

| Facility: Calvert Cliffs Units 1 & 2 | | Date of Examination: 8/28/06 - 9/1/06 |
|---|---------------|---|
| Examination Level (circle one): RO / SRO | | Operating Test Number: 2006 |
| Administrative Topic (see Note) | Type Code* | Describe activity to be performed |
| Conduct of Operations | N | Apply technical specifications to a relay failure (NRC-14) K/A 2.1.12 Ability to apply technical specifications for a system (2.9, 4.0) |
| Conduct of Operations | N | Establish max power limit with plant computer failure (NRC-15) K/A 2.1.25 Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data (2.8, 3.1) |
| Equipment Control | N | Calculate an estimated critical condition (NRC-16) K/A 2.2.34 Knowledge of the process for determining the internal and external effects on core reactivity (2.8, 3.2) |
| Radiation Control | N | Determine radiological conditions for personnel exposure (NRC-17) K/A 2.3.10 Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure (2.9, 3.3) |
| Emergency Plan | | |
| NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required. | | |
| * Type Codes & Criteria: (C)ontrol room (D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes) (N)ew or (M)odified from bank (≥ 1) (P)revious 2 exams (≤ 1 ; randomly selected) (S)imulator | | |

| Facility: Calvert Cliffs Units 1 & 2 | | Date of Examination: 8/28/06 - 9/1/06 |
|---|------------|---|
| Examination Level (circle one): RO / SRO | | Operating Test Number: 2006 |
| Administrative Topic (see Note) | Type Code* | Describe activity to be performed |
| Conduct of Operations | N | Identify reporting requirements (NRC-18) K/A 2.1.1 Knowledge of conduct of operations requirements (3.7, 3.8) |
| Conduct of Operations | N | Establish max power limit with plant computer failure (NRC-15) K/A 2.1.25 Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data (2.8, 3.1) |
| Equipment Control | N | Evaluate post-maintenance test requirements (NRC-19) K/A 2.2.21 Knowledge of pre- and post-maintenance operability requirements (2.3, 3.5) |
| Radiation Control | N | Determine radiological conditions for personnel exposure (NRC-17) K/A 2.3.10 Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure (2.9, 3.3) |
| Emergency Plan | D | Determine appropriate emergency response actions (NRC-20) K/A 2.4.29 Knowledge of the emergency plan (2.6, 4.0) |
| NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required. | | |
| * Type Codes & Criteria: (C)ontrol room (D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes) (N)ew or (M)odified from bank (≥ 1) (P)revious 2 exams (≤ 1 ; randomly selected) (S)imulator | | |

Facility: **Calvert Cliffs 1&2**Job Performance Measure No.: **NRC-14**Task Title: **Apply Technical Specifications to a Relay Failure**Task Number: **xxx.xxx**K/A Reference: **K/A 2.1.12 (2.9, 4.0)**Method of testing:Simulated Performance: _____ Actual Performance: √Classroom: √ Simulator: _____ Plant: _____

READ TO THE EXAMINEE:

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

Initial Conditions:

- 1. Unit 1 is at 100% power.**
- 2. An E&C technician performed a visual inspection of ESFAS Channel ZA Actuation Relay Cabinet. The technician reports that two SIAS A8 power relays are discolored and shows signs of deformation possibly due to excessive temperature. These relays CANNOT be considered operable.**
- 3. The affected relays are as follows:**
 - **SIAS A8 Relay at B5 (11 LPSI)**
 - **SIAS A8 Relay at B8 (11 & 12 CAC Fans)**

Initiating Cue:

You are directed to determine which TS LCOs apply, the LCO actions that must be taken and the completion time limits for these actions. Applicable prints and the technical specifications are provided.

Task Standard:

Determine the TS LCOs that apply and the LCO actions that must be taken.

Evaluation Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps 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. **1E-076 Sheet 1, "LPSI Pp 11", Revision 22**
2. **1E-076 Sheet 11C, "Containment Cooling Fan 11", Revision 3**
3. **1E-076 Sheet 11D, "Containment Cooling Fan 12", Revision 2**
4. **1E-058, "ESFAS Logic Diagram", Revision 35**
5. **1E-058A, "ESFAS Logic Diagram", Revision 48**
6. **Technical Specifications**

General References:

1. **SD-048, "Engineered Safety Features Actuation System", Revision 3 (Page 13)**
2. **1E-076 Sheet 1, "LPSI Pp 11", Revision 22**
3. **1E-076 Sheet 11C, "Containment Cooling Fan 11", Revision 3**
4. **1E-076 Sheet 11D, "Containment Cooling Fan 12", Revision 2**
5. **1E-058, "ESFAS Logic Diagram", Revision 35**
6. **1E-058A, "ESFAS Logic Diagram", Revision 48**
7. **Technical Specifications**

Time Critical Task:

No

Validation Time:

15 minutes

Simulator Setup:

None

TIME START _____

_____ Review prints and initial conditions.

Same as element.

_____ Refer to Technical Specifications

Same as element

* Identify the TS LCOs that apply.

* Identify the TS LCOs Actions that are required.

* Identify the required completion time for the actions.

Determines TS LCO 3.3.5 Action C applies for loss of Function 1.b. (SIAS Actuation Logic) in Table 3.3.5-1.

Determines that required action is to restore the affected Actuation Logic channel (SIAS Channel A) to OPERABLE status.

Determines that required completion time is 48 hours.

TIME STOP _____

| | |
|----------------|---|
| Examiner Note: | The task is complete when the examinee has determined which TS LCOs apply, the LCO actions that must be taken and the completion time limits for these actions. |
|----------------|---|

Verification of Completion

Job Performance Measure Number: NRC-14

Examinee: _____

NRC Examiner: _____

Date Performed: _____

Facility Evaluator: _____

Number of Attempts: _____

Time to Complete: _____

Follow up Question: _____

Examinee Response: _____

Result: SAT _____ UNSAT _____

Examiner's Signature and Date: _____

EXAMINEE'S CUE SHEET

INITIAL CONDITIONS:

1. Unit 1 is at 100% power.
2. An E&C technician performed a visual inspection of ESFAS Channel ZA Actuation Relay Cabinet. The technician reports that two SIAS A8 power relays are discolored and shows signs of deformation possibly due to excessive temperature. These relays **CANNOT** be considered operable.
3. The affected relays are as follows:
 - SIAS A8 Relay at B5 (11 LPSI)
 - SIAS A8 Relay at B8 (11 & 12 CAC Fans)

INITIATING CUE:

You are directed to determine which TS LCOs apply, the LCO actions that must be taken and the completion time limits for these actions. Applicable prints and the technical specifications are provided.

Facility: **Calvert Cliffs 1&2**Job Performance Measure No.: **NRC-15**Task Title: **Establish Max Power Limit With Plant Computer Failure**Task Number: **xxx.xxx**K/A Reference: **K/A 2.1.25 (2.8, 3.1)**Method of testing:Simulated Performance: _____ Actual Performance: √Classroom: √ Simulator: _____ Plant: _____

READ TO THE EXAMINEE:

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

Initial Conditions:

- 1. Unit 2 is been operating at 100% for two months.**
- 2. The plant computer has failed and reboot efforts have not been successful. DAS is also out of service.**
- 3. A transient occurred immediately after the loss of the plant computer. However, the plant has been stabilized.**
- 4. The current highest excore NI reading is 99.2%.**
- 5. CECOR is not available. Reactor Engineering reports a measured value of FxyT of 1.592**
- 6. Axial Shape Index is at +0.15.**
- 7. The Power Ratio Recorder is correctly adjusted.**
- 8. CEAs are above long term steady state insertion limit.**

Initiating Cue:

You are directed to perform AOP-7H, "Loss Of Plant Computer In Mode One Or Two", Step IV.C.3.b and to complete AOP-7H, Attachment 2.

Task Standard:

Determine maximum power limits with loss of plant computer.

Evaluation Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps 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. **Calculator**
2. **AOP-7H, "Loss Of Plant Computer In Mode One Or Two", Revision 22**
3. **Blank AOP-7H Attachment 2**
4. **NEOP-23, "Technical Data Book", Revision 22**

General References:

1. **AOP-7H, "Loss Of Plant Computer In Mode One Or Two", Revision 22 (pages 7-10 of 25 and Attachment 2**
2. **NEOP-23, "Technical Data Book", Revision 22 (pgs 74-76 of 81)**

Time Critical Task:

No

Validation Time:

15 minutes

Simulator Setup:

None

TIME START _____

_____ Identify and locate AOP-7H, Step IV.C.3.b. Same as element.

NOTE: The measured Fxy T is the last value calculated by CECOR or as provided by the Reactor Engineering Work Group when CECOR is NOT available.

NOTE: The assumed Fxy T is the value of the LHR curve of Figure 2-IV.A.1, Excure LHR Power vs Peripheral ASI, NEOP-23, that represents the smallest Fxy T that is greater than the measured Fxy T.

* (1) Determine the Maximum allowed power from NEOP-23, Figure 2-IV.A.1, Excure LHR Power vs Peripheral ASI, using the assumed FxyT

* (2) Determine the Maximum allowed power of NEOP-23, Figure 2-IV.A.2, Excure DNBR Power vs Peripheral ASI.

* (3) Record the following parameters on ATTACHMENT (2), EXCORE LHR MONITORING WHEN THE DAS IS OUT OF SERVICE:

- Measured Fxy T
- Assumed Fxy T
- Maximum allowed power from Step (1)
- Maximum allowed power from Step (2)

* Completes Attachment 2.

Determines maximum power is $\leq 82.5\% (+0.5\%)$. Records this value on Attachment 2.

Determines maximum power is $\leq 97.5\% (+0.5\%)$. Records this value on Attachment 2.

Records following values on Attachment 2.

- Measured FxyT = 1.592
- Assumed FxyT = 1.5925

Maximum allowed power from Step (1) = $82.5\% \pm 0.5\%$

Maximum allowed power from Step (2) = $97.5\% \pm 0.5\%$

Indicates the following on Attachment 2:

- CEAs above LTSS Insertion Lmt
- Power Ratio Recorder adjusted
- * Thermal Power IS > max allowed

ELEMENT
(* = CRITICAL STEP)

STANDARD

TIME STOP _____

Examiner Note:

The task is complete when the examinee has filled in AOP-7H,
Attachment 2.

EXAMINEE'S CUE SHEET

INITIAL CONDITIONS:

1. Unit 2 is been operating at 100% for two months.
2. The plant computer has failed and reboot efforts have not been successful. DAS is also out of service.
3. A transient occurred immediately after the loss of the plant computer. However, the plant has been stabilized.
4. The current highest excore NI reading is 99.2%.
5. CECOR is not available. Reactor Engineering reports a measured value of $F_{xy}T$ of 1.592.
6. Axial Shape Index is at +0.15.
7. The Power Ratio Recorder is correctly adjusted.
8. CEAs are above long term steady state insertion limit.

INITIATING CUE:

You are directed to perform AOP-7H, "Loss Of Plant Computer In Mode One Or Two", Step IV.C.3. b and to complete AOP-7H, Attachment 2.

Facility: **Calvert Cliffs 1&2**Job Performance Measure No.: **NRC-16**Task Title: **Calculate An Estimated Critical Condition**Task Number: **xxx.xxx**K/A Reference: **K/A 2.2.34 (2.8, 3.2)**Method of testing:Simulated Performance: _____ Actual Performance: √Classroom: √ Simulator: _____ Plant: _____

READ TO THE EXAMINEE:

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

Initial Conditions:

- 1. Unit 2 is in MODE 3 at normal operating temperature and pressure. Current time is 8am.**
- 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:**
 - Plant trip from 100% power 32 hours ago**
 - Power history - at 100% for the past 68 days**
 - Burnup - 16,225 MWD/MTU**
- 4. Previous critical condition data and boron correction factor have been filled in on NEOP-302 Attachment 2.**

Initiating Cue:

You are directed to calculate the estimated critical concentration for a quick trip recovery criticality anticipated in 2 hours. Do not calculate the ± 1 hr or the ± 2 hr values. Do not calculate the ECC tolerance band values.

Task Standard:

Calculate an estimated critical condition.

Evaluation Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps 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. **Calculator**
2. **NEOP-302, "Estimated Critical Condition", Revision 6**
3. **NEOP-23, "Technical Data Book", Revision 22**
4. **Xenon Worth Calculator Printout**

General References:

1. **NEOP-302, "Estimated Critical Condition", Revision 6**
2. **NEOP-23, "Technical Data Book", Revision 22**
3. **Unit 2 ECC performed 5/29/2003**
4. **Unit 2 ECC performed 1/25/2004**
5. **Xenon Worth Calculator Printout**

Time Critical Task:

No

Validation Time:

20 minutes

Simulator Setup:

None

TIME START _____

_____ Refers to NEOP-302

Same as element.

NEOP-302, Section 6.1

A. COMPLETE the previous critical conditions section of Attachment 2.

_____ RECORD the unit and cycle numbers, date/time of shutdown, current burnup.

Data filled in on form.

B. COMPLETE the current conditions section of Attachment 2.

- * 1. RECORD the excess reactivity from Fig 2-II.A.7 of NEOP-23 on Att. 2
- * 2. DETERMINE the HZP Inverse Boron Worth (IBW) from Fig 2-II.A.2 and record on Att. 2
- _____ 3. DETERMINE the B-10 Correction Factor and record on Att. 2

Records 8.549 \pm 0.015 [8.534 to 8.564]

Records 111.44 \pm 0.02 [111.42 to 111.46]

Records 0.971

_____ C. RECORD the estimated date and time of reactor criticality for the ECC on Attachment 2 for time point 0h.

Records 1000 as estimated time.

_____ D. RECORD the elapsed time from reactor shutdown to the estimated time of criticality as "Hours After Shutdown" on Att. 2 for time point 0h.

Records 34 hrs as elapsed time.

- * E. DETERMINE the post shutdown xenon worth for time point 0h.
- * H. DETERMINE the desired CEA position for criticality.
- * I. DETERMINE the CEA reactivity worth at the desired CEA position using Fig 2-II.B.1 of NEOP-23.
- * J. CALCULATE the Corrected HZP IBW using the formula.
- * K. CALCULATE the boron worth using the formula.

Records 1.036 % delta rho from Xenon Rho Calculator report for 34 hours.

Records Group 4 at 90 inches on Attachment 2.

Records CEA worth of 0.787 % delta rho on Attachment 2.

Records corrected HZP IBW as 114.77 \pm 0.12 [114.65 to 114.89]

Records boron worth as 6.726 \pm 0.02 [6.706 to 6.746]

* L. **MULTIPLY** the Boron Worth by the Corrected HZP IBW. This value equals estimated critical concentration.

Records estimated critical concentration as 772 ± 4 ppm [768 ppm to 776 ppm]

TIME STOP _____

| | |
|----------------|---|
| Examiner Note: | The task is complete when the examinee has finished calculating the estimated critical concentration for the planned time of criticality. |
|----------------|---|

Verification of Completion

Job Performance Measure Number: NRC-16

Examinee: _____

NRC Examiner: _____

Date Performed: _____

Facility Evaluator: _____

Number of Attempts: _____

Time to Complete: _____

Follow up Question: _____

Examinee Response: _____

Result: SAT _____ UNSAT _____

Examiner's Signature and Date: _____

EXAMINEE'S CUE SHEET

INITIAL CONDITIONS:

1. Unit 2 is in MODE 3 at normal operating temperature and pressure. Current time is 8am.
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:
 - Plant trip from 100% power 32 hours ago
 - Power history - at 100% for the past 68 days
 - Burnup - 16,225 MWD/MTU
4. Previous critical condition data and boron correction factor have been filled in on NEOP-302 Attachment 2.

INITIATING CUE:

You are directed to calculate the estimated critical concentration for a quick trip recovery criticality anticipated in 2 hours. Do not calculate the +1hr or the +2hr values. Do not calculate the ECC tolerance band values.

Estimated Critical Condition

**ATTACHMENT 2
ECC — 4-HOUR WINDOW WITH SAME BORON**

Previous Critical Conditions

| Unit | Cycle | Date | Time | Burnup, MWD/MTU |
|------|-------|------------|------|--------------------|
| 2 | 16 | 72 hrs ago | --- | 16,225 |

Current Conditions

| Excess Reactivity, %Δρ [A] | HZP IBW, ppm/%Δρ [B] | B-10 Correction [C] |
|----------------------------------|----------------------------|---------------------------|
| | | 0.971 |

Estimated Critical Conditions

| Time Point | Date | Time | Hours After Shutdown | Xenon Worth, %Δρ [D] | Group 3, inches | Group 4, inches | Group 5, inches | CEA Worth, %Δρ [E] (for 0h) or [E] = A-(D+G) | Corrected HZP IBW, ppm/%Δρ [F] = B/C | Boron Worth, %Δρ [G] = A-(D+E) | Critical Boron Conc., ppm [H] = F*G |
|------------|------|------|----------------------|----------------------|-----------------|-----------------|-----------------|--|--------------------------------------|--------------------------------|-------------------------------------|
| -2h | | | | | | | | | | | |
| -1h | | | | | | | | | | | |
| 0h | | | | | | | | | | | |
| +1h | | | | | | | | | | | |
| +2h | | | | | | | | | | | |

ECC Tolerance Band

| Time Point | Date | Time | Lower CEA Bound (ECC Worth + 0.5 %Δρ) | | | Upper CEA Bound (ECC Worth - 0.5 %Δρ) | | | | | |
|------------|------|------|---------------------------------------|-----------------|-----------------|---------------------------------------|----------------|-----------------|-----------------|-----------------|--|
| | | | Bounding Worth | Group 3, inches | Group 4, inches | Group 5, inches | Bounding Worth | Group 3, inches | Group 4, inches | Group 5, inches | |
| -2h | | | | | | | | | | | |
| -1h | | | | | | | | | | | |
| 0h | | | | | | | | | | | |
| +1h | | | | | | | | | | | |
| +2h | | | | | | | | | | | |

Excess Reactivity Source: _____

IBW Source: _____

B-10 Source: _____

CEA Worth Source: _____

Prepared by: _____ / _____
signature date

SRO Verification by: _____ / _____
signature date

NOTE: Obtain a sequence number from the Attachment Log Sheet, Attachment 1.

ATTACHMENT 2 - ANSWER KEY
ECC — 4-HOUR WINDOW WITH SAME BORON

Previous Critical Conditions

| Unit | Cycle | Date | Time | Burnup, MWD/MTU |
|------|-------|------------|------|-----------------|
| 2 | 16 | 72 hrs ago | --- | 16,225 |

Current Conditions

| Excess Reactivity, % $\Delta\rho$ [A] | HZP IBW, ppm/% $\Delta\rho$ [B] | B-10 Correction [C] |
|--|------------------------------------|------------------------|
| 8.549 \pm 0.015 | 111.44 \pm 0.02 | 0.971 |

Estimated Critical Conditions

| Time Point | Date | Time | Hours After Shutdown | Xenon Worth, % $\Delta\rho$ [D] | Group 3, inches | Group 4, inches | Group 5, inches | CEA Worth, % $\Delta\rho$ [E] (for 0h) or [E] = A-(D+G) | Corrected HZP IBW, ppm/% $\Delta\rho$ [F] = B/C | Boron Worth, % $\Delta\rho$ [G] = A-(D+E) | Critical Boron Conc., ppm [H] = F*G |
|------------|------|------|----------------------|------------------------------------|-----------------|-----------------|-----------------|---|--|--|--|
| -2h | | | | | | | | | | | |
| -1h | | | | | | | | | | | |
| 0h | | 1000 | 34 | 1.036 | | 90 | | 0.787 | 114.77 \pm .12 | 6.726 \pm 0.02 | 772 \pm 4 |
| +1h | | | | | | | | | | | |
| +2h | | | | | | | | | | | |

ECC Tolerance Band

| Time Point | Date | Time | Lower CEA Bound (ECC Worth + 0.5 % $\Delta\rho$) | | | | Upper CEA Bound (ECC Worth - 0.5 % $\Delta\rho$) | | | | |
|------------|------|------|---|-----------------|-----------------|-----------------|---|-----------------|-----------------|-----------------|--|
| | | | Bounding Worth | Group 3, inches | Group 4, inches | Group 5, inches | Bounding Worth | Group 3, inches | Group 4, inches | Group 5, inches | |
| -2h | | | | | | | | | | | |
| -1h | | | | | | | | | | | |
| 0h | | | | | | | | | | | |
| +1h | | | | | | | | | | | |
| +2h | | | | | | | | | | | |

Excess Reactivity Source: _____

IBW Source: _____

B-10 Source: _____

CEA Worth Source: _____

Prepared by: _____ / _____
signature date

SRO Verification by: _____ / _____
signature date

NOTE: Obtain a sequence number from the Attachment Log Sheet, Attachment 1.

Facility: **Calvert Cliffs 1&2**Job Performance Measure No.: **NRC-17**Task Title: **Determine radiological conditions for personnel exposure**Task Number: **xxx.xxx**K/A Reference: **K/A 2.3.10 (2.9, 3.3)**Method of testing:Simulated Performance: _____ Actual Performance: √ Classroom: √ Simulator: _____ Plant: √

READ TO THE EXAMINEE:

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

Initial Conditions:

- 1. Unit 2 is at 100% power.**
- 2. Letdown is in service on CVC-110Q Control Valve. L/D Control Valve CVC-110P is isolated and post work testing is in progress on the valve.**
- 3. Maintenance needs the valve observed for any binding while it is stroked a number of times before returning it to service.**

Initiating Cue:

You have been directed to locally observe valve stroke on Letdown Control Valve 2-CVC-110P-CV and then stand by to clear tags and open the downstream isolation valve. Task time is estimated to take 10 minutes.

State the radiological requirements for entering this area. Include in your discussion:

- 1. Protective clothing required in the work area**
- 2. Highest radiation level in the work area**
- 3. Expected dose for this assignment**
- 4. Dose rate alarm**
- 5. Low dose waiting area**

Does the Letdown HX Room meet the definition of High Radiation Area (HRA) or Locked HRA? Why? What differences, if any, are there in the barrier controls applied to these two types of areas at Calvert Cliffs?

Task Standard:

Determine radiological conditions for personnel exposure

Evaluation Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps 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. **Unit 2 Letdown Heat Exchanger Room Survey Map**
2. **Special Work Permit for Operations valve manipulation in the Letdown Heat Exchanger Room**

General References:

RP-1-100, "Radiation Protection", Revision 8 (Pages 14, 31)

Time Critical Task:

No

Validation Time:

10 minutes

Simulator Setup:

None

TIME START _____

_____ Review survey map and SWP.

Same as element.

- * 1. **State** protective clothing requirements.
- * 2. **Identify** highest radiation level in the area.
- * 3. **Calculate** expected dose for this assignment.
- * 4. **Identifies** dose rate alarm setpoint.
- * 5. **Locates** low dose waiting area.
- * 6. **Explains** the radiation classification of the Letdown HX Room.
- * 7. **Describes** the differences in barrier control for HRA vs. Locked HRA.

Determines that **shoe covers and cotton liners** are required.

Determines that highest radiation level in the area is **90 mR/hr** by the N side of the heat exchanger.

Determines that expected dose in 10 minutes is $1/6 * 90\text{mR/hr} = \mathbf{15\ mR}$

Determines from SWP that dose rate alarm will be set at **100 mR/hr**.

Identifies from SWP that room does not have a low dose waiting area. Must exit room to lower dose.

States that LD HX Room is HRA as HRAs have areas where dose rate could exceed 100 mR/hr at 30 cm. Locked HRA has areas where dose could exceed 1R/hr at 30 cm.

States that HRAs and Locked HRAs treated the same at Calvert Cliffs. Both are locked, guarded or electronically surveilled.

TIME STOP _____

Examiner Note:

The task is complete when the examinee has provided requested radiological information.

EXAMINEE'S CUE SHEET

INITIAL CONDITIONS:

- Unit 2 is at 100% power.
- Letdown is in service on CVC-110Q Control Valve. L/D Control Valve CVC-110P is isolated and post work testing is in progress on the valve.
- Maintenance needs the valve observed for any binding while it is stroked a number of times before returning it to service.

INITIATING CUE:

You have been directed to locally observe valve stroke on Letdown Control Valve 2-CVC-110P-CV and then stand by to clear tags and open the downstream isolation valve. Task time is estimated to take 10 minutes.

State the radiological requirements for entering this area. Include in your discussion:

1. Protective clothing required in the work area
2. Highest radiation level in the work area
3. Expected dose for this assignment
4. Dose rate alarm
5. Low dose waiting area

Does the Letdown HX Room meet the definition of High Radiation Area (HRA) or Locked HRA? Why? What differences, if any, are there in the barrier controls applied to these two types of areas at Calvert Cliffs?

Facility: **Calvert Cliffs 1&2**Job Performance Measure No.: **NRC-19**Task Title: **Evaluate Post-Maintenance Test Requirements**Task Number: **xxx.xxx**K/A Reference: **K/A 2.2.21 (2.3, 3.5)**Method of testing:Simulated Performance: _____ Actual Performance: √ Classroom: √ Simulator: _____ Plant: _____

READ TO THE EXAMINEE:

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

Initial Conditions:

1. **Unit 1 is at 100% power.**
2. **E&C replaced two SIAS A8 power relays in ESFAS Channel ZA Actuation Relay Cabinet.**
3. **Relay testing was NOT performed on the new relays prior to installation.**
4. **The affected relays are as follows:**
 - **SIAS A8 Relay at B5 (11 LPSI)**
 - **SIAS A8 Relay at B8 (11 & 12 CAC Fans)**

Initiating Cue:

You are directed to determine post-maintenance testing requirements.

Task Standard:

Evaluate post-maintenance test requirements for the relay replacement.

Evaluation Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps 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. **1E-076 Sheet 1, "LPSI Pp 11", Revision 22**
2. **1E-076 Sheet 11C, "Containment Cooling Fan 11", Revision 3**
3. **1E-076 Sheet 11D, "Containment Cooling Fan 12", Revision 2**
4. **1E-058, "ESFAS Logic Diagram", Revision 35**
5. **1E-058A, "ESFAS Logic Diagram", Revision 48**
6. **Technical Specifications**
7. **MN-PMTG, "Post Maintenance Testing Guideline", Revision 0**
8. **NO-1-208, "Nuclear Operations Post Maintenance Testing", Revision 11**

General References:

1. **SD-048, "Engineered Safety Features Actuation System", Revision 3 (Page 13)**
2. **1E-076 Sheet 1, "LPSI Pp 11", Revision 22**
3. **1E-076 Sheet 11C, "Containment Cooling Fan 11", Revision 3**
4. **1E-076 Sheet 11D, "Containment Cooling Fan 12", Revision 2**
5. **1E-058, "ESFAS Logic Diagram", Revision 35**
6. **1E-058A, "ESFAS Logic Diagram", Revision 48**
7. **Technical Specifications**
8. **MN-PMTG, "Post Maintenance Testing Guideline", Revision 0 (PMT-70)**
9. **NO-1-208, "Nuclear Operations Post Maintenance Testing", Revision 11 (Attachment 3)**

Time Critical Task:

No

Validation Time:

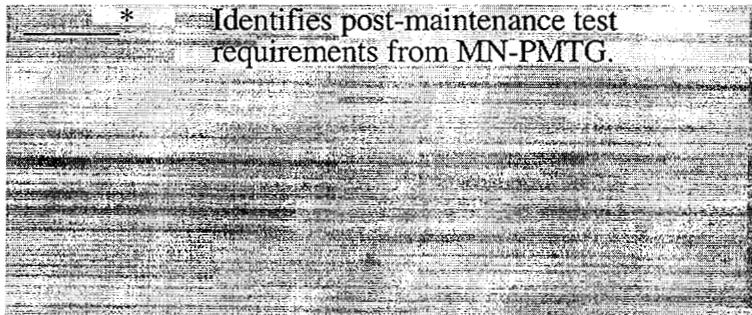
15 minutes

Simulator Setup:

None

TIME START _____

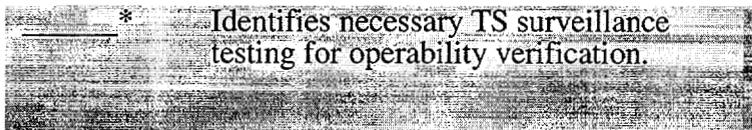
- _____ Review prints and initial conditions. Same as element.
- _____ Refer to Technical Specifications. Same as element
- _____ Refer to Post Maintenance Test Procedures. Same as element



_____ * Identifies post-maintenance test requirements from MN-PMTG.

Determines per PMT-70, Steps 2.2.4, 2.2.5 that need to (1) verify affected motors (11 LPSI, 11/12 CAC Fans) can be started using a simulated signal and (2) verify that all equipment affected by the repaired control circuit device operates properly (11 LPSI Bkr, 11/12 CAC Fan Bkrs).

Determines control circuit maintenance is **NOT** exempt from testing because relay not tested before installation. (Page 17 of 41)



_____ * Identifies necessary TS surveillance testing for operability verification.

Perform a channel functional test on SIAS Channel A Actuation Logic Channel under SR 3.3.5.1.

TIME STOP _____

| |
|---|
| Examiner Note: The task is complete when the examinee has determined the post-maintenance testing requirements for this activity. |
|---|

Verification of Completion

Job Performance Measure Number: NRC-19

Examinee: _____

NRC Examiner: _____

Date Performed: _____

Facility Evaluator: _____

Number of Attempts: _____

Time to Complete: _____

Follow up Question: _____

Examinee Response: _____

Result: SAT _____ UNSAT _____

Examiner's Signature and Date: _____

EXAMINEE'S CUE SHEET

INITIAL CONDITIONS:

1. Unit 1 is at 100% power.
2. E&C replaced two SIAS A8 power relays in ESFAS Channel ZA Actuation Relay Cabinet.
3. Relay testing was NOT performed on the new relays prior to installation.
4. The affected relays are as follows:
 - SIAS A8 Relay at B5 (11 LPSI)
 - SIAS A8 Relay at B8 (11 & 12 CAC Fans)

INITIATING CUE:

You are directed to determine post-maintenance testing requirements.

Facility: **Calvert Cliffs 1&2**Job Performance Measure No.: **NRC-20**Task Title: **Determine Appropriate Emergency Response Actions**Task Number: **204.097**K/A Reference: **K/A 2.4.29 (2.6, 4.0)**Method of testing:Simulated Performance: _____ Actual Performance: √ Classroom: √ Simulator: _____ Plant: _____

READ TO THE EXAMINEE:

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

Initial Conditions:

- 1. Unit 2 was at 100% power when a loss of 22 SGFP occurred.**
- 2. A reactor trip was manually initiated by de-energizing 480VAC busses at minus 40 inches in the SGs.**
- 3. EOP-8 was implemented due to multiple events in progress (steam leak and a LOCA.)**
- 4. RCS subcooling is 0°F.**
- 5. SIAS failed to automatically actuate and required manual actuation.**
- 6. Containment pressure was 30 psig and rising when it suddenly lowered to 1 psig.**
- 7. Containment High Range Radiation Monitors are currently reading 4000 Rem/Hr.**
- 8. You are performing the duties of the Shift Manager.**

Initiating Cue:

You are to complete the emergency response initial notification form.

Task Standard:

Determine EAL classification and protective action recommendations and complete the emergency response form.

Evaluation Criteria:

1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps 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. **ERPIP 3.0, "Immediate Actions", Revision 38**
2. **ERPIP 3.0 Attachment 1, "EAL Criteria", Revision 29**
3. **DRDT screen showing DIR10 is 90° and DIR60 is 80°**
4. **Blank Copy of ERPIP 3.0 Attachment 3, "Initial Notification Form" (ERPIP 3.0 Pages 19 and 20)**

General References:

1. **ERPIP 3.0, "Immediate Actions", Revision 38 (Pages 18 thru 25)**
2. **ERPIP 3.0 Attachment 1, "EAL Criteria", Revision 29**

Time Critical Task:

No

Validation Time:

15 minutes

Simulator Setup:

None

TIME START _____

- | | | |
|----------|--|---|
| _____ 1. | Identify and locate ERPIP. | Same as element. |
| _____ 2. | Refers to Immediate Actions and identifies the appropriate category from the listing and go to the appropriate Attachment. | Selects and goes to attachment 2, Emergency Classification. |

ATTACHMENT 2 EMERGENCY CLASSIFICATION

A. CLASSIFY THE EMERGENCY

NOTE: The decision to classify an emergency may NOT be delegated.

* _____ 1.0 **EVALUATE** conditions against Attachment 1, Emergency Action Level (EAL) criteria.

Fills in Notification Form to indicate a GENERAL EMERGENCY classification is warranted under FISSION PRODUCT BARRIER DEGRADATION, based on a loss of all 3 barriers-H.G.5.1.4

Fuel Clad Barrier-
Containment Radiation reading > 3500 rem/hr

RCS Barrier- RCS subcooling < 25°F due to RCS leakage.

Containment Barrier-Rapid unexplained CNTMT pressure decrease following initial increase.

B. IMPLEMENT EMERGENCY RESPONSE PLAN ACTIONS (ATTACHMENT 2)

- | | | |
|----------|---|---|
| ____ 1.0 | If an EAL is satisfied, <u>THEN OBTAIN an Attachment 3, Initial Notification Form (from this procedure).</u> | Determines from above evaluation that an EAL is satisfied and obtains an Initial Notification form from the working copy or the extra forms book. |
| ____ | GO TO the respective classification tab. | Determines Attachment 4, General Emergency Actions, is applicable. |

ATTACHMENT 4

- | | | |
|----------|--|--|
| ____ 1.0 | COMPLETE Attachment 3, page 1 of 2, Initial Notification Form, using directions on page 2 of 2. | Refers to Attachment 3, Initial Notification Form. |
|----------|--|--|

NOTE TO EVALUATOR: *The following page 2 instructions may or may not be referred to as the student completes page 1.*

ATTACHMENT 3-Page 2

- | | | |
|-----------|--|-----------------------------------|
| ____ 1.a. | Item A5 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. |
|-----------|--|-----------------------------------|

_____ 1.b. Item A6

IF any of the following conditions are/have been met, **THEN** Radioactivity is being/has been released:

- 1) The release flowpath monitor is/was in alarm.
- 2) The release is/was greater than Technical Specification limits.
- 3) The release is/was accidental.

Determines that radioactivity is being released since all 3 barriers have been lost and the release was accidental.

_____ 1.c. Item A8

IF General Emergency is checked in Item 4, **THEN DETERMINE** appropriate Protective Action Recommendation in and downwind zones(z) 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 4, **THEN CHECK "NONE."**

Refers to Attachment 5.

_____ 1.d. Item A10

Emergency Director must sign form after Items 1 through 10 have been completed

Signs Attachment 3 after items 1 through 10 have been completed

ATTACHMENT 3-Page 1

- | | | |
|---------|---------------------|---------------------------------------|
| _____ | 1. Complete Item 1. | Checks "is" in Item 1. |
| _____ | 2. Complete Item 2. | Inserts communicators name in Item 2. |
| _____ | 3. Complete Item 3. | Checks 'Unit-1' in Item 3. |
| * _____ | 4. Complete Item 4. | Checks 'General Emergency' in Item 4. |

| | | |
|------|------------------|---|
| * 5. | Complete Item 5. | Enters 'H.G.5.1.4' in Item 5. |
| * 6. | Complete Item 6. | Checks 'Unmonitored Release' in Item 6. |
| * 7. | Complete Item 7. | Checks 'Airborne' in Item 7. |

NOTE TO EVALUATOR: Attachment 5 should be referenced to complete Item 8.

ATTACHMENT 5 GENERAL EMERGENCY PROTECTIVE ACTION RECOMMENDATIONS

A. SELECT A PROTECTIVE ACTION RECOMMENDATION

NOTE: A prompt protective action recommendation shall be made for General Emergency.

_____ 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.

THEN MAKE the following Protective Action Recommendation:

“Shelter entire 10 mile EPZ”

* _____ 1.1 **IF** the criteria of A.1.0 are exceeded, **THEN SELECT ONE** of the following Protective Action Recommendation: Determines that this step is applicable.

“Evacuate [select one] (PAZ 1) (PAZ 1 & 3) (PAZ 1,2,& 3) (PAZ 1 & 2) unless conditions make evacuation dangerous, and shelter remainder of 10 mile EPZ.”

Using DIR10 since the release is not from the main vent and the Control Room map, selects “Evacuate PAZ 1 & 2 unless condition make evacuation dangerous, notify the public in PAZ 1 & 2 to take KI, shelter remainder of the 10 mile EPZ.” Based on down wind sector being N.

ATTACHMENT 3-Page 1

| | | |
|----------|------------------|------------------------|
| * 8. | Complete Item 8. | Checks 'd' in Item 8. |
| _____ 9. | Complete Item 9. | Checks 'is' in Item 9. |

ELEMENT
(* = CRITICAL STEP)

STANDARD

___ 10. Complete Item 10.

Enters time declared, enters date, prints name,
and signs name in Item 10.

TIME STOP ___

| |
|--|
| TERMINATING CUE: This JPM is complete when initial notification form completed. No further actions are required. |
|--|

EXAMINEE'S CUE SHEET

INITIAL CONDITIONS:

1. Unit 2 was at 100% power when a loss of 22 SGFP occurred.
2. A reactor trip was manually initiated by de-energizing 480VAC busses at minus 40 inches in the SGs.
3. EOP-8 was implemented due to multiple events in progress (steam leak and a LOCA.)
4. RCS subcooling is 0°F.
5. SIAS failed to automatically actuate and required manual actuation.
6. Containment pressure was 30 psig and rising when it suddenly lowered to 1 psig.
7. Containment High Range Radiation Monitors are currently reading 4000 Rem/Hr.
8. You are performing the duties of the Shift Manager.

INITIATING CUE:

You are to complete the emergency response initial notification form.