101 OR • 11 4KV BUS NORMAL FDR, 1-CS-152-1115 	Places sync stick in sync jack next to control switch for 152-1115.
CUE: Synchroscope and sync lights are operating.	
<input type="checkbox"/> h. CHECK the associated Synchroscope AND Sync Lights are operating.	Checks 1C19 synchroscope.
<u>NOTE:</u> Offsite power voltage indication will be on the INCOMING voltmeter.	
<input type="checkbox"/> i. ADJUST RUNNING VOLTS equal to INCOMING VOLTS using 1A DG AUTO VOLT CONTR, 1-CS-1704.	Lowers running volts to match incoming volts using 1-CS-1704.
<u>NOTE:</u> The Synchroscope works in the opposite direction from normal when 1A DG is the RUNNING power source.	
CUE: Synchroscope is running counterclockwise fast.	
<input type="checkbox"/> j. ADJUST 1A DG frequency so the synchroscope pointer is rotating <u>slowly</u> in the FAST direction using 1A DG SPEED CONTR, 1-CS-1705.	Adjusts synchroscope to <u>slowly</u> in fast direction.
JPM continued on next page	

ELEMENT
(* = CRITICAL STEP)

STANDARD

CAUTION:

To avoid improper paralleling, do **NOT** start **OR** stop any large loads on the 11/17 4KV Bus.

<input type="checkbox"/> k. <u>WHEN</u> the Synchroscope pointer is approximately 5 degrees prior to the 12 o'clock position, <u>THEN CLOSE</u> the 11/17 4KV Bus Normal <u>OR</u> Alternate Feeder breaker: <ul style="list-style-type: none">• 11 4KV BUS ALT FDR, 1-CS-152-1101 <u>OR</u> <ul style="list-style-type: none">• 11 4KV BUS NORMAL FDR, 1-CS-152-1115.	Closes 1-CS-152-1115 at $\pm 5^\circ$ of the 12 o'clock position.
<input type="checkbox"/> l. CHECK 1A DG load is approximately 2.0 MW.	Same as element
<input type="checkbox"/> m. REMOVE the Sync Stick <u>AND</u> RETURN to Home Base.	Same as element
CUE: 11/17 voltage is 4.2KV.	
<input type="checkbox"/> 4. Monitor 11/17 4KV Bus voltage between 3.75 KV and 4.35 KV.	Verifies voltage in spec.

Terminating Cue: This JPM is complete when offsite power is paralleled with the 1A DG, on 11 4KV Bus, at approximately 2 MW and 4.0 KV. No further actions are required.

Time Stop: _____

Verification of CompletionJob Performance Measure Number: **Sim-8**

Applicant: _____

NRC Examiner: _____

Date Performed: _____

Facility Evaluator: _____

Number of Attempts: _____

Time to Complete: _____

Follow up Question: _____

Applicant Response: _____

Result: SAT _____ UNSAT _____

Examiner's Signature and Date: _____

APPLICANT'S CUE SHEET

Initial Conditions:

1. 4KV Bus 11 was on its alternate feed, for maintenance on the normal feeder breaker, when the alternate feeder breaker tripped. The 1A DG started, loaded on and is supplying 4KV Bus 11.
2. Maintenance has been completed on the normal feeder breaker.
3. You are performing the duties of the Unit 1 CRO.

Initiating Cue:

The CRS directs you to Transfer 11/17 4KV Bus Loads from 1A DG to Offsite Power Source in preparation to shut down the 1A Diesel Generator. Are there any questions? You may begin.

2010 NRC
INITIAL LICENSED
OPERATOR EXAM
JPM #: PLANT-1

Facility: **Calvert Cliffs 1 & 2**

Job Performance Measure No.: **Plant-1**

Task Title: **Start 11 & 12 Containment Air Coolers**

Task Number: **032.049**

K/A Reference: **022 A4.01 (3.6, 3.6)**

Method of testing:

Simulated Performance: ☒

Actual Performance: ☐

Classroom: ☐

Simulator: ☐

Plant: ☒

READ TO THE APPLICANT:

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

Initial Conditions:

- 1. A severe fire has resulted in Control Room evacuation. AOP-9A has been implemented.**
- 2. You are performing the duties of the Unit-1 ABO.**

Initiating Cue:

You have just completed Step BK, RESTORE SWITCHGEAR ROOM VENTILATION which directs you to "Go to the 45' West Penetration Room to perform Step BL". Are there any questions? You may begin.

Task Standard:

This JPM is complete when 1C43 has been notified that 11 and 12 Containment Air Coolers are in high speed.

Evaluation Criteria:

1. All critical steps completed (denoted by shading).
2. All sequential steps completed in order.
3. All time-critical steps (denoted by an asterisk) completed within allotted time.
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made.

Required Materials:

1. Procedures and manuals normally available in the plant

General References:

1. AOP-9A, CONTROL ROOM EVACUATION AND SAFE SHUTDOWN DUE TO A SEVERE CONTROL ROOM FIRE.

Time Critical Task:

No

Validation Time:

20 minutes

Simulator Setup:

1. None

ELEMENT
(* = CRITICAL STEP)

STANDARD

Time Start: _____	
CUE: You have just completed Step BK, RESTORE SWITCHGEAR ROOM VENTILATION which directs you to “Go to the 45’ West Penetration Room to perform Step BL”.	
<input type="checkbox"/> Locate AOP-9A, Step BL.	Same as element.
<input type="checkbox"/> Candidate proceeds to the Unit-1 45’ West Penetration Room	Same as element
CUE: When the Local/Remote Key is inserted and rotated each switch is in the LOCAL position.	
1. Start 12 Containment Air Cooler in HIGH speed: <input type="checkbox"/> *. Place a Local/Remote Key into 12 Containment Air Cooler Load Contactor Panel handswitch, 1-HS-5300A1, and unlock the handswitch.	Same as element
<input type="checkbox"/> b. Rotate the handswitch to LOCAL.	Same as element
CUE: When the Local Control handswitch is positioned 12 CAC is running in HIGH.	
<input type="checkbox"/> c. Place 12 Containment Air Cooler Local Handswitch, 1-HS-5300A, to HIGH.	Same as element
<input type="checkbox"/> d. GO TO the 45’ East Electrical Penetration Room.	Same as element
CUE: When the Local/Remote Key is inserted and rotated each switch is in the LOCAL position.	
2. Start 11 Containment Air Cooler in HIGH speed: <input type="checkbox"/> a. Place a Local/Remote Key into 11 Containment Air Cooler Load Contactor Panel handswitch, 1-HS-5299A1, and unlock the handswitch.	Same as element
<input type="checkbox"/> b. Rotate the handswitch to LOCAL	Same as element
CUE: When the Local Control handswitch is positioned 11 CAC is running in HIGH.	
<input type="checkbox"/> c. Place 11 Containment Air Cooler Local Handswitch, 1-HS-5299A, to HIGH.	Same as element

CUE: Acknowledge communication that 11 and 12 Containment Air Coolers are in high speed using proper communication techniques.

3. Notify 1C43 that 11 and 12 Containment Air Coolers are in high speed.

Same as element

Terminating Cue: This JPM is complete when 11 and 12 Containment Air Coolers are in LOCAL and operating in high speed. per AOP-9A, Section BL

Time Stop: _____

Verification of CompletionJob Performance Measure Number: **Plant-1**

Applicant: _____

NRC Examiner: _____

Date Performed: _____

Facility Evaluator: _____

Number of Attempts: _____

Time to Complete: _____

Follow up Question: _____

Applicant Response: _____

Result: SAT _____ UNSAT _____

Examiner's Signature and Date: _____

APPLICANT'S CUE SHEET

Initial Conditions:

- 1) A severe fire has resulted in Control Room evacuation. AOP-9A has been implemented.
- 2) You are performing the duties of the Unit-1 ABO.

Initiating Cue:

You have just completed Step BK, RESTORE SWITCHGEAR ROOM VENTILATION which directs you to "Go to the 45' West Penetration Room to perform Step BL". Are there any questions? You may begin.

2010 NRC
INITIAL LICENSED
OPERATOR EXAM
JPM #: PLANT-2

Facility: **Calvert Cliffs 1 & 2**

Job Performance Measure No.: **Plant-2**

Task Title: **Initialize ADV Controllers and Align 11 and 12 ADVs to (1C43)**

Task Number: **083.050**

K/A Reference: **068 AA1.21 (3.9, 4.1)**

Method of testing:

Simulated Performance: ☒

Actual Performance: ☐

Classroom: ☐

Simulator: ☐

Plant: ☒

READ TO THE APPLICANT:

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

Initial Conditions:

- 1. A severe fire has resulted in Control Room evacuation. AOP-9A has been implemented.**
- 2. You are performing the actions of the Unit-1 CRO.**

Initiating Cue:

You have been directed by the Shift Manager to initialize the ADV controllers and align 11 and 12 ADVs to 1C43, per AOP-9A steps Z and AA. Are there any questions? You may begin.

Task Standard:

This JPM is complete when both ADV Controllers are initialized and aligned for control at 1C43.

Evaluation Criteria:

1. All critical steps completed (denoted by shading).
2. All sequential steps completed in order.
3. All time-critical steps (denoted by an asterisk) completed within allotted time.
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made.

Required Materials:

1. Procedures and manuals normally available in the plant

General References:

1. AOP-9A, Control Room Evacuation and Safe Shutdown due to a Severe Control Room Fire.

Time Critical Task:

No

Validation Time:

10 minutes

Simulator Setup:

1. None

ELEMENT
(* = CRITICAL STEP)

STANDARD

Time Start: _____	
CUE: You have been directed by the Shift Manager to initialize the ADV controllers and align 11 and 12 Atmospheric Dump Valves to 1C43, per AOP-9A steps Z and AA.	
<input type="checkbox"/> Locates AOP-9A, Step Z.	Same as element.
<input type="checkbox"/> Candidate proceeds to the Unit-1 45' Switchgear Room	Same as element
Note to Evaluator: ADV Controllers are initialized at 1C43	
CUE: ADV Controller output indicates zero.	
<input type="checkbox"/> 1. Place 11 ADV CONTR, 1-HC-4056A, to SHUT.	Same as element
CUE: ADV Controller output indicates zero.	
<input type="checkbox"/> 2. Place 12 ADV CONTR, 1-HC-4056B, to SHUT.	Same as element
<input type="checkbox"/> Locates AOP-9A, Step AA.	Same as element.
<input type="checkbox"/> 1. Place the following Handvalves to POSITION 2:	Same as element
NOTE TO EVALUATOR: Opening ADV Hand Transfer Station enclosures will cause AFAS Status alarm in the Control Room. Have operator describe the transfer process.	
NOTE TO EVALUATOR: 1-HV-3938A and 3938B are located in an enclosure marked "STEAM GENERATOR No. 11 MAIN STEAM LINE ATMOS DUMP CONTROL VALVE 1-CV-3938 CONTROL TRANSFER VALVES"	
CUE: 1-HV-3938A is in position 2.	
<input type="checkbox"/> 11 ADV Aux Shutdown Control Transfer, 1-HV-3938A	Same as element
CUE: 1-HV-3938B is in position 2.	
<input type="checkbox"/> 11 ADV Quick Open Override Handvalve, 1-HV-3938B.	Same as element
Continued on next page	

ELEMENT

STANDARD

(* = CRITICAL STEP)

NOTE TO EVALUATOR:

Opening ADV Hand Transfer Station enclosures will cause AFAS Status alarm in the Control Room. Have operator describe the transfer process.

NOTE TO EVALUATOR:

1-HV-3938A and 3938B are located in an enclosure marked "STEAM GENERATOR No. 12 MAIN STEAM LINE ATMOS DUMP CONTROL VALVE 1-CV-3939 CONTROL TRANSFER VALVES"

CUE: 1-HV-3939A is in position 2.

☐ 12 ADV Aux Shutdown Control Transfer, 1-HV-3939A

Same as element

CUE: 1-HV-3939B is in position 2.

☐ 12 ADV Quick Open Override Handvalve, 1-HV-3939B.

Same as element

Terminating Cue: This JPM is complete when both ADV Controllers are initialized and aligned for control at 1C43.

Time Stop: _____

Verification of CompletionJob Performance Measure Number: **Plant-2**

Applicant: _____

NRC Examiner: _____

Date Performed: _____

Facility Evaluator: _____

Number of Attempts: _____

Time to Complete: _____

Follow up Question: _____

Applicant Response: _____

Result: SAT _____ UNSAT _____

Examiner's Signature and Date: _____

APPLICANT'S CUE SHEET

Initial Conditions:

- 1) A severe fire has resulted in Control Room evacuation. AOP-9A has been implemented.
- 2) You are performing the duties of the Unit-1 CRO.

Initiating Cue:

You have been directed by the Shift Manager to initialize the ADV controllers and align 11 and 12 Atmospheric Dump Valves to 1C43, per AOP-9A steps Z and AA. Are there any questions? You may begin.

2010 NRC
INITIAL LICENSED
OPERATOR EXAM
JPM #: PLANT-3

Facility: **Calvert Cliffs 1 & 2**

Job Performance Measure No.: **Plant -3**

Task Title: **Deenergize/Energize a 4KV Bus**

Task Number: **004.001**

K/A Reference: **APE 068 AA1.31 (3.9, 4.0)**

Method of testing:

Simulated Performance: ☒

Actual Performance: ☐

Classroom: ☐

Simulator: ☐

Plant: ☒

READ TO THE APPLICANT:

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

Initial Conditions:

- 1. A severe fire has resulted in a control room evacuation and AOP-9A implementation.**
- 2. You are performing the duties of the Unit 1 RO.**
- 3. Step "AT" (OPEN THE FEEDER BREAKERS FOR 4KV BUS 11) is complete.**

Initiating Cue:

You have been instructed to align the 0C DG to 11 4 Kv bus per AOP-9A Step AU.

Task Standard:

This JPM is complete when the 0C DG is aligned to the 11 4Kv bus per AOP-9A Step IV.AU.

Evaluation Criteria:

1. All critical steps completed (denoted by shading).
2. All sequential steps completed in order.
3. All time-critical steps (denoted by an asterisk) completed within allotted time.
4. JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made.

Required Materials:

1. Procedures and manuals normally available in the plant

General References:

1. AOP-9A, CONTROL ROOM EVACUATION AND SAFE SHUTDOWN DUE TO A SEVERE CONTROL ROOM FIRE.

Time Critical Task:

No

Validation Time:

10 minutes

Simulator Setup:

1. None

ELEMENT
(* = CRITICAL STEP)

STANDARD

Time Start: _____	
CUE: Give the operator a copy of AOP-9A.	
<input type="checkbox"/> Locate AOP-9A, Step AU.	Same as element.
<input type="checkbox"/> Candidate proceeds to the Unit-1 27' Switchgear Room	Same as element
CUE: ATTACHMENTS for determination of proper Electrical Safety PPE, along with PPE, are located at the Switchgear Room Tool Cabinet	
<input type="checkbox"/> Candidate determines PPE required to complete assigned tasks	<p>Candidate determines required PPE for:</p> <ul style="list-style-type: none"> • Operation of a 4KV circuit breaker with enclosure doors closed • Operation of 4KV disconnects
NOTE TO EVALUATOR: Proper PPE for this task is: 100% Cotton Long Sleeve Shirt and Pants <u>OR</u> 100% Cotton short sleeve shirt and pants under FR Lab Coat. Discussion indicating candidate correctly determines PPE requirements is acceptable in lieu of donning the PPE for a simulation.	
CUE: When the Local/Remote Key is inserted and rotated each switch is in the LOCAL position.	
1. Take local control of 0C DG Output Breaker to 11 4KV bus, 152-1106 by performing the following:	Same as element
<input type="checkbox"/> a. Insert Local/Remote Key into 0C DG Output Breaker handswitch, 1-HS-1106A.	
<input type="checkbox"/> b. Rotate the handswitch to LOCAL.	Same as element
CUE: When taken to TRIP, 1-HS-1106B indicates trip.	
<input type="checkbox"/> c. Place the Local Control handswitch, 1-HS-1106B, to TRIP.	Same as element
CUE: When checked 152-1106 indicates open (red light is lit)	
d. Verify 0C DG Output Breaker, 152-1106 is open.	Checks Bkr indicating lights

ELEMENT

STANDARD

(* = CRITICAL STEP)

NOTE TO EVALUATOR: Proper PPE for this task is: FR Long Sleeve Shirt and FR Pants OR FR Coveralls (minimum 4 cal) over 100% cotton short sleeve shirt and pants OR FR Lab Coat (minimum 4 cal) over 100% cotton shirt and pants. Discussion indicating candidate correctly determines PPE requirements is acceptable in lieu of donning the PPE for a simulation

WARNING

Improper operation of disconnects can result in serious injury. Keep body and head clear of the operating arc of the disconnect handle. Do NOT release handle prior to full travel. When the disconnect is opened, a very loud bang will be heard, and a switch position flag indication will be visible indicating disconnect position.

CUE: The keys insert into Disconnect 189-1106 and disconnect is unlocked.

2. Close 0C DG to 4KV Bus 11 Disconnect 189-1106 by performing the following:

- ☐ a. Insert upper keys **AND** unlock 0C DG to 4KV Bus 11 Disconnect, 189-1106

Same as element

CUE: When operated, the disconnect indicates closed.

- ☐ b. Close disconnect 189-1106.

Same as element

CUE: When the key is inserted and rotated, disconnect 189-1106 locks closed.

- ☐ c. Insert lower key **AND** lock disconnect 189-1106, in the closed position.

Same as element

CUE: Acknowledge communication that 0C DG Output Bkr is in local and open and disconnect 189-1106 is closed, using proper communication techniques.

3. Notify 1C43 that 0C Diesel Generator Output Breaker to 11 4KV Bus, 152-1106 is in local and tripped and the 0C DG Disconnect to 4KV bus 11, 189-1106 is closed.

Same as element

Terminating Cue: This JPM is complete when 0C DG Output Bkr is in local and open and disconnect 189-1106 is closed. per AOP-9A, Section AU.

Time Stop _____

Verification of CompletionJob Performance Measure Number: **Plant -3**

Applicant: _____

NRC Examiner: _____

Date Performed: _____

Facility Evaluator: _____

Number of Attempts: _____

Time to Complete: _____

Follow up Question: _____

Applicant Response: _____

Result: SAT _____ UNSAT _____

Examiner's Signature and Date: _____

APPLICANT'S CUE SHEET

Initial Conditions:

1. **A severe fire has resulted in a control room evacuation and AOP-9A implementation.**
2. **Step "AT" (OPEN THE FEEDER BREAKERS FOR 4KV BUS 11) is complete.**
3. **You are performing the duties of the Unit 1 RO.**

Initiating Cue:

**You have been instructed to align the 0C DG to 11 4 Kv bus per AOP-9A Step AU.
Do you have any questions? You may begin.**

Facility: CCNPP Scenario No.: 1 Op-Test No.: 2010

Examiners: _____ Operators: _____

Initial Conditions:

U-1 is at 100% power MOC 10,885 MWD/MTU with long term steady state power history. U-2 at 100% power BOC.

Turnover:

1A D/G removed from service and tagged out for scheduled maintenance (return in 12 hours), with 0C D/G aligned to 11 4kv bus (disconnect 189-1106 shut). 13 CBP is in PTL and is considered emergency use only due to high vibrations. Instructions for the shift are to maintain power @ 100%.

Event No.	Malf. No.	Event Type*	Event Description
1	RCS023_02 RCS024_03 RCS025_02 RCS026_02	I (ATC/BOP) TS (SRO)	PZR Press Xmtr 100Y fails low PZR Press Xmtr 102C fails low PZR Press Xmtr 103-1 fails low PZR level XMTR 110Y fails high
2	RCS003	C (ALL) TS (SRO)	20 gpm RCS leak
3		R (ATC/SRO) N (BOP)	Expeditious Downpower
4	HDV005_02	C (BOP/SRO)	12 Condensate Booster Pump Failure w/o auto start of standby
5	SWYD002	M (ALL)	Loss of offsite power
6	CEDS010	C (ATC)	2 Stuck CEA's
7	DG002_02	C (BOP)	1B D/G Auto Start Failure
8	4KV001_02	C (ALL) TS (SRO)	11 4kv bus electrical fault
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Critical Tasks: (bold)

- Commence boration due to 2 stuck CEA's
- Restore 4kv vital bus power with 0C D/G

Op-Test No.: 2010 Scenario No.: 1

SCENARIO OVERVIEW

RCS LEAK WITH STATION BLACKOUT

Initial Conditions: U-1 is at 100% power MOC 10,885 MWD/MTU with long term steady state power history. U-2 at 100% power BOC. 1A D/G removed from service and tagged out for scheduled maintenance, with 0C D/G aligned to 11 4kv bus (disconnect 189-1106 shut). 13 CBP is in PTL due to high vibes when running, it is considered emergency use only. Instructions for the shift are to maintain power @ 100%.

An instrument failure occurs on PZR reference leg which affects multiple pressure and level instruments. The crew will need to shift Pressure control from 110Y to 110X or manually control PZR heaters. After a short delay the instrument line leak increases to 20 gpm leak which will prompt entry into AOP-2A, the leak is small enough to exercise AOP-2A completely and eventually lead to controlled S/D.

During the down power a trip of 12 Condensate Booster Pump occurs without an auto start of standby CBP, the crew should implement AOP-3G Section V. After trip criteria is given out the CRS should direct bypassing Precoats and Demineralizers to maximize SGFP suction pressure. Next the crew should start 13 CBP.

When crew directs tripping the reactor, a loss of offsite power will occur. Concurrent with the trip a failure of 1B D/G occurs which leaves U-1 without either vital 4kv bus. When the CRO performs Vital Auxiliaries safety function he will align the 0C D/G to 11 4kv bus but an electrical fault will occur after aligned for 5 minutes. There will be a problem closing disconnect 189-1406 which will prevent aligning the 0C D/G to 14 4kv bus. Two stuck CEA's will not be able to be identified (due to electrical malfunctions) so boration by ATC in EOP-0 is required. All safety functions will not be met due to loss of power effects. Numerous alternate actions will be required in EOP-0 (eg. Isolate MSR's or MSIV's, PO operation of ADV's, align AFW Pumps, etc). The SRO should transition to EOP-8 due to RCS leakage and station blackout.

EOP-8 entry with Safety Function Assessment IAW Resource Assessment Table, with the following results RC-1 Met, VA-2 Not Met, PIC-3 Met (PIC-4 Not Met if SIAS actuates), HR-1 Met (HR-2 Not Met if SIAS actuates), CE-1 Met, RLEC-1 Met.

The BOP should commence VA-2 immediately. Step B.2 will have him align 0C to 14 bus (Electricians will have solved disconnect 189-1106 problem allowing alignment) or transition to VA-3 for SMECO. The ATC should commence RC-1.

When the crew has restored power to 14 4kv bus the scenario will end.

INSTRUCTOR SCENARIO INFORMATION

- _____ 1. Reset to IC-24
- _____ 2. Perform switch check.
- _____ 3. Place simulator in RUN, advance charts and clear alarm display.
- _____ 4. Place simulator in FREEZE.
- _____ 5. Enter Malfunctions/ Triggers
 - _____ a. CW002 01 at 0% as T-1 on F1
 - _____ b. PZR Press Xmtr 100Y fails low on T-1 RCS023_02
 - _____ c. PZR Press Xmtr 102C fails low on T-1 RCS024_03
 - _____ d. PZR Press Xmtr 103-1 fails low on T-1 RCS025_02
 - _____ e. PZR Level Xmtr 110Y fails high on T-1 RCS026_02
 - _____ f. RCS Leakage 20 gpm after 5 min delay on T-1 RCS003
 - _____ g. Loss of 12 Condensate Booster Pump CD00?_02 on F2
 - _____ h. CEA-01 on bottom as T-2
 - _____ i. Loss of Offsite Power SWYD002 on T-2
 - _____ j. 2 Stuck CEA's CEDS010 at Time Zero
 - _____ k. 1B DG Auto-start Failure DG002 02 at Time Zero
 - _____ l. 11 4 KV bus electrical fault 4KV001 02 on F3

- 6 Enter Panel Overrides
- Shut disconnect 189-1106
 - Place 13 CBP in PTL
 - Hang tags on 1A DG
 - Place pink abnormal tags:
 - 152-1406
 - 152-2106
 - 152-2406
 - 13 CBP
7. Set simulator time to real time, then place simulator in RUN.
8. Give crew briefing.
- Present plant conditions: 100% load at MOC 10.885 MWD/MTU
 - Power history: Long term steady state for past 39 days
 - Equipment out of service:
 - 1A DG removed from service for scheduled maintenance.
 - 0C DG aligned to 11 4 KV Bus
 - 13 CBP is emergency use only due to high vibes
 - Abnormal conditions: None
 - Surveillances due: STP O-90-1 in 3 hours
 - Instructions for shift: Maintain power
 - EOOS Risk: Low CDF 1.43 LERF 1.47
 - Blowdown: Overboard at 100 gpm
9. Allow crew 3-5 minutes to acclimate themselves with their positions.
10. Instructions for the Booth Operator.
- Once the crew accepts the watch use **F1** to initiate PZR Instrument Failures
 - Once down power has begun for shutdown of U-1 use **F2** to initiate failure of 12 Condensate Booster Pump.
 - Approximately 5 minutes after crew aligns 0C DG to 11 4KV bus use **F3** to initiate electrical fault on 11 4KV Bus.

RESPONSES TO CREW REQUEST

If a request and response is not listed, delay response until reviewed with the examiner. Responses to routine requests, which have no effect the scenario, do not require examiner clearance.

REQUEST	RESPONSE
1. OWC contact IM shop, Rad Con, Matrix notification.	Acknowledge request
2. PWS or PPO check ESFAS panel.	After 3 minutes, report SIAS Pressurizer Pressure Channel ZF is reading low and tripped.
3. PWS bypass ZD SIAS PP.	After 5 minutes, give ESFAS door alarm, then bypass SIAS ZD, then clear door alarm.
4. TBO/EM Shop check 12 CBP & Breaker	After 3 min report pump is stopped but nothing else looks abnormal. After 5 min report breaker is tripped with dropped flags.
5. ESO how long until offsite power restored	No idea at this time but will call when we find out
6. TBO shut MSR isolation valves and panel loaders to zero	Acknowledge request
7. ABO open ADV's locally	After 2 minutes adjust ADV's to requested position
8. TBO open 189-1106 and shut 189-1406	After 2 minutes open 189-1106, after another 3 minutes report problems with shutting 189-1406.
9. OWC have EM shop check 189-1406	After 10-15 min, shut 189-1406 and report

Page 2 of 10

C (All) TS (SRO)

[illegible]

Op-Test No.: 2010 Scenario No.: 1 Event No.: 3Page 3 of 10

Event Description: Commence plant shutdown IAW OP-3.

R (ATC/SRO) N (BOP)

[illegible]

Op-Test No.: 2010 Scenario No.: 1 Event No.: 4

Page 4 of 10

Event Description: Loss of 12 Condensate Booster Pump without Auto Start of standby CBP.
C (BOP/SRO)

Time	Position	Applicant's Actions or Behavior
	BOP	Announce alarm and reference ARM
	SRO	Implement AOP-3G determines proper section is Section V
	SRO	Announces trip criteria (S/G level approaching -40) and assigns to ATC
	SRO	Direct BOP to maximize SGFP suction pressure
	BOP	Maximize SGFP suction pressure <ul style="list-style-type: none"> Place hotwell controller in manual at 50% Open Condensate Precoat Sys bypass valve 1-CD-5818-CV Open Condensate Demin Sys bypass valve 1-CD-4439-MOV
	SRO	Direct start of 13 CBP
	BOP	Starts 13 CBP
	SRO	Notifies Chemistry that Condensate Precoats & Demins were bypassed.
	SRO	Exits AOP-3G

Op-Test No.: 2010 Scenario No.: 1 Event No.: 5

Page 5 of 10

Event Description: Reactor Trip with loss of Offsite Power with failure of 1B DG

M (All)

[illegible]

Op-Test No.: 2010 Scenario No.: 1 Event No.: 6

Page 6 of 10

Event Description: Two stuck CEA's on reactor trip

C (ATC)

[illegible]

Op-Test No.: 2010 Scenario No.: 1 Event No.: 7Page 7 of 10

Event Description: 1B DG Auto Start failure
C (BOP)

[illegible]

Op-Test No.: 2010 Scenario No.: 1 Event No.: 8

Page 8 of 10

Event Description: Loss of 11 4KV bus (Station Blackout)

M (All) TS (SRO)

Time	Position	Applicant's Actions or Behavior
	SRO	Direct ATC & BOP to re-verify Safety Functions
	ATC	Reports Reactivity Control "Not Met" due to unable to borate due to loss of power
	BOP	Reports Turbine trip complete
	ATC	Verify Pressure and Inventory Control <ul style="list-style-type: none"> Check PZR press between 1850-2300 psia, trending to 2250 psia Check PZR level stabilizes between 80-180 inches trending to 160 inches Ensure RCS subcooling >30°F Reports Pressure & Inventory as not met due to lowering PZR pressure and level
	BOP	Verify Vital Auxiliaries Safety Function <ul style="list-style-type: none"> Recognize 11 4KV bus faulted and reports to SRO Attempts to re-align 0C DG to 14 4 KV bus (OSO reports 189-1406 disconnect problem) Reports Vital auxiliaries cannot be met due to no 4 KV bus & 1Y09 & 10 not energized
	BOP	Verify Core & RCS Heat Removal Safety Function <ul style="list-style-type: none"> Directs ABO to open ADV's manually (~40%) and reports position to SRO Start 11 AFW pump due to loss of main feed water Trip SGFP and shut S/G Feed Isolations Reports Core & RCS Heat Removal as not met due to no operating RCP's
	BOP/ATC	Verify Containment Environment Safety Function <ul style="list-style-type: none"> Check pressure < 0.7 psig Check temperature < 120°F Check radiation monitor alarms clear with no unexplained rise Reports Containment Environment as not met due to inability to assess due to power loss
	BOP/ATC	Verify Rad Level External to Containment Safety Function <ul style="list-style-type: none"> Check RMS alarms clear with no unexplained rise Secures S/G Blowdown due to inability to assess Reports Rad Levels External to Containment as not met due to inability to assess
	SRO	Brief crew on status of all Safety Functions & Actuations
	SRO	References Diagnostic Flowchart and Implements EOP-8 due to RCS leak with Station Blackout

Op-Test No.: 2010 Scenario No.: 1 Event No.: 8 (cont)

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Event Description: EOP-8 Entry due to RCS leakage with station Balckout

Time	Position	Applicant's Actions or Behavior
	SRO	Direct ATC to perform RCP trip strategy
	SRO	Contact Chemistry to monitor S/G activity and Containment Hydrogen Levels
	SRO	Direct ATC & BOP to identify success paths per Resource Assessment Table
	ATC	Recommends RC-1 Met due to no 4KV buses with WRNI $<10^{-4}$ and negative SUR
	BOP	Recommends VA-3 Not Met due to no DG available and no 4KV buses (May recommend VA-2 Not Met due to 0C DG available but not able to be loaded on a bus currently with no 4 KV buses)
	BOP	Commences working on VA-3 (or VA-2) immediately
	ATC	Recommends PIC-3 Met due to no 4KV buses, No SIAS, subcooled margin $> 25^{\circ}\text{F}$ and RVLMS indicates core is covered. (If SIAS has actuates then PIC-4 Not Met and starts working immediately)
	ATC	Recommends HR-1 Met due to No SIAS and AFW operating to keep subcooled margin $> 25^{\circ}\text{F}$ and RVLMS indicates core is covered (If SIAS actuates then SRO must evaluate and determine HR-2 Not Met since ATC would be working PIC-4)
	ATC	Recommends CE-1 Met due to containment pressure < 2.8 psig and no unexplained radiation alarms in containment with temperature $< 220^{\circ}\text{F}$
	ATC	Recommends RLEC-1 Met due to normal rad levels and no alarms with unexplained rise
	BOP	Performs VA-3 Appendix: <ul style="list-style-type: none"> Align Electrical System for power restoration (This step is similar in both VA-2 & VA-3) When report comes in that E&C has repaired disconnect 189-1406, recommend to SRO to switch to VA-2
	ATC	Performs PIC-1 Appendix <ul style="list-style-type: none"> Verify a charging path is available, so when power is restored then charging flow can be restored
	SRO	When report comes in that E&C has repaired disconnect 189-1406, direct BOP to switch to VA-2 and align 0C DG to 14 4 KV bus

Op-Test No.: 2010 Scenario No.: 1 Event No.: 8 (cont) Page 10 of 10Event Description: EOP-8 Entry due to to RCS leakage with station Balckout

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Performs VA-2 Appendix:</p> <ul style="list-style-type: none">• Align electrical systems for power restoration• Verifies 07 4KV Bus 152-0704 breaker is open• Verify 0C DG output breaker 152-0703 is shut• Verifies 0C DG disconnect to 14 4 KV bus is 189-1406 is shut• Close 07 4 KV Bus Tie breaker 152-0701• Insert sync stick and close 0C DG to 14 4KV bus breaker 152-1406
	SRO	<p>Tech Specs not met for event:</p> <ul style="list-style-type: none">• 3.8.1.A, B, D, E, G, H, I, K• 3.0.3• 3.8.9.A

Facility: CCNPP Scenario No.: 2Op-Test No.: 2010
 Examiners: _____ Operators: _____

Initial Conditions:

U-1 is at 100% power EOC, 15,500 MWD/MTU with long term steady state power history. U-2 at 100% power MOC

Turnover:

11 HPSI Pump is removed from service for scheduled maintenance (return in 3 hours). 13 CCW pump is OOS for work on 3rd pump disconnect. 13 CBP is for emergency use only due to high vibrations. Instructions for the shift is to remain at 100% power.

Event No.	Mal. No.	Event Type*	Event Description
1	CNTM001 04	TS (SRO)	14 Containment Air Cooler failure
2	TG017	C (BOP/SRO) R (ATC)	Turbine vibration on bearing 4
3	Various	C (ATC)	1-CVC-514-MOV breaker failure
4	TG001	M (ALL)	Turbine trip
5	RPS005, RPS006 & DSS failure	C (ATC) TS (SRO)	RPS & Manual Trip Pushbutton failure
6	CCW002 01	C (BOP)	11 Component Cooling Pump failure
7	RCS022	M (ALL)	Pressurizer Safety Valve fails to reseal (leak on top of PZR)
8	ESFA001 02	I (BOP)	SIAS B failure

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

Critical Tasks:

- Trip Reactor from electrical panels due to ATWS
- Trip all RCP's due to no cooling
- Manually actuate SIAS B

Op-Test No.: 2010 Scenario No.: 2

SCENARIO OVERVIEW

ATWS WITH PZR SAFETY VALVE LEAKAGE

Initial Conditions: U-1 is at 100% power EOC 15,500 MWD/MTU with long term steady state power history. U-2 at 100% power MOC. 11 HPSI pump is removed from service for scheduled maintenance and will be returned in 3 hours. 13 CCW pump is OOS for work on 480V disconnect. Instructions for the shift are to maintain power @ 100%.

Scenario starts with a trip of 14 Containment Air Cooler which requires entry in TS 3.6.6.C. Also consideration should be made to start 13 CAC to maintain containment cooling.

Turbine bearing #4 vibration problem develops, causing entry into AOP-7E. Crew must keep track of time when vibration exceeds 10 mils (due to 15 minute limit for trip criteria). Vibration stabilizes at approximately 11 mils which will require a rapid downpower to attempt to lower vibration prior to exceeding 10 mils for 15 minutes.

When lining up for rapid downpower 1-CVC-514-MOV will fail due to breaker trip requiring the crew to use a non-preferred method of boration. Reducing power will have some affect on turbine vibration but not enough to avoid a trip. When crew is within 2 minutes of trip criteria the turbine will trip on its own due to vibration related problems.

When the turbine trips, RPS will be calling for the reactor to trip but due to a failure, both auto trip (including DSS) and manual pushbuttons fail. EOP-0 ATWS actions (opening breakers at 1C18 & 1C19) will trip the reactor.

Once the reactor is tripped a PZR safety valve will start to leak due to overpressure and 11 Component Cooling Pump will fail. The BOP attempts to start 12 CCW pump to provide cooling to RCP's, when it fails he must secure all RCP's. The ATC will shut PORV block valves due to flow readings for both PORV's & Safety Valves. When RCS pressure lowers to SIAS setpoint the ATC should verify SIAS and at that time manually initiate SIAS B and secure 2 RCP's. Pressure and Inventory will be reported as Not Met due to low PZR pressure and high PZR level. The CRO should recognize trends on containment pressure and temperature and take alternate action to increase cooling and eventually call Containment Environment as Not Met. CRS will follow EOP-0 flow chart and transition to EOP-5.

In EOP-5, the ATC will shut letdown isolation valves and verify PORV block valves shut in step IV.F Leak Isolation. The crew will also commence a cooldown using S/G's and also depressurize in an attempt to lower the leak rate. The scenario will end when cooldown is commenced.

INSTRUCTOR SCENARIO INFORMATION

- _____ 1. Reset to IC-24
- _____ 2. Perform switch check.
- _____ 3. Place simulator in RUN, advance charts and clear alarm display.
- _____ 4. Place simulator in FREEZE.
- _____ 5. Enter Malfunctions/ Triggers
 - _____ a. 14 Containment Air Cooler Failure CNTM001_04 on **F1**
 - _____ b. Main Turbine Bearing 4 high vibrations TG017 (7-11.5) over 5 min on **F2**
 - _____ c. CVC-514-MOV H/S to Open as **T-1**
 - _____ d. CVC-514-MOV H/S to close on **T-1**
 - _____ e. CVC-514-MOV H/S lights to out on **T-1**
 - _____ f. Main Turbine trip TG017 on **F3**
 - _____ g. RPS Failure to trip Reactor RPS005 & RPS006 at Time Zero
 - _____ h. DSS failure to trip Reactor ESFAS????
 - _____ i. CEA 01 on bottom as **T-2**
 - _____ j. 11 component cooling pump failure CCW002_01 on **T-2**
 - _____ k. Pressurizer safety valve fails to reseal RCS022 (0-25) over 5 min on **T-2**
 - _____ l. SIAS B failure ESFA001_02 at Time Zero

- _____ 6 Enter Panel Overrides
- _____ a. Place 11 HPSI Pump in PTL with yellow tag
- b. Override alarm H-17 “11 HPSI PP SIAS Block Auto Start” and place red dot on window
- c. Place 13 CCW pump in PTL with yellow tag
- d. Override 12CCW pump in PTL, with green off light lit.
- _____ 7. Set simulator time to real time, then place simulator in RUN.
- _____ 8. Give crew briefing.
- a. Present plant conditions: 100% load at EOC 14.885
MWD/MTU
- b. Power history: Long term steady state for past 16 days
- c. Equipment out of service:
- 11 HPSI removed from service for scheduled maintenance.
 - 13 CCW Pump OOS for work on 480V disconnect
- d. Abnormal conditions: None
- e. Surveillances due: None
- f. Instructions for shift: Maintain power
- g. EOOS Risk: Low CDF 1.76 LERF 1.79
- h. Blowdown: Overboard at 100 gpm
- _____ 9. Allow crew 3-5 minutes to acclimate themselves with their positions.
- _____ 10. Instructions for the Booth Operator.
- a. Once the crew accepts the watch use **F1** to initiate trip of 14 CAC.
- b. Once Tech specs reference and brief is complete then use **F2** to initiate high vibrations on Main turbine bearing #4.
- c. After crew lowers Reactor power <90% use F3 to trip Main Turbine.

RESPONSES TO CREW REQUEST

If a request and response is not listed, delay response until reviewed with the examiner. Responses to routine requests, which have no effect the scenario, do not require examiner clearance.

	REQUEST	RESPONSE
1.	OWC contact EM shop, Matrix notification.	Acknowledge request
2.	TBO check 14 CAC breaker.	After 3 minutes, report breaker is tripped but otherwise looks normal.
3.	TBO man panel unloaders for down power.	Acknowledge request.
4.	ABO check CVC-514-MOV valve & breaker	After 3 min report breaker appears tripped, after another 3 minutes report valve looks shut.
5.	OWC notify EM shop about CVC-514-MOV breaker trip	Acknowledge request
6.	ABO check 11 CC pump	After 3 minutes report pump is not running but otherwise appears normal
7.	OWC contact EM shop about 11 CC pump trip	Acknowledge request

Form ES-D-2

Page 1 of 10

Event Description: 14 Containment Air Cooler (CAC) fails
TS (SRO)

[illegible]

Op-Test No.: 2010 Scenario No.: 2 Event No.: 2Page 2 of 10Event Description: High vibration on bearing #4 of Main Turbine
C (BOP/SRO) R (ATC)

Time	Position	Applicant's Actions or Behavior
	BOP	Announce alarm B-3 "Turbine Vibration"
	BOP	Verify alarm valid by observing both X & Y probes reading high, and adjacent bearing also elevated
	SRO	Implement AOP-7E "Main Turbine Malfunctions" and make plant page announcement
	SRO	Announce trip criteria "12 mils or 10 mils for >15 minutes", and assign trip criteria to the BOP
	SRO	Assign block step V.A to BOP
	BOP	Coordinate with the TBO to get Condenser Vacuum Breaker breaker 52-11618 shut
	BOP	Coordinate with the Electrical System Operator to get reactive load reduced to zero. When ESO gives permission then lowers Main Generator output voltage until VAR's read zero.
	SRO	Direct ATC & BOP to perform rapid down power to reduce turbine loading to reduce vibration
	ATC	Commences rapid down power procedure IAW OP-3 (See Event 3 for CVC-514 failure actions)
	ATC	Places all PZR heater handswitches to ON, lowers setpoint of on service PZR Pressure Controller PIC-100X to 2200 psia to equalize boron
	BOP	When RCS Tcold lowers to <537° F, lowers turbine load to maintain RCS Tcold within 5° F of program Tcold (5° is upper limit, should be maintained with 2° F): <ul style="list-style-type: none"> • Uses manual Turbine Load Set handswitch 1-CS-80 • Uses keyboard to set 3% minute ramp rate and puts turbine in auto
	ATC	After ensuring BOP is ready, insert CEA's as follows: <ul style="list-style-type: none"> • Selects Manual Sequential pushbutton at 1C05 • Moves CEA Control Handswitch to lower position while observing multiple indications of Reactor Power.

Form ES-D-2

Event Description: Failure of CVC-514-MOV (Boric Acid Pump discharge to Charging Pump suction)
C (ATC)

[illegible]

Form ES-D-2

[illegible]

Form ES-D-2

Page 5 of 10

Event Description: RPS, DSS, & Manual Pushbutton Reactor Trip Failure
C (ATC) TS (SRO)

[illegible]

Required Operator Actions

Form ES-D-2

Op-Test No.: 2010 Scenario No.: 2 Event No.: 6

Page 6 of 10

Event Description: 11 Component Cooling pump failure
C (BOP)

[illegible]

Op-Test No.: 2010 Scenario No.: 2 Event No.: 7Page 7 of 10Event Description: Pressurizer Safety Valve fails to reseal (RCS leak on top of PZR)
M(All)

Time	Position	Applicant's Actions or Behavior
	ATC	<p>Verify Pressure and Inventory Control:</p> <ul style="list-style-type: none"> • Check pressure 1850-2300 psia trending to 2250 psia • Verifies all PZR heaters on and spray flow is secured (No RCP's) • If PZR press <2300 psia and PORV cannot be verified closed (acoustic monitor indication) then: <ul style="list-style-type: none"> ○ Shut PORV Block valve RC-403-MOV ○ Places PORV 402 Override in "Override to close" • If PZR Press lowers <1725 psia, then verify SIAS (see event 8) • Verifies RCP's secured (BOP secured for no CCW pump) • Checks PZR level between 80 & 180 inches, trending to 160 inches <ul style="list-style-type: none"> ○ If PZR level low and trending lower, then isolate letdown ○ If PZR level high and trending higher then secure charging pumps one at a time (Discuss with SRO prior to securing final pump) • Ensure RCS subcooling >30° F • Reports RCS Pressure & Inventory not met due to low RCS pressure
	BOP	<p>Verify Core & RCS Heat Removal safety Function</p> <ul style="list-style-type: none"> • Verify TBV's or ADV's maintaining S/G press 850-920 psia and Tcold 525-535° F • Verify at least 1 S/G available for heat removal: <ul style="list-style-type: none"> ○ S/G level (-)170 – (+)30 inches ○ Main or Auxiliary Feed operating ○ Tcold >525° F • Check at least one RCP in loop with available S/G • If any RCP's operating ensure RCS $\Delta T < 10^\circ \text{F}$ • Reports Core & RCS Heat Removal cannot be met due to no operating RCP's.

	BOP/ATC	<p>Verify Containment Environment Safety Function:</p> <ul style="list-style-type: none"> • Check containment pressure <0.7 psig: <ul style="list-style-type: none"> ○ If >0.7 psig then verify all CAC's running with max SRW flow ○ If >2.8 psig then verify CIS & SIAS (not expected at this time) • Check containment temp < 120° F <ul style="list-style-type: none"> ○ If >120° F then verify all CAC's running with max SRW flow • Check containment radiation alarms clear with no unexplained rise: <ul style="list-style-type: none"> ○ If any alarms received then start all IRU's (not expected) • Reports Containment Environment Safety Function as Not Met due to containment pressure negative trend
	BOP/ATC	<p>Verify Radiation Levels External to Containment Safety Function:</p> <ul style="list-style-type: none"> • Check RMS alarms clear with no unexplained rise • Report Radiation Levels External to Containment is complete
	SRO	<p>Hold crew briefing covering:</p> <ul style="list-style-type: none"> • VA not met due to no operating CC pumps • PIC not met due to low RCS press (maybe high PZR level) • HR not met due to no operating RCP's • CE not met due to containment pressure trends • SIAS actuation (SIAS B failure)
	SRO	Review Diagnostic flowchart and determines EOP-5 is correct path
	SRO	Implements EOP-5, hold entry brief, assigns block steps to ATC & BOP
	ATC	<p>Block step D "Monitor Depressurization"</p> <ul style="list-style-type: none"> • Uses Attachment 10 to verify HPSI flow is consistent with pump curve
	BOP	<p>Block Step F "Attempt Leak Isolation":</p> <ul style="list-style-type: none"> • Verifies L/D isolation valves shut (CVC-515 & 516) • Checks for PORV leakage (leakage is present from RV) <ul style="list-style-type: none"> ○ Verifies PORV Block valve RC-403-MOV shut ○ Verifies PORV 402 Override handswitch in "Override to Close" • Shut RCS Sample valve PS-5464-CV • Shut Reactor Vessel Vent valves RC-103 & 104-SV's • Shut PZR vent valves RC-105 & 106-SV's • Checks no leakage into CC system • Verifies leak is inside containment

	BOP	<p>Block Step G “Maintain Containment Environment”:</p> <ul style="list-style-type: none"> • If containment pressure >2.8 psig then verify SIAS & CIS • If CIS actuated then ensure all RCP’s secured • Contact TBO to verify SRW pump room ventilation in service • If containment pressure >4.25 psig the verify CSAS (not expected) • Direct Chemistry to place Hydrogen Monitors in service • Verify all CAC’s, at least one Cavity Cooling, at least one CEDM Cooler, and all PZR Vent fans are running
	ATC	<p>Block Step H “Commence Boration”:</p> <ul style="list-style-type: none"> • Verify SIAS actuated, then: <ul style="list-style-type: none"> ○ VCT Makeup CVC-512-CV shut ○ Boric Acid Direct Makeup CVC-514 open ○ BAST Gravity Feed valves CVC-508 & 509-MOV’s open ○ All available Boric Acid pumps running ○ VCT Outlet valve CVC-501-MOV is shut ○ All available Charging pumps operating ○ Record boration start time and BAST levels
	BOP	<p>Block step I “Commence Cooldown”</p> <ul style="list-style-type: none"> • Block SGIS when Block Permitted alarms are received • Commence cooldown to < 300° F using TBV’s (if available, may be lost due to SIAS causing vacuum to go away) or ADV’s
	SRO	ERPIP call Alert H.A.5.1.2 due to excessive RCS leakage > capacity of charging pumps

Op-Test No.: 2010 Scenario No.: 2 Event No.: 8Page 10 of 10

Event Description: SIAS B failure (with 11 HPSI tagged out for maintenance)
I(ATC)

[illegible]

Facility: CCNPP Scenario No.: 4 Op-Test No.: 2010

Examiners: _____ Operators: _____

Initial Conditions:

U-1 is at 100% power MOC 10,885 MWD/MTU long term steady state, U-2 is at 100% power EOC.

Turnover:

13 4kv bus aligned to alternate feed while normal feed breaker 152-1311 is OOS for scheduled maintenance.

Event No.	Malf. No.	Event Type*	Event Description
1	MS009_01	C (SRO/BOP) R (ATC)	TBV 3940 fails open
2	480v001_04	C (SRO/BOP)	12B 480V bus failure
3	CVCS003_01	C (ATC)	11 Charging Pump coupling failure
4	ESFA009_02	I (BOP) TS (SRO)	Spurious CIS B Actuation
5	CVCS009	I (ATC)	VCT level transmitter fails high
6	CCW003	C (All)	Component Cooling leak in the containment
7	MS002_02	M (All) TS (SRO)	12 S/G tube rupture
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Critical Tasks:

- Secure RCP's prior to exceeding temp limits.
- Isolate S/G in EOP-6
- Depressurize RCS to minimize leakage

SCENARIO OVERVIEW

CC LEAK & S/G TUBE RUPTURE

Initial Conditions: U-1 is at 100% power MOC 10,885 MWD/MTU long term steady state, U-2 is at 100% power EOC. 13 4kv bus aligned to alternate feed while normal feed breaker 152-1311 is OOS for scheduled maintenance.

The scenario starts with a failure of TBV 3940 causing an overcooling event requiring entry into AOP-7K. Crew must control power <100% by unloading turbine and inserting CEA's, then isolate the affected TBV.

A loss of 12B 480V bus occurs next. The crew will implement AOP-7I, tying MCC-106 to MCC-116 and verifying pumps and fans running.

When 11 charging pump coupling fails proper alarm response (F-46) should have ATC start 12 or 13 charging pump prior to losing letdown due to high temp. After another charging pump is started the crew should consult OI-2A for proper positioning of charging pump selector switch.

A spurious actuation of CIS B isolates component cooling to RCP's. When crew verifies containment pressure <2.8 psig they should reset CIS B IAW alarm manual using EOP Attachments. When CIS is reset the crew should reinitiate cooling to RCP's by opening CC isolation valves. When component cooling is re-established to the containment a slow leak develops in the component cooling system.

VCT level transmitter failing high causes letdown to be diverted to waste processing, ATC will position Diversion valve from Auto to VCT which should align system back to normal.

When component cooling is re-established to the containment a leak develops in the component cooling system. AOP-7C should be implemented which leads to isolating the leak which will require tripping reactor and securing all RCP's after Reactivity Control is completed.

When the reactor trips EOP-0 will be implemented and after reactivity control is complete the ATC will secure all RCP's. Trip transient will also cause a S/G tube rupture in 12 S/G which will force alternate actions for both Pressure and Inventory Control. At completion of EOP-0 the SRO should select EOP-6 using EOP-0 diagnostic flow chart.

When EOP-6 is entered the ATC should be assigned monitoring RCS Depressurization which will align Safety Injection in preparations for blocking SIAS. RCS boration will also be started and a rapid cooldown of the RCS to <515 T_{hot} will be commenced. BOP should recognize that TBV 3940 is isolated so controller manual output signal must be 25% higher for same cooldown.

Once T_{hot} <515, the BOP should slow the rate of cooldown and commence isolating 12 S/G IAW EOP-6. When 12 S/G is isolated the scenario will end.

INSTRUCTOR SCENARIO INFORMATION

- ____ 1. Reset to IC-17
- ____ 2. Perform switch check.
- ____ 3. Place simulator in RUN, advance charts and clear alarm display.
 - ____ a. Ensure 12 CEDM Fan running
 - ____ b. Ensure only 11 & 12 CAR's operating (secure 14 CAR)
 - ____ c. Lower VCT level to approximately 95-97"
 - ____ d. Align 13 4KV bus to alternate feed
- ____ 4. Place simulator in FREEZE.
- ____ 5. Enter Malfunctions/ Triggers
 - ____ a. TBV 3940 fails open MS009 on **F1**
 - ____ b. 12B 480V Bus failure 480v001_04on **F2**
 - ____ c. 11 Charging Pump coupling failure CVCS003_01on **F3**
 - ____ d. Spurious CIS B actuation ESFA010_02 on **F4**
 - ____ e. VCT level transmitter fails high CVCS 009 high on **F5**
 - ____ f. CCW leak in Containment CCW003 0-3% over 5 minutes on **F6**
 - ____ g. CEA01 on bottom set as **T1**
 - ____ h. 12 S/G tube rupture MS002_02 (1 tube) on **T1**

- _____ 6. Enter Panel Overrides
- a. 13 4KV Bus Normal Feeder breaker in PTL with yellow tag.
- _____ 7. Set simulator time to real time, then place simulator in RUN.
- _____ 8. Give crew briefing.
- a. Present plant conditions: 100% load at MOC 10.885 MWD/MTU
- b. Power history: Long term steady state for past 52 days
- c. Equipment out of service:
- 13 4KV Bus normal feeder breaker OOS for scheduled maintenance.
- d. Abnormal conditions: None
- e. Surveillances due: None
- f. Instructions for shift: Maintain power
- g. EOOS Risk: Low CDF 1.16 LERF 1.19
- h. Blowdown: Overboard at 100 gpm
- _____ 9. Allow crew 3-5 minutes to acclimate themselves with their positions.
- _____ 10. Instructions for the Booth Operator.
- a. After crew assumes the watch use **F1** to fail TBV-3940 open.
- b. After TBV isolation is shut and crew has a brief use **F2** to fail 12B 480V Bus
- c. After crew ties MCC-106 & 166 use **F3** to fail 11 charging pump coupling.
- d. Once CVCS returned to normal use **F4** & **F5** to give spurious CIS B actuation and the VCT transmitter failure.
- e. After the crew has reset CIS and initiated CCW flow to containment use **F6** to initiate the CCW leak in the containment

RESPONSES TO CREW REQUEST

If a request and response is not listed, delay response until reviewed with the examiner. Responses to routine requests, which have no effect the scenario, do not require examiner clearance.

	REQUEST	RESPONSE
1.	TBO check TBV 3940	After 3 minutes report an air leak and valve is open. Leak can be isolated by shutting 1-IA-82, only 3940 affect by shutting IA-82
2.	Shut MS-120 to isolate TBV-3940.	Shut MS-120 as requested
3.	OWC direct EM to check 12B 480V Bus	After 10 min report bus is grounded.
4.	PPO/TBO tie MCC 106 & 116	After 5 min report ready to tie buses. Override SGFP A oil pump H/S's to off prior to tying bus using remote function.
5.	ABO check 11 charging pump	After 3 minutes report coupling failure
6.	OWC direct IM to evaluate CIS failure at ESFAS	Acknowledge request.
7.	ABO check M/U to CCW Head Tank	After 3 minutes report M/U valve open
8.	TBO shift 12 ADV to 1C43 with 0% output.	After 3 minutes perform and inform Control Room

Op-Test No.: 2010 Scenario No.: 4 Event No.: 1Page 1 of 12

Event Description: TBV 3940 fails open

C (SRO/BOP) R (ATC)

Time	Position	Applicant's Actions or Behavior
	ATC	Recognize Tcold lowering & Reactor power increasing and reports to SRO
	BOP	Recognize TBV-3940 failed open and reports to SRO
	SRO	Implements AOP-7K due to overcooling event
	SRO	Assigns trip criteria to ATC: <ul style="list-style-type: none"> • Reactor trip imminent • Tcold <515° F
	SRO	Direct ATC to control Reactor Power < 100% by: <ul style="list-style-type: none"> • Insert CEA's as necessary to control power • Borate via fast boration to control power
	ATC	Control Reactor Power < 100% by: <ul style="list-style-type: none"> • Insert CEA's as necessary to control power • Borate via fast boration to control power
	SRO	Direct BOP to lower turbine load to maintain Tcold on program
	BOP	Lowers turbine load using Load Set H/S 1-CS-80, to raise Tcold back to program without exceeding 548° F
	BOP	Direct TBO to investigate TBV-3940 and standby to isolate
	SRO	When plant is stable direct BOP to work with TBO to get TBV isolated.
	BOP	Direct shutting TBV isolation valve MS-120 while adjusting turbine load to maintain temperature constant
	SRO	Review Tech Specs for any required entries

Op-Test No.: 2010 Scenario No.: 4 Event No.: 2Page 2 of 12

Event Description: 12B 480V bus failure

C (SRO/BOP)

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	Recognize multiple alarms and report to SRO
	SRO	Direct ATC to monitor the primary and BOP to check RPS for a trip
	BOP	Checks RPS and reports "RPS not calling for a trip"
	BOP	Checks electrical buses and reports loss of 12 B 480V bus
	SRO	Implements AOP-7I and directs BOP to perform Block step IV.A to verify failed bus
	BOP	Determines only 12B 480V Bus is lost and reports
	SRO	Determines Section XV appropriate for 12B 480V Bus and direct BOP to perform step XV.A
	BOP	Directs TBO/PPO/OWC to tie MCC-106 to MCC-116 IAW AOP-7I XV.A.3
	BOP	Performs remainder of Block step A: <ul style="list-style-type: none"> • Verify Emergency H₂ Seal Oil Pump running • Place 11 & 12 CAR's in PTL and starts 13 & 14 CAR's • Verifies 12 CEDM fan running • Verify 12 Gland Exhaust Blower in operatin
	SRO	Directs OWC to have EM shop investigate loss of 12B 480V bus

Op-Test No.: 2010 Scenario No.: 4 Event No.: 3Page 3 of 12

Event Description: 11 Charging Pump coupling failure
C (ATC)

[illegible]

Op-Test No.: 2010 Scenario No.: 4 Event No.: 4

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Event Description: Spurious CIS B Actuation

I (BOP)	TS (SRO)
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100	100

[illegible]

Op-Test No.: 2010 Scenario No.: 4 Event No.: 5Page 5 of 12

Event Description: VCT level transmitter fails high I (ATC)

[illegible]

Op-Test No.: 2010 Scenario No.: 4 Event No.: 6Page 6 of 12Event Description: Component Cooling leak in the containment
C (All)

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize & report containment sump alarm
	BOP	Monitor containment parameters and report no abnormalities.
	BOP	Reference ARM and drain containment sump IAW OI-17
	BOP	Recognize & report low Component Cooling Head Tank alarm
	SRO	Implement AOP-7C
	SRO	Direct ATC to monitor for trip criteria: <ul style="list-style-type: none"> • RCP upper or lower thrust bearing temp >195° F • RCP upper or lower guide bearing temperature >195° F • RCP controlled Bleed-Off flow temperature >200° F
	SRO	Direct BOP to perform Block step C
	BOP	Verify CC pump not cavitating
	BOP	Bypass CVCS IX's using CVC-520-CV
	BOP	Determines leak location is in the containment and requests permission to isolate CC to the containment
	SRO	Direct BOP to shut Containment CC isolation valves
	BOP	Shut CC-3832 & 3833-CV's and verify leak is isolated by verifying CC Head Tank level rise
	SRO	Direct ATC to trip the Reactor and when Reactivity Control Safety Function is complete, then secure all RCP's
	ATC	Trip's Reactor & implements EOP-0: <ul style="list-style-type: none"> • Depress one set of Reactor trip pushbuttons • Verifies prompt drop in Reactor Power and negative SUR • Verifies no more than 1 CEA fails to insert • Verifies DI water makeup to RCS is secured. • Reports Reactivity Control Safety Function is complete Trips all RCP's due to no CC flow

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Event Description: 12 S/G tube rupture

M (All) TS (SRO)

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Verify Turbine is tripped:</p> <ul style="list-style-type: none"> • Check Reactor is tripped • Ensure Turbine is tripped <ul style="list-style-type: none"> ○ Depress both turbine trip pushbuttons ○ Check Turbine Stop valves shut ○ Check turbine speed drops ○ Ensure TG breakers open • Ensure both 2nd stage MSR MOV's shut <p>Report Turbine Trip complete to SRO</p>
	BOP	<p>Verify Vital Auxiliaries:</p> <ul style="list-style-type: none"> • Check 11 or 14 4KV Bus energized • If either 11 or 14 4KV Bus de-energized then start 0C DG • Check 125VDC & 120VAC buses energized • Check either 1Y09 or 1Y10 energized • Verify Component Cooling flow to RCP's • Directs ABO to verify Switchgear Room Ventilation operating <p>Reports Vital Auxiliaries cannot be met due to Component Cooling flow to RCP's.</p>
	ATC	<p>Verify Pressure and Inventory Control:</p> <ul style="list-style-type: none"> • Check pressure 1850-2300 psia trending to 2250 psia <ul style="list-style-type: none"> ○ Operates PZR heaters & spray to maintain ○ If RCS Press <1725 psia verify SIAS • Checks PZR level between 80 & 180 inches, trending to 160 inches <ul style="list-style-type: none"> ○ If PZR level low and trending lower, then start all available charging pumps and isolate letdown • Ensure RCS subcooling >30° F <p>Reports RCS Pressure & Inventory cannot be met due to low PZR level and negative trends on PZR level & pressure</p>

	BOP	<p>Verify Core and RCS Heat Removal Safety Function</p> <ul style="list-style-type: none"> • Verify TBV's or ADV's maintain S/G press 850-920 psia and Tcold 525-535° F • Verify at least one S/G available for controlled heat removal <ul style="list-style-type: none"> ○ S/G level (-)170 – (+)30 inches ○ Main or Aux Feedwater operating to maintain level ○ Tcold >525° F • Check at least one RCP in loop with S/G available • If RCP's operating check $\Delta T < 10^{\circ} \text{ F}$ <p>Report Core and RCS Heat Removal cannot be met due to no operating RCP's</p>
	BOP/ATC	<p>Verify Containment Environment Safety Function:</p> <ul style="list-style-type: none"> • Check containment pressure <0.7 psig: • Check containment temp < 120° F • Check containment radiation alarms clear with no unexplained rise: <p>Reports Containment Environment Safety Function as complete</p>
	BOP/ATC	<p>Verify Radiation Levels External to Containment Safety Function:</p> <ul style="list-style-type: none"> • Check RMS alarms clear with no unexplained rise <ul style="list-style-type: none"> ○ Valid condenser off-gas & S/G blow down radiation alarms, verify S/G blow down isolated. • Report Radiation Levels External to Containment is complete
	SRO	<p>Hold crew briefing covering:</p> <ul style="list-style-type: none"> • Vital Auxiliaries not met due to no component cooling flow to RCP's • PIC not met due to PZR level & pressure low and/or negative trends • Heat Removal not met due to no operating RCP's • RLEC not met due to valid off gas & blow down alarms • SIAS actuation (if actuated)
	SRO	Review Diagnostic flowchart and determines EOP-6 is correct path
	SRO	Implements EOP-6, hold entry brief, assigns block steps to ATC & BOP

	ATC	<p>Block Step D Monitor RCS Depressurization:</p> <ul style="list-style-type: none"> • If RCS pressure < 1725, psia verify SIAS • If RCS pressure > 1725 psia, take actions top block SIAS: <ul style="list-style-type: none"> ○ Open Main & Aux HPSI header valves ○ Start 11 & 13 HPSI pumps ○ Start all available charging pumps ○ When PZR Press Block Permitted alarm is received, then Block SIAS with key switches on 1C10 ○ When RCS pressure is below 1270 psia, then verify HPSI flow IAW Att. 10 • If SIAS has actuated: <ul style="list-style-type: none"> ○ Verify 11 & 13 HIS running ○ Verify 11 & 12 LPSi running ○ Verify all available charging pumps operating ○ Verify HPSI & LPSI flow per Att. 10 & 11
	ATC	<p>Block Step F Commence RCS Boration:</p> <ul style="list-style-type: none"> • If SIAS has actuated then: <ul style="list-style-type: none"> ○ Verify VCT M/U valve CVC-512-CV shut ○ BA Direct M/U valve CVC-514-MOV open ○ BAST Gravity Feed valves CVC-508 & 509-MOV's open ○ RWT CHG PP Suction valve CVC-504-MOV shut ○ All BA pumps running ○ VCT outlet CVC-501-MOV shut ○ All available charging pumps operating • IF SIAS ahs not actuated then: <ul style="list-style-type: none"> ○ Same actions as above with.. ○ M/U Mode selector in Manual • Record time boration started and BAST levels

		<p>Block Step G Commence RCS Cooldown:</p> <ul style="list-style-type: none"> • If SGIS not actuated then: <ul style="list-style-type: none"> ○ Block SGIS A & B when SGIS Block Permitted alarms are received • If SGIS actuates with vacuum available: (not expected) <ul style="list-style-type: none"> ○ Place all CBP H/S's in PTL ○ Verify SGIS IAW Att. 7 ○ Block SGIS ○ Reset SGIS signals ○ Open both MSIV's • Cooldown RCS using TBV's <ul style="list-style-type: none"> ○ Ensure ADV's shut ○ Perform rapid cooldown to 515° F Thot, while maintaining < 100° F cooldown in any one hour (TBV controller to approximately $17 + 25 = 42\%$) • If any of the following conditions exist: <ul style="list-style-type: none"> ○ SIAS actuated ○ TBV's not available ○ Main Feedwater not in operation then: <ul style="list-style-type: none"> ▪ Establish AFW flow with 13 AFW pump <ul style="list-style-type: none"> • Open all Motor train block valves • Start 13 AFW pump • Restore unaffected S/G level (-)24 – (+)30 inches using flow control valve ▪ Secure Main Feedwater system: • If SIAS not actuated, TBV's available & Main Feedwater in operation: <ul style="list-style-type: none"> ○ Establish shutdown feed lineup <ul style="list-style-type: none"> ▪ One SGFP, One CBP, Two Condensate pumps, no HDP's ▪ Ensure feed flow restoring S/G level (-)24 – (+)30 inches w/o exceeding 100° F in any one hour • Dispatch TBO to standby in 45' SWGR room for shifting ADV control
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	ATC	<p>Block Step H Evaluate Need for HPSI Throttling:</p> <ul style="list-style-type: none"> • If all following conditions met <ul style="list-style-type: none"> ○ At least 25° F subcooling based on CET's ○ PZR level > 101 inches ○ One S/G available for heat removal, then <ul style="list-style-type: none"> ▪ HPSI flow may be reduced by throttling or stopping HPSI pumps one at a time to maintain: <ul style="list-style-type: none"> • CET Subcooling 25 - 140° F • PZR level 101-180 inches
	ATC	<p>Block Step I Depressurize RCS to reduce subcooling and maintain PZR level</p> <ul style="list-style-type: none"> • If a bubble exist in PZR then maintain subcooling as low as possible but between 25 & 140 • RCS Press < 900 psia • RCS Press approximately equal to S/G pressure by <ul style="list-style-type: none"> ○ Initiation of Aux. Spray <ul style="list-style-type: none"> ▪ Record PZR water temp & Charging temp ▪ Open Aux. Spray valve CVC-517-CV ▪ Shut Charging loop stops as necessary CVC-518 & 519-CV's ▪ Shift PZR Main spray controller HIC-110 to manual with 0% output ▪ Maintain PZR C/D rate < 200° F per hour

	BOP	<p>Block Step J Identify, Isolate and Confirm affected S/G</p> <ul style="list-style-type: none"> • Identify affected S/G using: <ul style="list-style-type: none"> ○ S/G samples ○ Main Steam Rad Monitor trends ○ S/G level trends when not feeding ○ Post trip S/G level trends • When Thot < 515° F then isolate most affected S/G <ul style="list-style-type: none"> ○ Shut 12 ADV using hand transfer valve in 45' SWGR room ○ Shut 12 MSIV ○ Verify 12 MSIV Bypass MS-4052-MOV shut ○ Verify 12 S/G Feedwater Isolation valve FW-4517-MOV shut ○ Shut 12 S/g AFW Steam Supply valves MS-4071 & 4071A-CV's ○ Shut 12 S/G AFW Block valves <ul style="list-style-type: none"> ▪ 1-AFW-4530-CV ▪ 1-AFW-4531-CV ▪ 1-AFW-4532-CV ▪ 1-AFW-4533-CV ○ Shut 12 S/G Blowdown valves BD-4012 & 4013-CV's ○ Shut MS Upstream drain Isolation valves with HS-6622 in close ○ Direct ABO or OSO to verify no 12 S/G Safety valves leaking
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