

12-27-99

NOTE TO: NRC DOCUMENT CONTROL DESK
MAIL STOP 0-5-D-24

FROM: Virgil Curley, LICENSING ASSISTANT
OPERATING LICENSING BRANCH REGION I

SUBJECT: OPERATOR LICENSING EXAMINATION ADMINISTERED ON
March 22, 23-25, 1999, AT Beaver Valley Unit 2
DOCKET NO. 50-412

ON _____ OPERATOR LICENSING EXAMINATIONS WERE ADMINISTERED
AT THE REFERENCED FACILITY. ATTACHED YOU WILL FIND THE FOLLOWING
INFORMATION FOR PROCESSING THROUGH NUDOCS AND DISTRIBUTION TO THE
NRC STAFF, INCLUDING THE NRC PDR.

Item #1 a) FACILITY SUBMITTED OUTLINE AND INITIAL EXAM SUBMITTAL
DESIGNATED FOR DISTRIBUTION UNDER RIDS CODE A070.

b) AS GIVEN OPERATING EXAMINATION, ^{+ Final Outlines & Written} DESIGNATED FOR DISTRIBUTION
UNDER RIDS CODE A070.

Item #2 EXAMINATION REPORT WITH THE AS GIVEN WRITTEN EXAMINATION
ATTACHED, DESIGNATED FOR DISTRIBUTION UNDER RIDS CODE IE42.

A070

| Facility: <u>BVPS2</u> Date of Examination: <u>3/22/99</u> | |
|---|---|
| Examination Level (circle one): RO / SRO Operating Test Number: _____ | |
| Administrative Topic/Subject Description | Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions |
| A.1 | 2.1.20, Ability to execute procedure steps 1. New JPM, determine highest priority critical safety function from list of parameters. |
| | 2.1.12, Ability to apply TS for a system 1. New JPM, Determine Tech Spec requirements for a failed PZR pressure transmitter. |
| A.2 | 2.2.22, Knowledge of LCOs and Safety Limits 1. New JPM, determine if safety limit was exceeded during event based on chart recorder traces |
| A.3 | 2.3.10, Ability to perform procedures to reduce excessive levels of radiation 1. New JPM, Determine maximum stay time in high radiation area |
| A.4 | 2.4.29, Knowledge of the Emergency Plan 1. New Question Which emergency facility should you report to for an Alert |
| | 2. New Question What minimum Emergency Classification will require the activation of the TSC? |

A070

BEAVER VALLEY JOB PERFORMANCE MEASURE
EVALUATOR COVER SHEET

JPM Number: ADM-S TREES (2LOT2B NRC) Rev:0 System #:2.1
 JPM Title: Determine FRPs to Enter and Priority
 K/A Reference: 2.1.20 [4.3] Task ID #: 301AAA0601

JPM Application: Requal Initial Exam Training

| <u>Evaluation Method</u> | <u>LOCATION</u> | <u>TYPE</u> |
|---|---|---|
| <input checked="" type="checkbox"/> Perform | <input type="checkbox"/> Plant Site | <input type="checkbox"/> Training |
| <input type="checkbox"/> Simulate | <input type="checkbox"/> Simulator | <input type="checkbox"/> Annual Requal. Exam |
| | <input checked="" type="checkbox"/> Classroom | <input type="checkbox"/> OJT |
| | | <input checked="" type="checkbox"/> Initial Operator Exam |
| | | <input type="checkbox"/> Other: _____ |

Administered By:

BV-T

NRC

Other: _____

Evaluation Results

Performer: Name: _____ Employee No: _____

Results SAT Time (minutes)

UNSAT* Allotted: 20 Actual: _____

Time Critical: Yes No

Administrative JPM Faulted

*Comments (Required for UNSAT Evaluation): _____

Evaluation Results Check here if same as above

| | |
|-------------------------|--------------------|
| Observer 1: Name: _____ | Employee No: _____ |
| Observer 2: Name: _____ | Employee No: _____ |
| Observer 3: Name: _____ | Employee No: _____ |
| Observer 4: Name: _____ | Employee No: _____ |

| Question #1 | Question ID | Time (minutes) | | Results | |
|--------------------|-------------|----------------|--------|--------------------------|--------------------------|
| | | Allotted | Actual | SAT | UNSAT* |
| _____ | _____ | N/A | _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| Employee No: _____ | _____ | | | | |
| Question #1 | _____ | N/A | _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| Employee No: _____ | _____ | | | | |

*Comments (Required for UNSAT Evaluation): _____

Evaluator (Print): _____ Organization: _____

Evaluator Signature _____ Date: _____

EVALUATOR DIRECTION SHEET

JPM NUMBER: ADM-S TREES (2LOT2B NRC)

JPM TITLE: Determine FRPs to Enter and Priority

TASK STAN: All FRPs identified and properly prioritized.

RECOMMENDED CLASSROOM
STARTING LOCATION:

DIRECTIONS: Determine FRPs to Enter and Priority

INIT. CONDITIONS: The plant was operating at 100% power all systems in NSA. A large break LOCA occurred, the EOPs have been entered, Procedure E-1 "Loss of Reactor or Secondary Coolant" is being implemented. The following plant conditions exist:

- CNMT pressure 16.5 PSIG
- All core exit T/Cs 752 F
- All RCPs are OFF
- RVLIS Full range 46%
- ALL Power Range NIS 0%
- IRs Startup rate is minus .3 DPM
- SRs NIS are deenergized
- ALL RCS cold leg temps 573 F
- RCS pressure 0 PSIG
- All S/Gs NR levels 18%
- Total AFW flow to S/Gs 300 GPM
- PZR level 0%

INIT. CUE: Your supervisor informs you that the STA has been injured, and requests you to perform EOP Status Tree monitoring. Complete the review of the Status Trees and report back the procedures that should be entered and their order of entry.

REFERENCES: Status trees

TOOLS: None

HANDOUT:

| NUMBER | TITLE |
|--------------------------|--------------------------------------|
| ADM-S TREES (2LOT2B NRC) | Determine FRPs to Enter and Priority |

| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|--|--|
| <p>1. Locates Status Trees.</p> <p>2. Checks Subcriticality</p> <p>3. Checks Core Cooling</p> <p>4. Checks Heat Sink</p> | <p>START TIME: _____</p> <p>1. Candidate locates Status Trees</p> <p>2. Candidate determines Subcriticality tree is GREEN/SATISFIED</p> <p>Comments: _____</p> <p>3.1 Candidate determines Core Cooling tree is ORANGE with FR-C.2 indicated</p> <p>Comments: _____</p> <p>4.1 Candidate determines Heat Sink tree is RED with FR-H.1 indicated</p> <p>Comments: _____</p> |

| NUMBER | TITLE |
|--------------------------|--------------------------------------|
| ADM-S TREES (2LOT2B NRC) | Determine FRPs to Enter and Priority |

| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|--|---|
| 5. Checks Integrity | <p>5.1 Candidate determines Integrity tree is GREEN/SATISFIED</p> <p>Comments: _____</p> |
| 6. Checks Containment | <p>4.1 Candidate determines Containment tree is ORANGE with FR-Z.1 indicated</p> <p>Comments: _____</p> |
| 7. Checks Heat Sink | <p>7.1 Candidate determines Inventory tree is YELLOW with FR-I.2 indicated</p> <p>Comments: _____</p> |
| <p>EVALUATOR NOTE: The identification of FR-I.2 in the next step is NOT critical since yellow path procedures are only optionally entered at the discretion of the NSS/ANSS.</p> | |

| NUMBER | TITLE |
|--------------------------|--------------------------------------|
| ADM-S TREES (2LOT2B NRC) | Determine FRPs to Enter and Priority |

| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|---|---|
| 8.C Prioritizes Procedures to be entered. | 8.1.C Candidate reviews status tree results and determines order of procedure entry to be: 1.C FR-H.1 2.C FR-C.2 3.C FR-Z.1 4. FR-I.2 _____ Comments: |
| 9. Report results | 9. Candidate reports results to supervisor. _____ Comments: STOP TIME _____ |

CANDIDATE DIRECTION SHEET

* THIS SHEET TO BE GIVEN TO CANDIDATE *

Read:

Task:

Determine FRPs to Enter and Priority

INITIAL
CONDITIONS:

The plant was operating at 100% power all systems in NSA. A large break LOCA occurred, the EOPs have been entered, Procedure E-1 "Loss of Reactor or Secondary Coolant" is being implemented. The following plant conditions exist:

CNMT pressure 16.5 PSIG
 All core exit T/Cs 752 F
 All RCPs are OFF
 RVLIS Full range 46%
 ALL Power Range NIS 0%
 IRs Startup rate is minus .3 DPM
 SRs NIS are deenergized
 ALL RCS cold leg temps 573 F
 RCS pressure 0 PSIG
 All S/Gs NR levels 18%
 Total AFW flow to S/Gs 300 GPM
 PZR level 0%

INIT. CUE:

Your supervisor informs you that the STA has been injured, and requests you to perform EOP Status Tree monitoring. Complete the review of the Status Trees and report back the procedures that should be entered and their order of entry.

At this time, ask the evaluator any questions you have on this JPM.

When satisfied that you understand the assigned task, announce "I am now beginning the JPM".

Simulate performance or perform as directed the required task. Point to any indicator or component you verify or check and announce your observations.

After determining the Task has been completed, announce "I have completed the JPM". Then hand back this sheet to the evaluator.

After Validation

BEAVER VALLEY JOB PERFORMANCE MEASURE
EVALUATOR COVER SHEET

JPM Number: ADM-IF TS (2LOT2B NRC) Rev:0 System #:2.1
 JPM Title: Determine TS Requirements for Failed PZR Pressure Xmitter
 K/A Reference: 2.1.12 [2.9] Task ID #: 1190150301

JPM Application: Requal Initial Exam Training

| <u>Evaluation Method</u> | <u>LOCATION</u> | <u>TYPE</u> |
|---|---|---|
| <input checked="" type="checkbox"/> Perform | <input type="checkbox"/> Plant Site | <input type="checkbox"/> Training |
| <input type="checkbox"/> Simulate | <input type="checkbox"/> Simulator | <input type="checkbox"/> Annual Requal. Exam |
| | <input checked="" type="checkbox"/> Classroom | <input type="checkbox"/> OJT |
| | | <input checked="" type="checkbox"/> Initial Operator Exam |
| | | <input type="checkbox"/> Other: _____ |

Administered By:

BV-T
 NRC
 Other: _____

Evaluation Results

Performer: Name: _____ Employee No: _____
 Results SAT Time (minutes)
 UNSAT* Allotted: 20 Actual: _____
 Time Critical: Yes No
 Administrative JPM Faulted

*Comments (Required for UNSAT Evaluation): _____

Evaluation Results Check here if same as above
 Observer 1: Name: _____ Employee No: _____
 Observer 2: Name: _____ Employee No: _____
 Observer 3: Name: _____ Employee No: _____
 Observer 4: Name: _____ Employee No: _____

| Question #1 | Question ID | Time (minutes) | | Results | |
|--------------|-------------|----------------|--------|--------------------------|--------------------------|
| | | Allotted | Actual | SAT | UNSAT* |
| | | N/A | | <input type="checkbox"/> | <input type="checkbox"/> |
| Employee No: | | | | | |
| Question #1 | | N/A | | <input type="checkbox"/> | <input type="checkbox"/> |
| Employee No: | | | | | |

*Comments (Required for UNSAT Evaluation): _____

Evaluator (Print): _____ Organization: _____
 Evaluator Signature _____ Date: _____

EVALUATOR DIRECTION SHEET

JPM NUMBER: ADM-IF TS (2LOT2B NRC)

JPM TITLE: Determine TS Requirements for Failed PZR Pressure Transmitter.

TASK STAN: Identify All TS Requirements for Failed PZR Pressure Transmitter, including time limits.

RECOMMENDED STARTING LOCATION: Classroom

DIRECTIONS: Determine TS Requirements for Failed PZR Pressure Transmitter

INIT. CONDITIONS: The plant is operating at 100% power all systems in NSA. Pressurizer pressure transmitter 2RCS*PT455 fails low. All other PZR pressure transmitters are operable.

INIT. CUE: Your supervisor directs you to identify all required Tech Spec actions for this failure. Include any applicable time limits.

REFERENCES: Tech Specs

TOOLS: None

HANDOUT:

| NUMBER | TITLE |
|------------------------|--|
| ADM-IF TS (2LOT2B NRC) | Determine TS Requirements for Failed PZR Pressure Transmitter. |

| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|-------------------------------------|---|
|-------------------------------------|---|

| | |
|--|---|
| <p>1. Locates reference.</p> <p>2. Identify functions fed from transmitter</p> | <p>START TIME: _____</p> <div style="border: 1px solid black; padding: 5px;"> <p>EVALUATOR NOTE: The candidate may begin the JPM by referring to various references to make an evaluation of the functions served by the failed transmitter. The specific reference used is not important, rather that the correct functions are identified. The JPM is written using the figure on page 22 of 2OM-6.4.IF</p> </div> <p>1. Candidate locates page 22 of 2OM-6.4.IF</p> <p>2. Identifies transmitter feeds:</p> <p>Rx Trips OTDT PZR Press Low PZR Press High</p> <p>ESF ACT PZR Press Low(SI) P-11</p> <p style="text-align: center;">AND</p> <p>SDP indication</p> <p>Comments: _____</p> |
|--|---|

| NUMBER | TITLE |
|---------------------------|---|
| ADM-IF TS (2LOT2B NRC) | Determine TS Requirements for Failed PZR Pressure Transmitter. |

| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|---|--|
| <p>3. Checks Tech Specs for applicability</p> | <p>3.1 Candidate reviews TS 3.3.1.1 table 3.3-1 and determines the following items are applicable:</p> <p style="padding-left: 40px;">Item 7 OTDT Item 9 PZR Press low Item 10 PZR Press High</p> <p>Comments: _____</p> <p>3.2 Candidate reviews TS 3.3.2.1 table 3.3-3 and determines the following items are applicable:</p> <p style="padding-left: 40px;">Item 1.d PZR Press Low(SI)</p> <p>Comments: _____</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>EVALUATOR NOTE: P-11 is NOT applicable since the minimum channels operable is still met.</p> </div> |

| NUMBER | TITLE |
|------------------------|--|
| ADM-IF TS (2LOT2B NRC) | Determine TS Requirements for Failed PZR Pressure Transmitter. |

| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|-------------------------------------|---|
|-------------------------------------|---|

| | |
|--|---|
| <p>4.C Determine Tech Spec requirements.</p> | <p>4.1.C Identifies that bistables for the failed channel must be placed in the tripped condition within 6 hours for:</p> <p>Rx Trips OTDT PZR Press Low PZR Press High</p> <p>ESF ACT PZR Press Low(SI)</p> <p>Comments: _____</p> |
| | <table border="1"> <tr> <td>EVALUATOR NOTE: SDP action is NOT applicable since the minimum channels operable is still met.</td> </tr> </table> <p>Comments: _____</p> <p>STOP TIME _____</p> |
| EVALUATOR NOTE: SDP action is NOT applicable since the minimum channels operable is still met. | |

CANDIDATE DIRECTION SHEET

* THIS SHEET TO BE GIVEN TO CANDIDATE *

Read:

Task:

Determine TS Requirements for Failed PZR Pressure Transmitter

**INITIAL
CONDITIONS:**

The plant is operating at 100% power all systems in NSA. Pressurizer pressure transmitter 2RCS*PT455 fails low. All other PZR pressure transmitters are operable.

INIT. CUE:

Your supervisor directs you to identify all required Tech Spec actions for this failure. Include any applicable time limits.

At this time, ask the evaluator any questions you have on this JPM.

When satisfied that you understand the assigned task, announce "I am now beginning the JPM".

Simulate performance or perform as directed the required task. Point to any indicator or component you verify or check and announce your observations.

After determining the Task has been met, announce "I have completed the JPM". Then hand back this sheet to the evaluator.

EVALUATOR DIRECTION SHEET

JPM NUMBER: ADM-Safety Limit (2LOT2B NRC)

JPM TITLE: Determine If Tech Spec Safety Limit has been Violated.

TASK STAN: Identify TS for Safety Limit was violated, including actions and time limits.

RECOMMENDED STARTING LOCATION: Classroom

DIRECTIONS: Determine If Tech Spec Safety Limit has been Violated.

INIT. CONDITIONS: The plant had been operating at 100% power all systems in NSA. A loss of feedwater induced ATWS occurred.

INIT. CUE: Using the attached graph for wide range RCS pressure and wide range Tc and Th, determine if a Tech Spec safety limit has been violated, including any applicable actions and time limits. Assume that Rx power was 40% during the period of the graph recordings.

REFERENCES: Tech Specs

TOOLS: None

HANDOUT:

| NUMBER | TITLE |
|----------------------------------|--|
| ADM-Safety Limit (2LOT2B NRC) | Determine If Tech Spec Safety Limit has been Violated. |

| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|-------------------------------------|---|
|-------------------------------------|---|

| | |
|---|--|
| <p>1. Locates reference.</p> <p>2. Calculate hottest loop Tav_g</p> <p>3.C Checks Reactor Core Safety limit Tech Spec for applicability</p> | <p>START TIME: _____</p> |
| | <table border="1"> <tr> <td>EVALUATOR NOTE: Candidate may check steps in any order.</td> </tr> </table> <p>1. Candidate locates Tech Spec 2.1 and figure 2.1-1 _____</p> <p>2. Using the numbers taken from the strip charts, candidate calculates hottest loop Tav_g to be $\pm F$ </p> <p>Comments: _____</p> <p>3.1.C Candidate reviews TS 2.1.1 and determines that the Reactor Core Safety Limit Tech Spec has been violated.</p> <p>Comments: _____</p> <p>3.2.C Candidate determines that the action required is to be in HOT STANDBY within 1 hour</p> <p>Comments: _____</p> |
| EVALUATOR NOTE: Candidate may check steps in any order. | |

| NUMBER | TITLE |
|----------------------------------|--|
| ADM-Safety Limit (2LOT2B NRC) | Determine If Tech Spec Safety Limit has been Violated. |

| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|---|--|
| 3.C Checks Reactor Coolant System Pressure Safety limit Tech Spec for applicability | <p>3.1.C Candidate reviews TS 2.1.2 and determines that the Reactor Coolant System Pressure Safety limit Tech Spec has been violated.</p> <div style="border: 1px solid black; padding: 2px;"> <p>EVALUATOR NOTE: No Tech Spec action should be necessary, the RCS pressure has already returned to below 2735 psig.</p> </div> <p>Comments: _____</p> <p>STOP TIME _____</p> |

CANDIDATE DIRECTION SHEET

* THIS SHEET TO BE GIVEN TO CANDIDATE *

Read:

| | |
|-------|--|
| Task: | Determine If Tech Spec Safety Limit has been Violated. |
|-------|--|

| | |
|------------------------|---|
| INITIAL CONDITIONS: | The plant had been operating at 100% power all systems in NSA. A loss of feedwater induced ATWS occurred. |
|------------------------|---|

| | |
|------------|---|
| INIT. CUE: | Using the attached graph for wide range RCS pressure and wide range Tc and Th, determine if a Tech Spec safety limit has been violated, including any applicable actions and time limits. Assume that Rx power was 40% during the period of the graph recordings. |
|------------|---|

At this time, ask the evaluator any questions you have on this JPM.

When satisfied that you understand the assigned task, announce "I am now beginning the JPM".

Simulate performance or perform as directed the required task. Point to any indicator or component you verify or check and announce your observations.

After determining the Task has been completed, announce "I have completed the JPM". Then hand back this sheet to the evaluator.

BEAVER VALLEY JOB PERFORMANCE MEASURE
EVALUATOR COVER SHEET

JPM Number: ADM-RAD (2LOT2B NRC) Rev:0 System #:2.3
 JPM Title: Determine Stay Time in High Rad Area
 K/A Reference: 2.3.10 [2.9] Task ID #: 301AAA0601
 2.1.25 [2.8]

JPM Application: Requal Initial Exam Training

| | | |
|---|---|---|
| <u>Evaluation Method</u> | <u>LOCATION</u> | <u>TYPE</u> |
| <input checked="" type="checkbox"/> Perform | <input type="checkbox"/> Plant Site | <input type="checkbox"/> Training |
| <input type="checkbox"/> Simulate | <input type="checkbox"/> Simulator | <input type="checkbox"/> Annual Requal. Exam |
| | <input checked="" type="checkbox"/> Classroom | <input type="checkbox"/> OJT |
| | | <input checked="" type="checkbox"/> Initial Operator Exam |
| | | <input type="checkbox"/> Other: _____ |

Administered By:

BV-T
 NRC
 Other: _____

Evaluation Results

Performer: Name: _____ Employee No: _____
 Results SAT Time (minutes)
 UNSAT* Allotted: 20 Actual: _____
 Time Critical: Yes No
 Administrative JPM Faulted

*Comments (Required for UNSAT Evaluation): _____

Evaluation Results Check here if same as above

| | |
|-------------------------|--------------------|
| Observer 1: Name: _____ | Employee No: _____ |
| Observer 2: Name: _____ | Employee No: _____ |
| Observer 3: Name: _____ | Employee No: _____ |
| Observer 4: Name: _____ | Employee No: _____ |

| Question #1 | Question ID | Time (minutes) | | Results | |
|--------------------|-------------|----------------|--------|--------------------------|--------------------------|
| | | Allotted | Actual | SAT | UNSAT* |
| _____ | _____ | N/A | _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| Employee No: _____ | _____ | | | | |
| Question #1 | _____ | N/A | _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| Employee No: _____ | _____ | | | | |

*Comments (Required for UNSAT Evaluation): _____

Evaluator (Print): _____ Organization: _____
 Evaluator Signature _____ Date: _____

EVALUATOR DIRECTION SHEET

JPM NUMBER: ADM-RAD (2LOT2B NRC)

JPM TITLE: Determine Stay Time in High Rad Area

TASK STAN: BVPS Dose guide limits not exceeded.

RECOMMENDED
STARTING LOCATION: Classroom

DIRECTIONS: Determine Maximum stay time in high radiation area.

INIT. CONDITIONS: The plant is operating at 100% power all systems in NSA. It is necessary close valve A-1 on Training pump A-1 located in training pump A-1 cubicle on the 755' level of the PAB. Your annual year to date radiation exposure is 3.25 REM TEDE. You are meter qualified to perform your own monitoring.

INIT. CUE: As part of your pre-job brief, your supervisor directs you to use the posted map of the area (given) to determine your maximum allowable stay time, at the valve, without exceeding the BVPS Dose Guide for Yearly TEDE.

REFERENCES: Map of area, NPDAP 3.1 rev. 4 page 5

TOOLS: None

HANDOUT:

| NUMBER | TITLE |
|----------------------|--------------------------------------|
| ADM-RAD (2LOT2B NRC) | Determine Stay Time in High Rad Area |

| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|-------------------------------------|---|
|-------------------------------------|---|

| | |
|--|--|
| <p>1. Determine dose rate at the valve.</p> <p>2.C Calculate BVPS Dose Guide</p> <p>3.C Calculate remaining Dose not to exceed 4 REM</p> | <p>START TIME: _____</p> <div style="border: 1px solid black; padding: 5px;"> <p>EVALUATOR NOTE: It may be necessary to help orient the student to the location of valve A-1 on the map.</p> </div> <p>1. Candidate reviews map and determines that the dose rate at the valve is 1250 mR/hr.</p> <p>Comments: _____</p> <p>2.C Candidate refers to NPDAP 3.1 and determines that the BVPS Dose Guide is 80% of the 10CFR Limit or 4 REM</p> <p>Comments: _____</p> <p>3.C Candidate determines remaining Dose not to exceed 4 REM: 4 REM - 3.25 REM = 750 mR</p> |
|--|--|

| NUMBER | TITLE |
|----------------------|--------------------------------------|
| ADM-RAD (2LOT2B NRC) | Determine Stay Time in High Rad Area |

| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|---|---|
| <p>4.C Calculate maximum stay time.</p> | <p>Comments: _____</p> <p>4.C Candidate determines maximum stay time :</p> $750\text{mR} = 1250\text{mR}/60\text{min} \times (x)$ $750 = 20.83 \times (x)$ $750/20.83 = x$ <p>36 min. = x</p> <p>Comments: _____</p> <p>STOP TIME _____</p> |

CANDIDATE DIRECTION SHEET

* THIS SHEET TO BE GIVEN TO CANDIDATE *

Read:

Task:

Determine Stay Time in High Rad Area

**INITIAL
CONDITIONS:**

The plant is operating at 100% power all systems in NSA. It is necessary close valve A-1 on Training pump A-1 located in training pump A-1 cubicle on the 755' level of the PAB. Your annual year to date radiation exposure is 3.25 REM TEDE. You are meter qualified to perform your own monitoring.

INIT. CUE:

As part of your pre-job brief, your supervisor directs you to use the posted map of the area (given) to determine your maximum allowable stay time, at the valve, without exceeding the BVPS Dose Guide for Yearly TEDE.

At this time, ask the evaluator any questions you have on this JPM.

When satisfied that you understand the assigned task, announce "I am now beginning the JPM".

Simulate performance or perform as directed the required task. Point to any indicator or component you verify or check and announce your observations.

After determining the Task has been completed, announce "I have completed the JPM". Then hand back this sheet to the evaluator.

* * THIS SHEET TO BE GIVEN TO CANDIDATE * *

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #1

The Emergency Plan has been implemented in response to a Large break LOCA. As an extra NCO for the shift, you had been assigned the PAB tour, and you are NOT an assigned E-squad or Fire Brigade member. The standby alarm is sounded, and an announcement made that an "ALERT has been declared, all onsite emergency response personnel and facilities should begin to activate". To which emergency response facility should you report?

ORAL QUESTION #1

The Emergency Plan has been implemented in response to a Large break LOCA. As an extra NCO for the shift, you had been assigned the PAB tour, and you are NOT an assigned E-squad or Fire Brigade member. The standby alarm is sounded, and an announcement made that an "ALERT has been declared, all onsite emergency response personnel and facilities should begin to activate". To which emergency response facility should you report?

ANSWER: Operations Support Center (OSC located below the Unit 1 CR in the process instrument room.)

TIME

ALLOTTED: 5 minutes

KSA #: 2.4.39 3.3/3.1
2.4.43 2.8/3.5

REF: EPP Vol 1 section 7 page 7-2 item 7.1.2 rev. 11
Operations Standards item F.6 page 10 rev.23

COMMENTS: _____

RTL #A5.635.J

* * THIS SHEET TO BE GIVEN TO CANDIDATE * *

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #2

The Emergency Plan has been implemented in response to a Large break LOCA. What Minimum emergency classification will require the activation of the Technical Support Center (TSC)?

Final Revision

ORAL QUESTION #2

The Emergency Plan has been implemented in response to a Large break LOCA. What Minimum emergency classification will require the activation of the Technical Support Center(TSC)?

ANSWER: ALERT

TIME 5 minutes
ALLOTTED:

KSA #: 2.4.34 3.8/3.6

REF: EPP/IP 1.4 rev. 12 pages 1 and 2

COMMENTS: _____

| Facility: <u>BVPS2</u> | | Date of Examination: <u>3/22/99</u> |
|--|-----------------|--|
| Exam Level (circle one): RO / SRO(I) / SRO(U) | | Operating Test No.: _____ |
| System / JPM Title / Type Codes* | Safety Function | Planned Follow-up Questions: K/A/G - Importance - Description |
| 1. 001/ Recover Dropped RCCA/ D,S | 1. | a. 003AK1.07 - 3.1 - Explain affect of dropped rod on Shutdown Margin/ CL |
| | | b. 003AK1.02 - 3.1 - Explain Affect of turbine/reactor power mismatch on rod control/ CL |
| 2. 002/ Respond to Shutdown LOCA/ D,S,A,L | 2. | a. 009EK3.04 - 4.1 - Determine High Head Safety Injection Requirements/ O |
| | | b. 009EA1.01 - 4.4 - Determine Cold Overpressure Protection Setpoint/ O |
| 3. 006/ Makeup to the Refueling Water Storage Tank (RWST)/ N,S | 3. | a. 033K1.05 - 2.7 - Find flowpath for Alternate source of Makeup to the RWST (Spent Fuel Pool)/ O |
| | | b. 006A3.05 - 3.4 - Explain consequences of CVCS gas binding and determine how to remove accumulated gas/ O |
| 4. 061/Service Water Supply to AFW pump suctions/ D,P,R | 4. | a. 037AA2.14 - 4.0 - Discuss consequences of overfilling a Steam Generator/ O |
| | | b. 061A2.06 - 2.7 - Evaluate effects of check valve backleakage on AFW operability / O |
| 5. 003/ Respond to RCP Oil leak/ M,S | 4. | a. 003K1.10 - 3.0 - Determine consequences of starting a RCP with the RCS solid and excessive ΔT s/ CL |
| | | b. 003K1.12 - 3.0 - Analyze Effects of RCS leakage through the Thermal Barrier Heat Exchanger/ O |
| 6. 076/ Startup Standby Service Water System (SWS) / D,S | 4. | a. 062AA1.02 - 3.2 - Contrast SWS heat load at BOL with that at EOL/ O |
| | | b. 076K1.16 - 3.6 - Deduce affect of Containment Isolation Signal on the SWS and Liquid Discharge/ O |

| System / JPM Title / Type Codes* | Safety Function | Planned Follow-up Questions: K/A/G - Importance - Description |
|---|-----------------|--|
| 7. 103/ Perform Containment Isolation Phase A (CIA) checklist / D,S | 5. | a. 103A2.03 - 3.5 - Predict results of failure to isolate Containment after fuel damaging accident/ CL |
| | | b. 103K4.06 - 3.1 - Determine how to override CIA to obtain Samples/O |
| 8. 064 / Start #1 Diesel Generator (DG) using local relays / D,P,A | 6. | a. 062A2.12 - 3.2 - Predict impact of reenergizing a faulted bus/ O |
| | | b. 064K1.01 - 4.1 - Determine if EDG ground protection is available following an undervoltage start/ O |
| 9. 015 / Perform a Quadrant Power Tilt Factor (QPTR) (unsatisfactory result) / N,S | 7. | a. 015A1.04 - 3.5 - Evaluate effect of control rod drop on QPTR/ O |
| | | b. 015A2.02 -3.1 - Contrast the results of power range NIS detector and circuit (summing amplifier) failures/ O |
| 10. 078 / Start an Instrument Air (IA) Compressor / D,P | 8. | a. 065AK3.03- 2.9 - Explain the effect of a loss of instrument air on the Seal Injection flow control valve and justify the choice of the fail position/ O |
| | | b. 067AK3.04 - 3.3 - Determine why Domestic water is needed as backup air compressor cooling/ CL |
| * Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (P)lant, (R)CA, (O)pen reference, (CL)osed reference | | |

RTL #A5.640U BEAVER VALLEY JOB PERFORMANCE MEASURE
EVALUATOR COVER SHEET

JPM Number: 2CR-090

Rev:3

System #:003

JPM Title: Recover a Dropped RCCA

K/A Reference:003 AA1.02 3.6/3.4

Task ID #: 0010300101

JPM Application: Requal Initial Exam Training

| <u>Evaluation Method</u> | <u>LOCATION</u> | <u>TYPE</u> |
|---|---|---|
| <input checked="" type="checkbox"/> Perform | <input type="checkbox"/> Plant Site | <input type="checkbox"/> Training |
| <input type="checkbox"/> Simulate | <input checked="" type="checkbox"/> Simulator | <input type="checkbox"/> Annual Requal. Exam |
| | <input type="checkbox"/> Classroom | <input type="checkbox"/> OJT |
| | | <input checked="" type="checkbox"/> Initial Operator Exam |
| Administered By: | | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> BV-T | <input checked="" type="checkbox"/> NRC | |
| <input type="checkbox"/> Other: _____ | | |

Evaluation Results

Performer: Name: _____ Employee No: _____

Results SAT Time (minutes)

UNSAT* Allotted: 20 Actual: _____

Time Critical: Yes No

Administrative JPM Faulted

*Comments (Required for UNSAT Evaluation): _____

Evaluation Results Check here if same as above

Observer 1: Name: _____ Employee No: _____

Observer 2: Name: _____ Employee No: _____

Observer 3: Name: _____ Employee No: _____

Observer 4: Name: _____ Employee No: _____

| | <u>Time (minutes)</u> | | <u>Results</u> | |
|--------------------|-----------------------|--------|--------------------------|--------------------------|
| Question ID | Allotted | Actual | SAT | UNSAT* |
| Question #1 _____ | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| Employee No: _____ | | | | |
| Question #2 _____ | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| Employee No: _____ | | | | |

*Comments (Required for UNSAT Evaluation): _____

Evaluator (Print): _____ Organization: _____

Evaluator Signature _____ Date: _____

EVALUATOR DIRECTION SHEET

JPM NUMBER: 2CR-090

JPM TITLE: Recover a Dropped RCCA

TASK STANDARD:

1. Control Rod P-8 has been realigned with Control Bank D.
2. All control rods are left operable.
3. The RIL alarm is left operable.

RECOMMENDED STARTING LOCATION: Simulator

DIRECTIONS: You are to perform the task: Recover a dropped RCCA

INITIATING CONDITIONS: A plant startup was in progress. Control Bank D rods were at 131 steps when rod P-8 dropped to the bottom of the core. The actions of AOP 2.1.8 have been completed and the crew has transitioned to 2OM-1.4.P. The PO will adjust turbine load as necessary to maintain Tave on program.

The cause for the dropped rod has been identified and corrected. The GMNO has directed withdrawing the dropped rod.

INITIATING CUE: The ANSS directs you, as RO, to recover control rod P-8 and align the rod with the other rods in Control Bank D using procedure 2OM-1.4.P, section IV.D. You are to perform steps D.1 through D.11.

REFERENCES: 2OM-1.4.P, "RCCA or RCCA Group Misalignment", Issue 4, Revision 2

TOOLS: None

HANDOUT: 2OM-1.4.P "RCCA or RCCA Group Misalignment", Issue 4, Revision 2

| | |
|------------------------------|--|
| <p>NUMBER</p> <p>2CR-090</p> | <p>TITLE</p> <p>Recover a Dropped RCCA</p> |
|------------------------------|--|

| | |
|--|--|
| <p>STEP</p> <p>("C" denotes critical step)</p> | <p>STANDARD</p> <p>(Indicate "S" for Sat. or "U" for Unsat.)</p> |
|--|--|

| | |
|--|---|
| <div style="border: 1px solid black; padding: 5px;"> <p>EXAMINER NOTE: Candidate should perform Section D of 2OM-1.4.P.</p> </div> <p>1.C Place Rod Control Selector Switch to bank which has dropped rod.</p> <p>2.C Align Disconnect Switches for Rod Recovery</p> | <div style="border: 1px solid black; padding: 5px;"> <p>EXAMINER NOTE: Simulator IC-24 (25% power rods at 131 steps). Activate Malf CRF 3A P8, 1,0 0,D, Act. Then clear malfunction. (OR, for exam, IC 69)</p> </div> <p>Start time: _____</p> <p>1.C Candidate places the switch to the Control Bank "D" position.</p> <p>COMMENTS: _____</p> <p>2.C Candidate places all disconnect switches for Bank D to the ROD DISCONNECTED Position except for rod P-8 which is left in CONNECT.</p> <p>COMMENTS: _____</p> |
|--|---|

| NUMBER | TITLE | |
|---|--|--|
| 2CR-090 | Recover a Dropped RCCA | |
| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) | |
| <p>9.C Continue to move dropped rod until Group Step Counter indicates previous position recorded in procedure Step D.3.</p> <p>10. Verify dropped rod is now at the same position as other rods in bank by observing DRPI.</p> | <p>9.C Candidate withdraws the rod until the Group Step Counter indicates 131 steps.</p> <div style="border: 1px solid black; padding: 5px;"> <p><u>EXAMINER CUE:</u> Group Step Counter for CBD both indicate 131 steps.</p> </div> <p>COMMENTS: _____</p> <p>10. Candidate verifies Rod P-8 indicates same as other rods in CBD on DRPI.</p> <div style="border: 1px solid black; padding: 5px;"> <p><u>EXAMINER CUE:</u> DRPI indicates all rods in CBD at 131 steps.</p> </div> <p>COMMENTS: _____</p> | |

| | |
|------------------------------|--|
| <p>NUMBER</p> <p>2CR-090</p> | <p>TITLE</p> <p>Recover a Dropped RCCA</p> |
|------------------------------|--|

| | |
|--|--|
| <p>STEP</p> <p>("C" denotes critical step)</p> | <p>STANDARD</p> <p>(Indicate "S" for Sat. or "U" for Unsat.)</p> |
|--|--|

| | |
|---|--|
| <p>15. Restores Rod Control Selector Switch</p> | <p>15. Candidate places the Rod Control Selector switch in MANUAL.</p> <div style="border: 1px solid black; padding: 5px;"> <p>EXAMINER CUE: Inform candidate that the JPM is complete. If asked, direct candidate to place rod control in MANUAL.</p> </div> <p>COMMENTS: _____</p> <p>Stop Time: _____</p> |
|---|--|

ORAL QUESTION #1

Question; The plant is at 100% power steady state operation, with rod control in manual. A control rod drops; the reactor does not trip. Assume no operator action. Briefly, describe the effect of the dropped control rod on shutdown margin. Explain your reasoning.

Note; this is a closed reference question..

ANSWER: The Shutdown Margin will not change. The negative reactivity added by the dropped control rod will be equalized by positive reactivity from a decrease in Tavg. (Tavg no longer on program.) Therefore, upon a reactor trip, less positive reactivity will be added by a decrease in Tavg to 547°F. This decrease in the affect of the cooldown will cancel out the reduced trip reactivity worth of the rods.

(Alternate reasoning; since SDM is defined as the amount the Reactor would be shutdown with all rods inserted, the actual insertion of a rod does not change SDM.)

TIME

ALLOTTED: 3 Minutes

KSA #: 003 AK1.07 3.1/3.9

REF: 2OST-49.1

COMMENTS: _____

ORAL QUESTION #2

QUESTION: The plant is at 75% power with rod control in automatic. Bank D is at 215 steps.

Briefly, explain the effect of a dropped rod in the vicinity of Power Range Channel N44 on automatic rod control (assume that the reactor does not trip).

Note; this is a closed reference question.

ANSWER: The dropped rod will appear to N44 as a decrease in Reactor Power. The power mismatch circuit of the Automatic Rod Control Unit will sense Reactor Power less than Turbine Power and will withdraw the Bank D rods. (NOTE: Bank D rods will only withdraw to the C-11 permissive setpoint) (The Tav_g decrease will also cause rods to withdraw, but this will not occur until after the power mismatch circuit has anticipated the cooldown.)

TIME ALLOTTED: 4 Minutes

KSA #: 003 AK 1.02 3.1/3.4

REF: 2OM-1.1

COMMENTS: _____

RTL #A5.635.J

* * THIS SHEET TO BE GIVEN TO CANDIDATE * *

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #2

The plant is at 75% power with rod control in automatic. Bank D is at 215 steps.

Briefly, explain the effect of a dropped rod in the vicinity of Power Range Channel N44 on automatic rod control (assume that the reactor does not trip).

Note; this is a closed reference question.

* * THIS SHEET TO BE GIVEN TO CANDIDATE * *

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #1

The plant is at 100% power steady state operation, with rod control in manual. A control rod drops; the reactor does not trip. Assume no operator action. Briefly, describe the effect of the dropped control rod on shutdown margin. Explain your reasoning.

Note; this is a closed reference question.

CANDIDATE DIRECTION SHEET

* THIS SHEET TO BE GIVEN TO CANDIDATE *

Read:

| | |
|--------------|---|
| Task: | Recover a dropped rod and restore the rod to proper alignment with it's bank. |
|--------------|---|

| | |
|----------------------------|--|
| INITIAL CONDITIONS: | A plant startup was in progress. Control Bank D rods were at 131 steps when rod P-8 dropped to the bottom of the core. The actions of AOP 2.1.8 have been completed and the crew has transitioned to 2OM-1.4.P. The PO will adjust turbine load as necessary to maintain Tave on program. The cause for the dropped rod has been identified and corrected. The GMNO has directed withdrawing the dropped rod. |
|----------------------------|--|

| | |
|------------------------|---|
| INITIATING CUE: | The ANSS directs you, as RO, to recover control rod P-8 and align the rod with the other rods in Control Bank D using procedure 2OM-1.4.P, section IV.D. You are to perform steps D.1 through D.11. |
|------------------------|---|

- At this time, ask the evaluator any questions you have on this JPM.
- When satisfied that you understand the assigned task, announce "I am now beginning the JPM".
- Perform the required task. Point to any indicator or component you verify or check and announce your observations.
- After determining the Task has been completed, announce "I have completed the JPM", then hand this sheet back to the evaluator.

RTL #A5.640U BEAVER VALLEY JOB PERFORMANCE MEASURE
EVALUATOR COVER SHEET

JPM Number: 2CR-620

Rev:4

System #: 006

JPM Title: Respond to a Shutdown LOCA

K/A Reference: 009EA1.13 4.4/4.4

Task ID #:3010020601

JPM Application: Requal Initial Exam Training

Evaluation Method

LOCATION

TYPE

Perform

Plant Site

Training

Simulate

Simulator

Annual Requal. Exam

Classroom

OJT

Initial Operator Exam

Administered By:

Other: _____

BV-T

NRC

Other: _____

Evaluation Results

Performer: Name: _____ Employee No: _____

Results SAT Time (minutes)

UNSAT* Allotted: 15 Actual: _____

Time Critical: Yes No

Administrative JPM Faulted

*Comments (Required for UNSAT Evaluation): _____

Evaluation Results Check here if same as above

Observer 1: Name: _____ Employee No: _____

Observer 2: Name: _____ Employee No: _____

Observer 3: Name: _____ Employee No: _____

Observer 4: Name: _____ Employee No: _____

| | Question ID | Time (minutes) | | Results | |
|--|-------------|----------------|--------|---------|--------|
| | | Allotted | Actual | SAT | UNSAT* |

| | | | | | |
|-------------|-------|-------|-------|--------------------------|--------------------------|
| Question #1 | _____ | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> |
|-------------|-------|-------|-------|--------------------------|--------------------------|

| | | | | | |
|--------------|-------|--|--|--|--|
| Employee No: | _____ | | | | |
|--------------|-------|--|--|--|--|

| | | | | | |
|-------------|-------|-------|-------|--------------------------|--------------------------|
| Question #2 | _____ | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> |
|-------------|-------|-------|-------|--------------------------|--------------------------|

| | | | | | |
|--------------|-------|--|--|--|--|
| Employee No: | _____ | | | | |
|--------------|-------|--|--|--|--|

*Comments (Required for UNSAT Evaluation): _____

Evaluator (Print): _____ Organization: _____

Evaluator Signature _____ Date: _____

EVALUATOR DIRECTION SHEET

JPM NUMBER: 2CR-620

JPM TITLE: Respond to a Shutdown LOCA

TASK STANDARD: 1. RCS isolated and
2. HHSI flow established.

RECOMMENDED
STARTING
LOCATION: Simulator

DIRECTIONS: You are to perform the task "Respond to a
Shutdown LOCA".

INITIAL CONDITIONS: The plant was in Hot Shutdown, Mode 4, on
RHS, with the normal charging pathway being
the declared Boration Flowpath. PZR level
rapidly dropped from 25% to 0% and PRT
alarms were received. The ANSS has decided
to enter AOP 2.6.5 "Shutdown LOCA" to
stabilize plant conditions.

INITIATING CUE: The ANSS directs you to perform the first
six steps of AOP 2.6.5 "Shutdown LOCA" to
establish HHSI flow.

REFERENCES: 20M-53C.4.2.6.5 (ISSUE 1A Rev 9) "Shutdown
LOCA"

TOOLS: None

HANDOUT: AOP 2.6.5 pages 1 through 6

| | |
|---------------------------|---|
| <p>NUMBER 2CR-620</p> | <p>TITLE Respond to a Shutdown LOCA-Faulted</p> |
|---------------------------|---|

| | |
|---|---|
| <p>STEP ("C" denotes critical step)</p> | <p>STANDARD (Indicate "S" for Sat. or "U" for Unsat.)</p> |
|---|---|

| | |
|--|---|
| <div style="border: 1px solid black; padding: 5px;"> <p><u>EXAMINER NOTE:</u> Candidate may secure the RCP during this JPM due to seal leakoff, Vibration, etc., but this is not required by the AOP.</p> </div> <p>1.Candidate locates procedure.</p> | <p>Start time: _____</p> <div style="border: 1px solid black; padding: 5px;"> <p><u>EXAMINER NOTE:</u> Initialize simulator in Mode 4, Hot Shutdown, with RHS in service (IC-4). De-energize 2SIS*MOV867A, B, C, D using LOAs LOV100, LOV109, LOV114, and LOV117 and caution tag. Remove RHR yellow tags on board, energize RHS recorders. Caution Tag 2CHS P21A and 2RHS 701&702. Place PCV145 in MANUAL at 50% open. Open 2CHS MOV 275A&C. Activate Malf RHR1A=100% and CLF RHR VLV13=2 (RHS suction relief open & MOV 750A open) Have Shorting Bar available. Write snap. OR IC-66 for exam.</p> </div> <p>1.1 Candidate locates AOP 2.6.5 "Shutdown LOCA".</p> <p>_____ COMMENTS:</p> |
|--|---|

| | |
|---------------------------|---|
| <p>NUMBER 2CR-620</p> | <p>TITLE Respond to a Shutdown LOCA-Faulted</p> |
|---------------------------|---|

| | |
|---|---|
| <p>STEP ("C" denotes critical step)</p> | <p>STANDARD (Indicate "S" for Sat. or "U" for Unsat.)</p> |
|---|---|

| | |
|---|--|
| <p>8.C Establish alternate SI flowpath.</p> <div style="border: 1px solid black; padding: 2px; margin-top: 20px;"> <p>EXAMINER CUE: Other operators will reenergize the valves.</p> </div> <div style="border: 1px solid black; padding: 2px; margin-top: 20px;"> <p>EXAMINER NOTE: Terminate the JPM at this point.</p> </div> | <p>8.1 Candidate verifies only one Charging/HHSI pump running.</p> <p>8.2 Candidate opens/verifies [2CHS*LCV115B and/or D].</p> <p>8.3 Candidate closes/verifies [2CHS*LCV115C and/or E].</p> <p>8.4 Candidate locates shorting bar and inserts it into receptacle on 'VB' A for [2SIS*MOV836].</p> <p>8.5.C Candidate opens [2SIS*MOV836].</p> <div style="border: 1px solid black; padding: 2px; margin-top: 10px;"> <p>EXAMINER NOTE: Use of valves 868A & 840 is acceptable in 8.5</p> </div> <p>8.6.C Candidate closes [2CHS*MOV289].</p> <p>8.7 Candidate dispatches operators to re-energize [2SIS*MOV867A-D]. _____</p> <p>COMMENTS: _____</p> <p>STOP TIME: _____</p> |
|---|--|

ORAL QUESTION #1

Assume that you are performing AOP 2.6.5, "Shutdown LOCA".
The following conditions exist following a LOCA in MODE 4:

- Containment radiation level is 100R/hr
- Containment pressure is 2 psig
- Pressurizer level = 22%
- RCS Pressure = 285 psig
- RCS Temperature (based on Core Exit T/Cs) = 380°F
- Subcooling by the PSMS is 40°F

Determine if the second charging pump should be started, and explain your answer.

ANSWER: The containment and subcooling conditions are adverse. The PZR level and subcooling are less than those required for adverse conditions. Therefore, the second charging pump should be started.

TIME ALLOTTED: 5 minutes

KSA #: 009 EK3.04 4.1/4.3

REF: AOP 2.6.5 Attachment 3

COMMENTS: _____

ORAL QUESTION #2

Question;

Assume you are in AOP 2.6.5, "Shutdown LOCA.
The following conditions exist:

OPPS is armed.

All RCS Cold leg Temperatures are = 320°F

All RCS Hot leg Temperatures are = 320°F

All RCS Wide Range Pressures are = 375 psig

Determine if the Cold Overpressure Protection System lift setpoint for either OPPS PORV is exceeded. Explain how you reached your conclusion.

ANSWER: No. By applying the graph for the existing conditions,

(2RCS*PCV455C = 475 psig)

(2RCS*PCV456 = 555 psig)

TIME

ALLOTTED: 5 minutes

KSA #: 009 EA1.01 4.4/4.3

REF: AOP 2.6.5 Attachment 1
ARP 2OM-6.4.ABC

COMMENTS: _____

* * THIS SHEET TO BE GIVEN TO CANDIDATE * *

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #2

Assume you are in AOP 2.6.5, "Shutdown LOCA.
The following conditions exist:

OPPS is armed.

All RCS Cold leg Temperatures are = 320°F

All RCS Hot leg Temperatures are = 320°F

All RCS Wide Range Pressures are = 375 psig

Determine if the Cold Overpressure Protection System lift setpoint for either OPPS PORV is exceeded. Explain how you reached your conclusion.

* * THIS SHEET TO BE GIVEN TO CANDIDATE * *

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #1

Assume that you are performing AOP 2.6.5, "Shutdown LOCA".
The following conditions exist following a LOCA in MODE 4:

Containment radiation level is 100R/hr

Containment pressure is 2 psig

Pressurizer level = 22%

RCS Pressure = 285 psig

RCS Temperature (based on Core Exit T/Cs) = 380°F

Subcooling by the PSMS is 40°F

Determine if the second charging pump should be started, and
explain your answer.

CANDIDATE DIRECTION SHEET

* THIS SHEET TO BE GIVEN TO CANDIDATE *

Read:

Task: Respond to a Shutdown LOCA.

INITIAL CONDITIONS:

The plant was in Hot Shutdown, Mode 4, on RHS, with the normal charging pathway being the declared Boration Flowpath. PZR level rapidly dropped from 25% to 0% and PRT alarms were received. The ANSS has decided to enter AOP 2.6.5 "Shutdown LOCA" to stabilize plant conditions.

**INITIATING.
CUE:**

The ANSS directs you to perform the first six steps of AOP 2.6.5 "Shutdown LOCA" to establish HHSI flow.

- At this time, ask the evaluator any questions you have on this JPM.
- When satisfied that you understand the assigned task, announce "I am now beginning the JPM".
- Simulate performance or perform as directed the required task. Point to any indicator or component you verify or check and announce your observations.
- After determining that the Task has been completed, announce "I have completed the JPM", then hand this sheet back to the evaluator.

BEAVER VALLEY JOB PERFORMANCE MEASURE
EVALUATOR COVER SHEET

JPM Number: 2CR-New #3

Rev:0

System #: 006

JPM Title: Makeup to the RWST

K/A Reference: 006A2.02 3.9/4.3

Task ID #:0060100101

JPM Application: Requal Initial Exam Training

Evaluation Method

LOCATION

TYPE

Perform

Plant Site

Training

Simulate

Simulator

Annual Requal. Exam

Classroom

OJT

Initial Operator Exam

Administered By:

Other: _____

BV-T

NRC

Other:

Evaluation Results

Performer: Name: _____

Employee No: _____

Results

SAT

Time (minutes)

UNSAT*

Allotted: _____ 25 _____ Actual: _____

Time Critical:

Yes

No

Administrative JPM

Faulted

*Comments (Required for UNSAT Evaluation):

Evaluation Results

Check here if same as above

Observer 1: Name: _____

Employee No: _____

Observer 2: Name: _____

Employee No: _____

Observer 3: Name: _____

Employee No: _____

Observer 4: Name: _____

Employee No: _____

Time (minutes)

Results

Question ID

Allotted

Actual

SAT

UNSAT*

Question #1 _____

Employee No: _____

Question #2 _____

Employee No: _____

*Comments (Required for UNSAT Evaluation):

Evaluator (Print): _____

Organization: _____

Evaluator Signature _____

Date: _____

FINAL APPROVED VERSION

BEAVER VALLEY JOB PERFORMANCE MEASURE

EVALUATOR DIRECTION SHEET

JPM NUMBER: 2CR-New#3

JPM TITLE: Makeup to the RWST

TASK STANDARD.: Blended makeup is established to the RWST at between 2000 and 2100 ppm Boron

RECOMMENDED STARTING LOCATION: Simulator

DIRECTIONS: You are to makeup to the RWST using blended flow.

INITIAL CONDITIONS: Following a Large Break LOCA while at 100% power, Recirculation from the Containment sump has been lost. ECA 1.1 has been performed up to step 5.

INITIATING CUE: The ANSS directs you, as an extra licensed operator, to make up to the RWST. You are to add 1,000 at 120 gpm per 2OM-7.4.O.

REFERENCES: ECA 1.1 Issue 1B, Rev. 6
2OM-7.4.O Issue 4, Rev. 5

TOOLS: Calculator

HANDOUT: 2OM 7.4.O

| | |
|-----------|--------------------|
| NUMBER | TITLE |
| 2CR-New#3 | Makeup to the RWST |

| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|---|--|
| <p>1.C Directs local valve lineup.</p> | <p>Start time: _____</p> <div style="border: 1px solid black; padding: 5px;"> <p><u>EXAMINER NOTE:</u> Initialize simulator in Mode 1, 100% power. Act Malf RCS 3B, DBA LOCA Act Malf CCS 7,8,9,&10, =3, RRS pumps fail Perform E-0, E-1, & ECA 1.1 to step 5. Write "7480ppm" on BB A for in-service BAT. Turn sound generator off Fail SR NIs to 1,000 cps (Malf. NIS 1A&B ~ 1000 cps) Start one HHSI pump on the RWST. Write snap. (IC 52 for exam)</p> </div> <p>1.C Directs local opening of 2FNC-47.</p> <p>COMMENTS: _____</p> |
| <div style="border: 1px solid black; padding: 5px;"> <p><u>BOOTH CUE:</u> Aux. Bldg operator reports; 2FNC-35,-36,&-38 verified closed 2FNC-47 has been opened</p> </div> | |

| | |
|-----------|--------------------|
| NUMBER | TITLE |
| 2CR-New#3 | Makeup to the RWST |

| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|-------------------------------------|--|
| 2.Stops the Makeup System | 2. Places Makeup Control Switch in STOP COMMENTS: |
| 3.C Selects Manual mode of makeup | <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> EXAMINER CUE: If requested, inform candidate that the accident occurred in Mode 1 (dilution valves are unlocked and open). </div> 3.1C Places Makeup Mode Selector switch in MANUAL. COMMENTS: |

| | |
|-----------|--------------------|
| NUMBER | TITLE |
| 2CR-New#3 | Makeup to the RWST |

| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|--|--|
| 4.C Aligns Makeup valves . | <p>4. Puts the following control switches to CLOSE;</p> <p>4.1C 2CHS FCV113B, BA blender disch to Chg Pumps</p> <p>4.2C 2CHS FCV114B, Blender outlet to VCT</p> <p>4.3 2CHS SOV206, Alt. Emergency Boration Vlv</p> <p>4.4 2CHS MOV350 Emergency Boration Isolation Vlv</p> <hr/> <p>COMMENTS:</p> |
| <div style="border: 1px solid black; padding: 5px; width: fit-content;"> <p>EXAMINER NOTE: Emergency valves are not critical because they are initially closed and will not receive an open signal</p> </div> | |

| | |
|-----------|--------------------|
| NUMBER | TITLE |
| 2CR-New#3 | Makeup to the RWST |

| STEP | STANDARD |
|---|--|
| ("C" denotes critical step) | (Indicate "S" for Sat. or "U" for Unsat.) |
| 5.C Adjusts Boric Acid flow to the blender. | <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>EXAMINER CUE: ANSS desires 120 gpm flow at 2050 ppm. BAT "A" is in service at 7480 ppm. The first addition will be 1,000 gal.</p> </div> <p>5.1 Calculates ~ 33 gpm desired (32.08 to 33.69 gpm).</p> <p>5.2C Sets 2CHCS FCV 113A between 8.02 and 8.42</p> <p>COMMENTS: _____</p> <div style="border: 1px solid black; padding: 5px; margin-top: 20px;"> <p>EXAMINER NOTE: If the flow is initially mis-set, but corrected in step 17 of the procedure, that constitutes satisfactory completion of this step.</p> <p>Allowable settings are based on a concentration of 2000 to 2100 ppm if total flow is exactly 120 gpm.</p> </div> |

| | |
|-----------|--------------------|
| NUMBER | TITLE |
| 2CR-New#3 | Makeup to the RWST |

| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|-------------------------------------|---|
| 6.C Adjusts total makeup flow. | <p>6.1 Sets 2CHS HIC168 to ~ 7.5 turns(75%)</p> <div style="border: 1px solid black; padding: 5px;"> <p><u>EXAMINER NOTE</u>; HIC setting is the auto setpoint, which is not used in the MANUAL mode of makeup.</p> </div> <p>6.2C Sets 2CHS FCV114A pot. to ~ 7.5 (7.32 to 7.68)</p> <p>COMMENTS: _____</p> <div style="border: 1px solid black; padding: 5px; margin-top: 20px;"> <p><u>EXAMINER NOTE</u>: If the flow is initially mis-set, but corrected in step 17, that constitutes satisfactory completion of this step.</p> <p>Acceptable settings are based on a concentration of 2000 to 2100 ppm with exactly 32.89gpm boric acid flow.</p> <p>Steps 5 and 6 are both satisfactory as long as makeup concentration is between 2000 and 2100 ppm.</p> </div> |

| | |
|-----------|--------------------|
| NUMBER | TITLE |
| 2CR-New#3 | Makeup to the RWST |

| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|-------------------------------------|---|
| 7.C Sets Boric acid totalizer | 7.C Sets Boric acid totalizer to at least 267 gallons. COMMENTS: |
| | <div style="border: 1px solid black; padding: 5px;"> <p>EXAMINER NOTE: Totalizer may be set much higher due to anticipated continuous addition. Critical element is not to interrupt addition during the course of the JPM.</p> </div> |

| | |
|-----------|--------------------|
| NUMBER | TITLE |
| 2CR-New#3 | Makeup to the RWST |

| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|--------------------------------------|--|
| 8.C Sets Total Makeup totalizer | <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> EXAMINER CUE: ANSS directs an initial addition of 1,000 gallons. </div> <p>8.C Sets Total Makeup flow totalizer to at least 1000 gallons.</p> <p>COMMENTS:</p> <hr/> <div style="border: 1px solid black; padding: 5px; margin-top: 20px;"> EXAMINER NOTE: Totalizer may be set much higher due to anticipated continuous addition. Critical element is to not interrupt addition during the course of the JPM. </div> |
| 9. Records Total Makeup Flow reading | <p>9. Records Total flow reading (2CHS-FQ168).</p> <p>COMMENTS:</p> <hr/> <div style="border: 1px solid black; padding: 5px; margin-top: 20px;"> EXAMINER NOTE: This step may not be performed due to urgency of EOP initial conditions </div> |

| | |
|-----------|--------------------|
| NUMBER | TITLE |
| 2CR-New#3 | Makeup to the RWST |

| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|---|--|
| 10.C Directs operator at blender room to lineup to the RWST | <p>10.1C Directs opening 2CHS 87, Blender to Refueling Cavity Isolation</p> <p>10.2C Directs opening 2CHS 89, Blender to RWST Isolation</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p><u>EXAMINER CUE:</u> In Expert Mode, type Set RCHV87 = 2. Do not open valve 87 until FNC 47 has been directed opened.</p> </div> <p>COMMENTS: _____</p> |
| 11.C Initiates makeup | <p>11.C Places the Makeup Control Switch to START.</p> <p>COMMENTS: _____</p> |

| | |
|---------------------|-----------------------------|
| NUMBER 2CR-New#3 | TITLE Makeup to the RWST |
|---------------------|-----------------------------|

| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|-------------------------------------|---|
| 12. Verifies expected flows | <p>Checks red and green pens on 2CHS-FR113.</p> <p>COMMENTS: _____</p> <div style="border: 1px solid black; padding: 5px; margin-top: 20px;"> <p>EXAMINER NOTE: Makeup flow is about 120 gpm, boric acid flow is about 33 gpm.</p> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 20px;"> <p>EXAMINER NOTE: Terminate the JPM at this point.</p> </div> <p>STOP TIME _____</p> |

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #1

QUESTION; If blended flow is unavailable for RWST makeup in ECA 1.1, what is the alternate source of makeup? Trace the alternate flowpath on the VOND and discuss the driving head used.

ANSWER: Transfer (of borated water) from the Spent Fuel Pool Purification Pumps to the RWST. The flowpath is shown on VONDS 20-1 and 13-2. (The path is from the Spent Fuel Pool, through valve #2 to either Purification Pump, then through filter 21A or 21B and valve 35 or 36 to valve 47 and the RWST.)

TIME ALLOTTED: 10 minutes

KSA #: 033K1.05-2.7, 006A1.15 3.3/3.9

REFERENCE: ECA 1.1, 2OM-7.4.O Issue 4 Rev. 5

COMMENTS: _____

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #2

QUESTION: Evaluate the potential effect of a large (several cubic feet) hydrogen pocket at LCV 115B on the ability of the SI system to respond to a SI signal (from a standby condition).

Using the applicable reference, show how this condition could be corrected.

ANSWER: The hydrogen could gas bind the HHSI pump. Gas binding would be indicated by the failure of the pump to develop discharge pressure or flow and rapid pump failure.

The condition would be corrected by immediately stopping the pump to prevent pump damage. The suction piping and the pump could then be vented off using vent valves 2CHS-721, 886, 887, 883, 890, and 718, using the static head of the RWST. (Completion may be prompted; for example, after "gas binding" is mentioned, "How long could the HHSI pump be run under these conditions?")

TIME

ALLOTTED: 10 minutes

KSA #: 006A3.05 3.4/3.9
193006K1.08 2.8/1.8

REF: 2OM-7.2.A precaution C.2
SOER 97-1
VOND 7-1A or 2OM-7.4.AK

COMMENTS: _____

* * THIS SHEET TO BE GIVEN TO CANDIDATE * *

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #1

If blended flow is unavailable for RWST makeup in ECA 1.1, what is the alternate source of makeup? Trace the alternate flowpath on the VOND and discuss the driving head used.

* * THIS SHEET TO BE GIVEN TO CANDIDATE * *

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #2

QUESTION: Evaluate the potential effect of a large (several cubic feet) hydrogen pocket at LCV 115B on the ability of the SI system to respond to a SI signal (from a standby condition).

Using the applicable reference, show how this condition could be corrected.

BEAVER VALLEY JOB PERFORMANCE MEASURE

CANDIDATE DIRECTION SHEET

*THIS SHEET TO BE GIVEN TO CANDIDATE *

Read:

| | |
|-------|--------------------|
| Task: | Makeup to the RWST |
|-------|--------------------|

| | |
|---------------------|---|
| INITIAL CONDITIONS: | Following a Large Break LOCA while at 100% power, Recirculation from the Containment sump has been lost. ECA 1.1 has been performed up to step 5. |
|---------------------|---|

| | |
|-----------------|---|
| INITIATING CUE: | The ANSS directs you, as an extra licensed operator, to make up to the RWST. You are to add 1,000 at 120 gpm per 2OM-7.4.O. |
|-----------------|---|

At this time, ask the evaluator any questions you have about this JPM.

When satisfied that you understand the assigned task, announce "I am now beginning the JPM".

Perform the required task. Point to any indicator or component you verify or check and announce your observations.

After completing the task, announce "I have completed the JPM", then hand this sheet back to the evaluator.

BEAVER VALLEY JOB PERFORMANCE MEASURE
EVALUATOR COVER SHEET

JPM Number: 2PL-018 Rev: 03 System #:061
JPM Title: Service Water Supply to Auxiliary Feedwater Pump
Suction

K/A Reference: 000074EA1.19 3.7/3.8 Task ID #: 0610070104
061000K1.07 3.6/3.8

JPM Designation: NO RO SRO
JPM Application: NRC Initial Exam Training

Evaluation Method

Perform
 Simulate

LOCATION

Plant Site
 Simulator
 Classroom

TYPE

Training
 Annual Requal. Exam
 OJT
 Initial Operator Exam
 Other: _____

Administered By:

BV-T
 NRC
 Other: _____

Evaluation Results

Performer: Name: _____ Employee No: _____

Results SAT Time (minutes)
 UNSAT* Allotted: 20 Actual: _____
Faulted: Time Critical: Yes No

*Comments (Required for UNSAT Evaluation): _____

Evaluation Results Check here if same as above

Observer: Name: _____ Employee No: _____

| | Question ID | Time (minutes) | | Results | |
|-------------|-------------|----------------|--------|--------------------------|--------------------------|
| | | Allotted | Actual | SAT | UNSAT* |
| Question #1 | _____ | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| Question #2 | _____ | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| _____ | _____ | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| _____ | _____ | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> |

*Comments (Required for UNSAT Evaluation): _____

Evaluator (Print): _____ Organization: _____

Evaluator Signature: _____ Date: _____

EVALUATOR DIRECTION SHEET

JPM NUMBER: 2PL-018

JPM TITLE: Service Water Supply to Auxiliary Feedwater Pump Suction

RECOMMENDED
STARTING LOCATION: Plant

DIRECTIONS: You are to simulate the task "Align Service Water Supply to Auxiliary Feedwater Pump Suction".

INITIAL CONDITIONS: The plant has responded to an Inadequate Core Cooling Accident, and is now in Procedure E-1. Level in the PDWST has decreased to the low-level alarm setpoint. The PDWST low level annunciator is actuated. PDWST level indicators [2FWE*LI104A1] and [2FWE*LI104A2] both indicate 20". Both Demineralized Water Pumps [2WTD-P23A and B] are unavailable, and [2WTD-TK23] is also unavailable. Assume you have the keys for [2FWE*90, 91, 92] and [2FWE*93, 94, 95].

TASK STANDARD: Valve alignment which supplies Service Water to the suction of the Auxiliary Feedwater Pumps is performed in accordance with Attachment A-1.8.

INITIATING CUE: Your supervisor directs you to supply all three Auxiliary Feed Pumps from Service Water by completing EOP Att. A-1.8, Step 8. The Control Room has already checked open [2SWS*MOV103B] Recirc. Spray HXs Service Water Sup B Isolation Valve. They also inform you that they will monitor AFW pump discharge pressure throughout this evolution.

REFERENCES: OM-2.53A, Procedure E-1 Attachment A-1.8 Issue 1B, Revision 2

TOOLS: Use of the keys is simulated.

HANDOUT: Attachment A-1.8, OM-2.53A

| | |
|------------------------------|---|
| <p>NUMBER</p> <p>2PL-018</p> | <p>TITLE</p> <p>Service Water Supply to Auxiliary Feed Pump Suction</p> |
|------------------------------|---|

| <p>STEP</p> <p>("C" denotes critical step)</p> | <p>STANDARD</p> <p>(Indicate "S" for Sat. or "U" for Unsat.)</p> |
|---|---|
| | <p>2.3. Candidate simulates unlocking [2FWE*91]. (South SFGDS-718')</p> <p>2.4.C Candidate simulates opening [2FWE*91].</p> <div style="border: 1px solid black; padding: 2px;"> <p>EXAMINER CUE: [2FWE*91] is open.</p> </div> <p>2.5 Candidate simulates unlocking [2FWE*92]. (North SFGDS-718')</p> <p>2.6.C Candidate simulates opening [2FWE*92].</p> <div style="border: 1px solid black; padding: 2px;"> <p>EXAMINER CUE: [2FWE*92] is open.</p> </div> <p>COMMENTS: _____</p> <p>3.1. Candidate simulates unlocking [2FWE*93]. (South SFGDS-718')</p> <p>3.2.C Candidate simulates closing [2FWE*93].</p> |
| <p>3.C Close [2FWE*93, 94 and 95] Auxiliary Feedwater Pumps PDWST Suction Isolation Valves.</p> | |

| | |
|------------------------------|---|
| <p>NUMBER</p> <p>2PL-018</p> | <p>TITLE</p> <p>Service Water Supply to Auxiliary Feed Pump Suction</p> |
|------------------------------|---|

| <p>STEP</p> <p>("C" denotes critical step)</p> | <p>STANDARD</p> <p>(Indicate "S" for Sat. or "U" for Unsat.)</p> |
|--|--|
| | <div style="border: 1px solid black; padding: 2px;"> <p>EXAMINER CUE: [2FWE*93] is still closed.</p> </div> <p>3.3 Candidate simulates unlocking [2FWE*94]. (South SFGDS-718')</p> <p>3.4.C Candidate simulates closing [2FWE*94].</p> <div style="border: 1px solid black; padding: 2px;"> <p>EXAMINER CUE: [2FWE*94] is closed.</p> </div> <p>3.5 Candidate simulates unlocking [2FWE*95]. (North SFGDS-718')</p> <p>3.6.C Candidate simulates closing [2FWE*95].</p> <div style="border: 1px solid black; padding: 2px;"> <p>EXAMINER CUE: [2FWE*95] is closed.</p> </div> <p>COMMENTS: _____</p> <p>Stop Time: _____</p> |

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #1

QUESTION: Discuss the consequences of overfilling a Steam Generator while using the Turbine Driven AFW pump in Mode 3 (assume the Main Turbine is shutdown).

- ANSWER:
- 1) Water hammer could overstress the Main Steamline (due to collapse of steam voids formed in the lines)
 - 2) The Atmospheric Steam Dump or Secondary Safety valves could be rendered inoperable (fail open) due to discharge of water (or two phase flow).
 - 3) The Main Steam Isolation Valves and/or Bypass valves could be damaged (rendered inoperable or leak) due to the effects of water or two-phase flow.
 - 4) The Terry Turbine would be inoperable with water at the inlet (initial low speed followed by overspeed if water cleared and was replaced with steam while the governor valve was fully open).

(Completion may be prompted, i.e. "what if an atmospheric dump opened?" or "what impact would water in the steamline have on Terry Turbine operability?")

TIME
ALLOTTED: 10 minutes

KSA #: 039K5.01 2.9/3.1
037AA2.14 4.0/4.4

REFERENCE: 2OM-24.2A Item 4

COMMENTS: _____

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #2

QUESTION; During rounds, the pump casing of the Turbine Driven AFW pump is found to be at 250°F.
1) Is the pump operable?
2) Diagnose the most probable cause of the elevated temperature.
3) Explain how the condition would be remedied.

ANSWER: 1) (The water in the pump is hot enough to flash to steam during pump startup, therefore) the pump is inoperable due to potential steam binding.
2) This condition is most likely to be caused by backleakage through the Outside Containment AFW check valves (2FWE 42A, 43A, or 44A if the TDAFW pump is in NSA to the "A" AFW header, or 2FWE 43A, 43B, or 44B if aligned to the "B" AFW header), The Inside Containment Check valves (2FWE 99, 100, or 101), and the Pump Discharge check valve FCV 122.
3) This condition would be corrected by closing the pump discharge valves and then venting the pump (using the static head of the PDWST). (The header could then be cooled down using either PDWST head or by running the pump to supply the SGs.)

TIME ALLOTTED: 5 minutes

KSA #: 061A2.06 2.7/3.0
191006K1.08 2.8/1.8

REFERENCE: 2OM-24Q Attachment 2
VOND 24-3

COMMENTS: _____

* * THIS SHEET TO BE GIVEN TO CANDIDATE * *

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #2

QUESTION: During rounds, the pump casing of the Turbine Driven AFW pump is found to be at 250°F.

- 1) Is the pump operable?
- 2) Diagnose the most probable cause of the elevated temperature.
- 3) Explain how the condition would be remedied.

* * THIS SHEET TO BE GIVEN TO CANDIDATE * *

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #1

QUESTION: Discuss the consequences of overfilling a Steam Generator while using the Turbine Driven AFW pump in Mode 3 (assume the Main Turbine is shutdown).

CANDIDATE DIRECTION SHEET

* THIS SHEET TO BE GIVEN TO CANDIDATE *

Read:

Task: Service Water Supply to Auxiliary Feedwater Pump Suction

INITIAL CONDITIONS:

The plant has responded to an Inadequate Core Cooling Accident, and is now in Procedure E-1. Level in the PDWST has decreased to the low-level alarm setpoint. The PDWST low level annunciator is actuated. PDWST level indicators [2FWE*LI104A1] and [2FWE*LI104A2] both indicate 20". Both Demineralized Water Pumps [2WTD-P23A and B] are unavailable, and [2WTD-TK23] is also unavailable. Assume you have the keys for [2FWE*90, 91, 92] and [2FWE*93, 94, 95].

INITIATING CUE:

Your supervisor directs you to supply all three Auxiliary Feed Pumps from Service Water by completing EOP Att. A-1.8, Step 8. The Control Room has already checked open [2SWS*MOV103B] Recirc. Spray HXs Service Water Sup B Isolation Valve. They also inform you that they will monitor AFW pump discharge pressure throughout this evolution.

- At this time, ask the evaluator any questions you have on this JPM.
- When satisfied that you understand the assigned task, announce "I am now beginning the JPM".
- Simulate the required task. Point to any indicator or component you verify or check and announce your observations.
- After completing the task, announce "I have completed the JPM", then hand this sheet back to the evaluator.

RTL #A5.640U BEAVER VALLEY JOB PERFORMANCE MEASURE
EVALUATOR COVER SHEET

JPM Number: New #5 Rev: 0 System #: 003

JPM Title: Respond to RCP Oil Leak

K/A Reference: 003 A3.04 3.6/3.6 Task ID #:0030010101

JPM Application: Requal Initial Exam Training

Evaluation Method

Perform

Simulate

LOCATION

Plant Site

Simulator

Classroom

TYPE

Training

Annual Requal. Exam

OJT

Initial Operator Exam

Other: _____

Administered By:

BV-T

NRC

Other:

Evaluation Results

Performer: Name: _____ Employee No: _____

Results

SAT

UNSAT*

Time (minutes)

Allotted: 10 Actual: _____

Time Critical: Yes No

Administrative JPM Faulted

*Comments (Required for UNSAT Evaluation):

Evaluation Results

Check here if same as above

Observer 1: Name: _____ Employee No: _____

Observer 2: Name: _____ Employee No: _____

Observer 3: Name: _____ Employee No: _____

Observer 4: Name: _____ Employee No: _____

| | Question ID | Time (minutes) | | Results | |
|--------------|-------------|----------------|--------|--------------------------|--------------------------|
| | | Allotted | Actual | SAT | UNSAT* |
| Question #1 | _____ | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| Employee No: | _____ | | | | |
| Question #2 | _____ | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| Employee No: | _____ | | | | |

*Comments (Required for UNSAT Evaluation):

Evaluator (Print): _____ Organization: _____

Evaluator Signature _____ Date: _____

FINAL APPROVED VERSION

EVALUATOR DIRECTION SHEET

JPM NUMBER: New # 5

JPM TITLE: Respond to RCP Oil Leak

TASK STANDARD: The "A" Reactor Coolant Pump is stopped before Thrust Bearing temperature reaches 300°F.

RECOMMENDED STARTING LOCATION: Simulator

DIRECTIONS: You are to start the "A" Reactor Coolant Pump.

INITIAL CONDITIONS: The plant is in Mode 3. Plant startup procedures have led you to 2OM 6 Procedure A, Reactor Coolant Pump Startup, Steps IV.A.12.c through 22. Assume all steps and conditions to this point are satisfied.

INITIATING CUE: Your supervisor directs you to perform Step IV.A.12.c of Procedure 2OM-6.4.A for 2RCS*P21A.

REFERENCES: 2OM-6.4.A Issue 4, Rev. 6
2OM-6.4.AAC, Issue 4, Rev. 2
2OM-6.4.AAB, Issue 4, Rev. 2

TOOLS: Plant Computer, Stopwatch

HANDOUT: 2OM-6.4.A and 2OM-6.4.AAC

| | |
|---------------------------|---------------------------------------|
| <p>NUMBER New # 5</p> | <p>TITLE: Respond to RCP Oil Leak</p> |
|---------------------------|---------------------------------------|

| <p>STEP ("C" denotes critical step)</p> | <p>STANDARD (Indicate "S" for Sat. or "U" for Unsat.)</p> |
|--|---|
| <div style="border: 1px solid black; padding: 5px;"> <p><u>BOOTH NOTE</u>; monitor variables (MONV) TRCPUTB(1), XA40018R, JRCXRCS8, and JRCP417H.</p> </div> <p>1. Candidate obtains a copy of OM-6, Procedure A, "Reactor Coolant System Startup".</p> <p>2.C Place the 21A reactor coolant pump control switch to START (BB-A)</p> | <p>Start time: _____</p> <div style="border: 1px solid black; padding: 5px;"> <p><u>EXAMINER NOTE</u>: Simulator setup Init IC-5. Stop 2RCS*P21A. Open Reactor Trip Breakers. Malf RPC8A, 5,0,120,C =JRCP417H. (RCP oil leak starts 120 seconds after lift pump starts). (IC-88 for exam)</p> </div> <p>1. Candidate locates OM-6, Procedure A. (Allow time to review the procedure.)</p> <p>COMMENTS: _____</p> <p>2.C Takes switch to the START position.</p> <p>COMMENTS: _____</p> |

| | |
|---------------------------|---------------------------------------|
| <p>NUMBER New # 5</p> | <p>TITLE: Respond to RCP Oil Leak</p> |
|---------------------------|---------------------------------------|

| <p>STEP ("C" denotes critical step)</p> | <p>STANDARD (Indicate "S" for Sat. or "U" for Unsat.)</p> |
|--|---|
| <p>3. Verify the oil lift pump running light (red) energizes. (BB-A)</p> | <p>3. Candidate verifies the red light is LIT.</p> <div style="border: 1px solid black; padding: 5px;"> <p><u>EXAMINER CUE:</u> Oil lift pump running light (red) is energized.</p> </div> <p>COMMENTS: _____</p> <div style="border: 1px solid black; padding: 5px;"> <p><u>EXAMINER CUE:</u> If asked, notify the candidate that the No. 1 seal leakoff flow is about 1 gpm before and 3 gpm after the lift pump start and the differential pressure is greater than 212 psid. The lift oil pump is still running.</p> </div> |

| | |
|---------------------------|---------------------------------------|
| <p>NUMBER New # 5</p> | <p>TITLE: Respond to RCP Oil Leak</p> |
|---------------------------|---------------------------------------|

| <p>STEP ("C" denotes critical step)</p> | <p>STANDARD (Indicate "S" for Sat. or "U" for Unsat.)</p> |
|---|--|
| <p>4. Verify that the 2RCS*P21A running light (red) illuminates approximately 2 minutes after placing the control switch to start. (BB-A)</p> | <p>4. Candidate verifies that the red light is energized.</p> <div style="border: 1px solid black; padding: 5px;"> <p>EXAMINER CUE: After a 2 min. time delay the red light is energized.</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>BOOTH CUE: Check Malf. RCP8A has actuated.</p> </div> <p>COMMENTS: _____</p> <div style="border: 1px solid black; padding: 5px;"> <p>BOOTH CUE: expert; RAMP TRCPUTB(1),300,500,0 after the Low Bearing Oil reservoir alarm is received.</p> </div> |

| | |
|-------------------|--------------------------------|
| NUMBER New # 5 | TITLE: Respond to RCP Oil Leak |
|-------------------|--------------------------------|

| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|--|---|
| 5. Verify that the RCP amps drop off 10 to 30 seconds after the RCP breaker closes. (VB-A) | 5.1 Candidate locates the pump current (amps) (2RCS*II21A). 5.2 Candidate checks that the RCP amps drop off within 30 seconds. <div style="border: 1px solid black; padding: 5px;"> EXAMINER CUE: Inform the candidate that RCP amps return within 30 seconds. Also annunciator A2-5C is in alarm. Shaft vibration is at 30 mils, frame vibration is at 5 mils. </div> COMMENTS: _____ |
| 6. Obtain a copy of ARP A2-4F. | 6. Candidate locates a copy of A2-4F. COMMENTS: _____ <div style="border: 1px solid black; padding: 5px;"> EXAMINER CUE: The computer alarm for the first A2-4F alarm is "RCP OIL COLL TK 23A LVL LS103A HIGH". The annunciator reflashed on "RCP 21A BRG LO LVL 71-RCAAX LOW". </div> |

| | |
|---------------------------|---------------------------------------|
| <p>NUMBER New # 5</p> | <p>TITLE: Respond to RCP Oil Leak</p> |
|---------------------------|---------------------------------------|

| <p>STEP ("C" denotes critical step)</p> | <p>STANDARD (Indicate "S" for Sat. or "U" for Unsat.)</p> |
|--|---|
| <p>7. Verify that RCP bearing temperatures are increasing.</p> | <p>7.1 Candidate monitors RCP "A" bearing temperatures using the recorder and/or the Plant Computer (PCS).</p> <p>7.2 Verifies that upper thrust bearing temperature is increasing.</p> <p>COMMENTS: _____</p> <div style="border: 1px solid black; padding: 5px;"> <p>EXAMINER NOTE: The candidate may deduce that he has an "actual" low reservoir level and trip the RCP at this point. (However, spurious level alarms sometimes occur on RCP start, so he may investigate further.)</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>EXAMINER CUE: "A" upper thrust bearing temperature is rising from ~ 75°F at 30°F/min. "B" and "C" upper thrust bearings are stable at about 150°F.</p> </div> |

| | |
|---------------------------|---------------------------------------|
| <p>NUMBER New # 5</p> | <p>TITLE: Respond to RCP Oil Leak</p> |
|---------------------------|---------------------------------------|

| <p>STEP ("C" denotes critical step)</p> | <p>STANDARD (Indicate "S" for Sat. or "U" for Unsat.)</p> |
|---|---|
| <p>8.C Operator stops RCP due to oil leak/high bearing temperature.</p> | <p>8.1 Candidate determines, from recorder or PCS, that bearing temperature is above 200°F.</p> <p>8.2.C Places control switch to STOP.</p> <p>8.3 Verifies white light is lit.</p> <div style="border: 1px solid black; padding: 5px;"> <p>EXAMINER CUE: Computer alarm for High Temperature is received at 195°F; "A" bearing temperature is continuing to increase. RCP control switch White light illuminates when pump is stopped.</p> </div> <p>COMMENTS: _____</p> <div style="border: 1px solid black; padding: 5px;"> <p>EXAMINER CUE: Examiner terminates JPM at this point</p> </div> <p>Stop Time: _____</p> |

ORAL QUESTION #1

QUESTION: One of the Initial conditions prior to starting the **first** reactor coolant pump is to establish a bubble in the pressurizer.
1) What is the reason for establishing a bubble prior to starting a RCP?
2) Discuss the sequence of events that would occur in the RCS if a RCP were started in a solid RCS with SG secondary side temperature elevated above the lowest RCS cold leg temperature.

Note; this is a closed reference question.

ANSWER: 1) There is the potential to over-pressurize the reactor coolant system when the pump is started (which could actuate the OPPS).
2) The sequence of events would begin with the cold water being pumped (through the Reactor Vessel) to the primary side of the SG. The cold water in the RCS would pick up heat from the relatively warmer water in the SG and expand. The expansion of the water in the solid RCS would cause a pressure increase (up to 100 psig for each degree the RCS heated up).

TIME ALLOTTED: 5 minutes

KSA #: 003 K1.10 3.0/3.2

REF: 2OM-6.4.A precaution II.B,K,
2OM-6.2 precaution 17

COMMENTS: _____

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #2

QUESTION: Discuss the affects of a gradually worsening leak in the Thermal Barrier Heat Exchanger with the plant in Mode 1 NSA. Include the expected alarms and any automatic actuations that might occur.

- ANSWER:** 1) CCP surge tank level will increase (prior to 2CCP AOV107 actuation)
- 2) CCP radiation monitor alarms
 - 3) CCP valve in the discharge from the Thermal Barrier Heat Exchanger will close (on high flow at 58 gpm or high pressure at 122 psig)
 - 4) (Pressurizer level drops slightly until charging flow increases)

(The fourth item is not required for credit. Completion may be prompted, i.e. "Will there be any other effects or actuations?")

(If candidate assumes that 2CCP AOV107 closes immediately, prompt "what indications would occur if the leak were too small to cause automatic isolation?")

TIME ALLOTTED: 5 minutes

KSA #: 003K1.12, .3.0/3.3

REF: 2OM-15.1.d pg. 14 of 26

COMMENTS: _____

* * THIS SHEET TO BE GIVEN TO CANDIDATE * *

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #2

QUESTION: Discuss the affects of a gradually worsening leak in the Thermal Barrier Heat Exchanger with the plant in Mode 1 NSA. Include the expected alarms and any automatic actuations that might occur.

* * THIS SHEET TO BE GIVEN TO CANDIDATE * *

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #1

One of the Initial conditions prior to starting the **first** reactor coolant pump is to establish a bubble in the pressurizer.

- 1) What is the reason for establishing a bubble prior to starting a RCP?
- 2) Discuss the sequence of events that would occur in the RCS if a RCP were started in a solid RCS with SG secondary side temperature elevated above the lowest RCS cold leg temperature.

Note; this is a closed reference question.

CANDIDATE DIRECTION SHEET

* THIS SHEET TO BE GIVEN TO CANDIDATE *

Read:

| | |
|--------------|---|
| Task: | You are to start the "A" Reactor Coolant Pump |
|--------------|---|

| | |
|----------------------------|--|
| INITIAL CONDITIONS: | The plant is in Mode 3. Plant startup procedures have led you to 2OM 6 Procedure A, Reactor Coolant Pump Startup, Step IV.A.12.c. Assume all steps and conditions to this point are satisfied. |
|----------------------------|--|

| | |
|------------------------|---|
| INITIATING CUE: | Your supervisor directs you to perform Steps IV.A.12.c through 22 of Procedure 2OM-6.4.A for 2RCS*P21A. |
|------------------------|---|

At this time, ask the evaluator any questions you have on this JPM.

When satisfied that you understand the assigned task, announce "I am now beginning the JPM".

Perform the required task. Point to any indicator or component you verify or check and announce your observations.

After determining the Task has been completed, announce "I have completed the JPM", then hand this sheet back to the evaluator.

BEAVER VALLEY JOB PERFORMANCE MEASURE
EVALUATOR COVER SHEET

JPM Number: 2CR-126 Rev: 3 System #: 076

JPM Title: Startup the Standby Service Water System

K/A Reference: 076000A2.02 2.7/3.1 Task ID #: 076AAA0121

JPM Designation: NO RO SRO

JPM Application: NRC Initial Exam Training

Evaluation Method

Perform

Simulate

* LOCATION

Plant Site

Simulator

Classroom

TYPE

Training

Annual Requal. Exam

OJT

Initial Operator Exam

Other: _____

Administered By:

BV-T

NRC

Other: _____

Evaluation Results

Performer: Name: _____ Employee No: _____

Results SAT Time (minutes)

UNSAT* Allotted: 15 Actual: _____

Admin. JPM Faulted: Time Critical: Yes No

*Comments (Required for UNSAT Evaluation): _____

Evaluation Results Check here if same as above

Observer 1: Name: _____ Employee No: _____

Observer 2: Name: _____ Employee No: _____

Observer 3: Name: _____ Employee No: _____

Observer 4: Name: _____ Employee No: _____

| | Question ID | Time (minutes) | Results | | |
|-------------|-------------|----------------|---------|--------------------------|--------------------------|
| | | Allotted | Actual | SAT | UNSAT* |
| Question #1 | _____ | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> |

Employee No: _____

Question #2 _____

Employee No: _____

*Comments (Required for UNSAT Evaluation): _____

Evaluator (Print): _____ Organization: _____

Evaluator Signature _____ Date: _____

EVALUATOR DIRECTION SHEET

JPM NUMBER: 2CR-126

JPM TITLE: Startup the Standby Service Water System

RECOMMENDED

STARTING LOCATION: Simulator

DIRECTIONS: You are to perform the task "Startup the Standby Service Water System".

INITIAL CONDITIONS: The plant is at 100% power. The "A" Train Service Water Pump [2SWS*P21A] has just tripped.

TASK STANDARD: Train "A" standby service water is placed in service to pressurize the SWS system.

INITIATING CUE: Your Supervisor directs you to QUICKLY supply water to the SWS header from the SWE system, using the normal operating procedure, 2OM-30.4G. Assume all Initial Conditions are satisfied.

REFERENCES: 2OM-30.4.G Issue 4 Rev. 5

TOOLS: None

HANDOUT: 2OM-30.4.G
2OM-30.4.AAB SW Header Pressure Low

| | |
|---------|--|
| NUMBER | TITLE |
| 2CR-126 | Startup the Standby Service Water System |

| | |
|-------------------------------------|---|
| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|-------------------------------------|---|

| | |
|---|---|
| <p>3.C Place Standby Service Water Pump [2SWE*P21A] control switch to START.</p> | <p>3.1.C Places control switch to START.</p> <p>3.2 Verifies red light illuminates.</p> <p>COMMENTS:</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>EXAMINER CUE: Red light is lit.</p> </div> |
| <p>4.C Place discharge valve [2SWE*MOV116A] in AUTO, and verify that the valve opens.</p> | <p>4.1 Locates control switch for [2SWE*MOV116A].</p> <p>4.2.C Takes control switch to the AUTO or OPEN position.</p> <p>4.3 Verifies red light illuminates.</p> <p>4.4 Notifies NSS of T.S. 3.7.4.1.</p> <p>COMMENTS:</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>EXAMINER CUE: [2SWE-PI114] indicates 140 psig. [2SWS-PI113A] indicates 50 psig.</p> </div> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>EXAMINER CUE: Acknowledge Tech Spec report as NSS.</p> </div> |

| NUMBER | TITLE | |
|---|--|---|
| 2CR-126 | Startup the Standby Service Water System | |
| STEP | STANDARD | |
| ("C" denotes critical step) | (Indicate "S" for Sat. or "U" for Unsat.) | |
| <p>5. Check 2SWE-II21A pump Amps are Normal, between 115 and 135 amps.</p> | <p>5.2 Verifies meter indicates between 115 and 135.</p> <hr/> <p>COMMENTS:</p> <table border="1"> <tr> <td>EXAMINER CUE: Pump current is 125 amps.</td> </tr> </table> | EXAMINER CUE: Pump current is 125 amps. |
| EXAMINER CUE: Pump current is 125 amps. | | |
| <p>6. If A1-4G "Service Water Header Pressure Low" is on, then refer to 20M-30.4.AAB.</p> | <p>6. Verifies alarm window not illuminated.</p> <hr/> <p>COMMENTS:</p> <table border="1"> <tr> <td>EXAMINER CUE: A1-4G did not alarm.</td> </tr> </table> | EXAMINER CUE: A1-4G did not alarm. |
| EXAMINER CUE: A1-4G did not alarm. | | |

ORAL QUESTION #1

QUESTION: Compare the severity of a total loss of Normal and Standby service water (both trains) in MODE 5 at the end of a 60 day outage compared to the beginning of the outage.

ANSWER: The loss would be more severe at the beginning of the outage due to the higher decay heat load from the core on the RHS and CCP systems. (While the heat load on the Spent Fuel Heat Exchangers would be higher at BOL, this heat load (from the 1/3 of the core offloaded) is smaller than the equilibrium decay heat for the whole core.)

TIME

ALLOTTED: 5 minutes

KSA #: 062AA1.02 3.2/3.3

REF.: AOP 2.30.1

COMMENTS: _____

ORAL QUESTION #2

QUESTION: The plant is at 100% power. An inadvertent Train "A" CIA signal has been generated. How would this signal affect a Liquid Waste discharge, if one were in progress and the signal could not be reset? What, if any, operator actions would be required with respect to the discharge? Explain your reasoning.

ANSWER: Since Secondary Component Cooling Water (CCS) is isolated by the Phase "A" signal, less water will be returning to the Cooling Tower due to closure of 107A & C. This decrease in water flow to the tower in turn reduces cooling tower blowdown, which is the dilution flow for the Radwaste Discharge.

The discharge should be manually terminated until the Discharge Permit can be recalculated for the lower dilution flow.

TIME

ALLOTTED: 5 minutes

KSA #: 076K1.16 3.6/3.8

REF: 20M-30.1.0
VOND 30-4, 30-1, and 31-1

COMMENTS: _____

* * THIS SHEET TO BE GIVEN TO CANDIDATE * *

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #2

The plant is at 100% power. An inadvertent Train "A" CIA signal has been generated. How would this signal affect a Liquid Waste discharge, if one were in progress and the signal could not be reset? What, if any, operator actions would be required with respect to the discharge? Explain your reasoning.

* * THIS SHEET TO BE GIVEN TO CANDIDATE * *

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #1

Compare the severity of a total loss of Normal and Standby service water (both trains) in MODE 5 at the end of a 60 day outage compared to the beginning of the outage.

CANDIDATE DIRECTION SHEET

* THIS SHEET TO BE GIVEN TO CANDIDATE *

Read:

| | |
|--------------|--|
| Task: | Startup the Standby Service Water System |
|--------------|--|

| | |
|----------------------------|--|
| INITIAL CONDITIONS: | The plant is at 100% power. The "A" Train Service Water Pump [2SWS*P21A] has just tripped. |
|----------------------------|--|

| | |
|------------------------|--|
| INITIATING CUE: | Your Supervisor directs you to QUICKLY supply water to the SWS header from the SWE system, using the normal operating procedure, 20M-30.4G. Assume all Initial Conditions are SAT. |
|------------------------|--|

At this time, ask the evaluator any questions you have on this JPM.

When satisfied that you understand the assigned task, announce "I am now beginning the JPM".

Perform the required task. Point to any indicator or component you verify or check and announce your observations.

After completing the task, announce "I have completed the JPM", then hand this sheet back to the evaluator.

EVALUATOR DIRECTION SHEET

JPM NUMBER: 2CR-046

JPM TITLE: Perform ESF Checklist - CIA

RECOMMENDED
STARTING
LOCATION:

Simulator

DIRECTIONS: You are to perform the task "Perform ESF
Checklist - CIA".INITIAL
CONDITIONS:

The plant has had a reactor trip and a safety injection. Operators have proceeded to Step 21 in OM-53A, Procedure E-0, "Reactor Trip and Safety Injection". The plant computer is not available. Another operator has verified and signed for all valves except for the ones on Pages 6 and 7.

TASK
STANDARD:

Seal Return containment penetration is isolated.

INITIATING
CUE:

Your supervisor directs you to review the instructions for and then perform Attachment A-0.2, "Containment Isolation Phase A Checklist" starting at Page 6 and report back on the status of Containment Isolation Phase A.

REFERENCES:

20M-53A.1, E-0, Issue 1B, Revision 3.

TOOLS:

None

HANDOUT:

20M-53A.1, Attachment A-0.2, signed off through page 5.

| | |
|------------------------------|---|
| <p>NUMBER</p> <p>2CR-046</p> | <p>TITLE</p> <p>Perform ESF Checklist - CIA</p> |
|------------------------------|---|

| | |
|--|--|
| <p>STEP</p> <p>("C" denotes critical step)</p> | <p>STANDARD</p> <p>(Indicate "S" for Sat. or "U" for Unsat.)</p> |
|--|--|

| | |
|--|---|
| | <p>Start time: _____</p> <div style="border: 1px solid black; padding: 5px;"> <p><u>EXAMINER NOTE:</u> Only provide cues if simulating performance of this task. Init. IC-13 CLF VLV SEA 15,1,D (Loss of Power to 378) CLF VLV SEA 16,2,D (Open). Activate Malf RCS2B=12,000 gpm. Allow components to actuate. Reset SI and CIA, both trains. Depress Reheater Reset P.B. Start second CCP pump. Reduce CCP ΔP to <95 psig. Reopen RCP thermal barrier valves if needed. (IC-48 for exam)</p> </div> |
|--|---|

| | |
|------------------------------|---|
| <p>NUMBER</p> <p>2CR-046</p> | <p>TITLE</p> <p>Perform ESF Checklist - CIA</p> |
|------------------------------|---|

| | |
|--|--|
| <p>STEP</p> <p>("C" denotes critical step)</p> | <p>STANDARD</p> <p>(Indicate "S" for Sat. or "U" for Unsat.)</p> |
|--|--|

| | |
|--|---|
| <p>1. Obtain copy of Attachment A-0.2.</p> | <p>1. Candidate locates attachment.</p> <div style="border: 1px solid black; padding: 5px;"> <p><u>EXAMINER NOTE:</u> Refer to Attachment A-0.2 and check each valve as verified by the candidate.</p> </div> <p>COMMENTS</p> <div style="border: 1px solid black; padding: 5px;"> <p><u>EXAMINER CUE:</u> Prove indications for each component to support required position. All components are in required position, except "2CHS*MOV378 RCP Seal Water Cnmt Return Isol Vlv" which has neither green nor red light illuminated and 2CHS-MOV381 which has its red light lit.</p> </div> |
|--|---|

| | |
|------------------------------|---|
| <p>NUMBER</p> <p>2CR-046</p> | <p>TITLE</p> <p>Perform ESF Checklist - CIA</p> |
|------------------------------|---|

| | |
|--|--|
| <p>STEP</p> <p>("C" denotes critical step)</p> | <p>STANDARD</p> <p>(Indicate "S" for Sat. or "U" for Unsat.)</p> |
|--|--|

| | |
|---|---|
| <p>2.C. Locate each component indicated and check status versus required condition.</p> <div style="border: 1px solid black; padding: 5px;"> <p><u>BOOTH CUE:</u> If candidate asks you as local operator to check MCC Breaker, tell him it will take at least 10 minutes.</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p><u>BOOTH CUE:</u> When directed, close 381 with the handwheel: CLF VLV SEA16, 5, 0%, then clear CLF.</p> </div> | <p>2.1 Candidate checks each valve on Attachment A-0.2 in the required condition.</p> <p>2.2 Candidate initials each component on checklist.</p> <div style="border: 1px solid black; padding: 5px;"> <p><u>EXAMINER NOTE:</u> Candidate may initiate routine diagnostics such as change indicating lamps, have local operator cycle MCC Breaker, reset thermal overload, etc.</p> </div> <p>2.3 Candidate places control switch for 2CHS*MOV378 to the CLOSED position.</p> <p>2.4.C Candidate directs local closure of 2CHS*MOV381.</p> <p>COMMENTS:</p> |
|---|---|

| | |
|------------------------------|---|
| <p>NUMBER</p> <p>2CR-046</p> | <p>TITLE</p> <p>Perform ESF Checklist - CIA</p> |
|------------------------------|---|

| | |
|--|--|
| <p>STEP</p> <p>("C" denotes critical step)</p> | <p>STANDARD</p> <p>(Indicate "S" for Sat. or "U" for Unsat.)</p> |
|--|--|

| | |
|---|---|
| <p>3. Reports Status of the CIA system to supervisor.</p> | <p>3. Candidate reports all Components in the required position, except "[2CHS*MOV378] RCP Seal Water Return Cnmt Isol Valve" which has neither green nor red lights illuminated and 2CHS*MOV381 which needed to be closed manually.</p> <hr/> <p>COMMENTS:</p> <div style="border: 1px solid black; padding: 5px; margin-top: 20px;"> <p>EXAMINER CUE: Tell the candidate to stop after he verifies all components on BB-A.</p> </div> <p>Stop Time: _____</p> |
|---|---|

ORAL QUESTION #1

Question: Given; A Main Steamline Break inside containment has occurred inside containment. A failure of one control rod to insert has resulted in the bursting of many fuel rods in the vicinity of the stuck rod.

Discuss the consequences of a failure of the Containment Isolation Phase A signal to isolate the RCS sample lines under these conditions.

Note; This is a closed reference question.

ANSWER: The bursting of the fuel rods would greatly increase the activity in the Reactor Coolant System.

The failure to isolate the sampling lines could result in substantial overexposures of the primary chemist and increased general area radiation levels in the auxiliary building near the sampling lines. (Completion may be prompted, i.e. "how would your ability to transit the auxiliary building be affected?".)

TIME

ALLOTTED: 5 minutes

KSA #: 103A2.03 3.5/3.8

REF: 20M-53A.1.ECA-1.2

COMMENTS: _____

ORAL QUESTION #2

Question: How can the primary coolant hot leg sample line containment isolation valve [2SSR*SOV128A1] be opened with a CIA signal present? Explain using the applicable drawing.
Discuss why the RCS should be sampled following a major accident.

ANSWER: The valve can be opened if the CIA signal is present and the valve has reset (by taking the control switch to the CLOSED position and then to the OPEN position) after a time delay.
The RCS should be sampled following a major accident to assess the presence (or extent) of core damage and to verify that boron concentration in the vessel is adequate.

TIME

ALLOTTED: 4 minutes

KSA #: 103K4.06 (3.1/3.7)
013K4.02 (3.9/4.2)

REF: 2OM-14A.1.D (I&C) page 9
Logic drawing 12241-LSK-14-15F
E-1 step 20 background

COMMENTS: _____

RTL #A5.635.J

* * THIS SHEET TO BE GIVEN TO CANDIDATE * *

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #2

How can the primary coolant hot leg sample line containment isolation valve [2SSR*SOV128A1] be opened with a CIA signal present? Explain using the applicable drawing. Discuss why the RCS should be sampled following a major accident.

FINAL APPROVED REVISION

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #1

Given; A Main Steamline Break inside containment has occurred inside containment. A failure of one control rod to insert has resulted in the bursting of many fuel rods in the vicinity of the stuck rod.

Discuss the consequences of a failure of the Containment Isolation Phase A signal to isolate the RCS sample lines under these conditions.

Note; This is a closed reference question.

CANDIDATE DIRECTION SHEET

* THIS SHEET TO BE GIVEN TO CANDIDATE *

Read:

Task: Perform ESF Checklist - CIA

INITIAL CONDITIONS: The plant has had a reactor trip and a safety injection. Operators have proceeded to Step 21 in OM-53A, Procedure E-0, "Reactor Trip and Safety Injection." The plant computer is not available. Another operator has verified and signed for all valves except for the ones on Pages 6 and 7.

INITIATING CUE: Your supervisor directs you to review the instructions for and then perform Attachment A-0.2, "Containment Isolation Phase A Checklist" starting at Page 6 and report back on the status of Containment Isolation Phase A.

- At this time, ask the evaluator any questions you have on this JPM.
- When satisfied that you understand the assigned task, announce "I am now beginning the JPM".
- Perform the required task. Point to any indicator or component you verify or check and announce your observations.
- After completing the task, announce "I have completed the JPM", then hand this sheet back to the evaluator.

RTL #A5.640U BEAVER VALLEY JOB PERFORMANCE MEASURE
EVALUATOR COVER SHEET

JPM Number: 2PL-506 Rev: 3 System: 064
JPM Title: Locally Start the No. 1 Emergency Diesel Generator
K/A Reference: 055 EA1.02 4.3/4.4 Rev. 1 Task ID #: 0640020101
JPM Application: Requal Initial Exam Training

| | | |
|--|--|---|
| <u>Evaluation Method</u> | <u>LOCATION</u> | <u>TYPE</u> |
| <input type="checkbox"/> Perform | <input checked="" type="checkbox"/> Plant Site | <input type="checkbox"/> Training |
| <input checked="" type="checkbox"/> Simulate | <input type="checkbox"/> Simulator | <input type="checkbox"/> Annual Requal. Exam |
| | <input type="checkbox"/> Classroom | <input type="checkbox"/> OJT |
| | | <input checked="" type="checkbox"/> Initial Operator Exam |
| Administered By: | | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> BV-T | <input checked="" type="checkbox"/> NRC | |
| <input type="checkbox"/> Other: _____ | | |

Evaluation Results

Performer: Name: _____ Employee No: _____
Results SAT Time (minutes)
 UNSAT* Allotted: 20 Actual: _____
Time Critical: Yes No
Administrative JPM Faulted

*Comments (Required for UNSAT Evaluation): _____

Evaluation Results Check here if same as above

Observer 1: Name: _____ Employee No: _____
Observer 2: Name: _____ Employee No: _____
Observer 3: Name: _____ Employee No: _____
Observer 4: Name: _____ Employee No: _____

| | Time (minutes) | | Results | |
|--------------------|----------------|--------|--------------------------|--------------------------|
| Question ID | Allotted | Actual | SAT | UNSAT* |
| Question #1 _____ | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| Employee No: _____ | | | | |
| Question #2 _____ | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| Employee No: _____ | | | | |

*Comments (Required for UNSAT Evaluation): _____

Evaluator (Print): _____ Organization: _____
Evaluator Signature _____ Date: _____

EVALUATOR DIRECTION SHEET

JPM NUMBER: 2PL-506

JPM TITLE: Locally Start the No. 1 Emergency Diesel Generator

TASK STANDARD: The No. 1 Diesel Generator is started and ready to energize the 2AE Emergency Bus.

RECOMMENDED STARTING LOCATION: Plant

DIRECTIONS: You are to simulate the task "Locally Start the No. 1 Emergency Diesel Generator"

INITIAL CONDITIONS: A station blackout has occurred. OM 53A Procedure ECA-0.0 "Loss of All AC Power" has led to step 16, which requires local actions to be taken to restore power. Service water pump 2SWS*P21A is in AUTO.

INITIATING CUE: Your supervisor directs you to use Attachment A-1.5 of ECA-0.0 to start the No. 1 Diesel Generator. You have been given the keys for the No. 1 Diesel Generator.

REFERENCES: OM 2.53A ECA-0.0 Attachment A-1.5 Issue 1B Revision 2

TOOLS: Plant Page, Flashlight, Key 138 for Excitation Cabinet

HANDOUT: OM 2.53A ECA-0.0 Attachment A-1.5

| | |
|------------------------------|--|
| <p>NUMBER</p> <p>2PL-506</p> | <p>TITLE</p> <p>Locally Start the No. 1 Emergency Diesel Generator</p> |
|------------------------------|--|

| | |
|--|--|
| <p>STEP</p> <p>("C" denotes critical step)</p> | <p>STANDARD</p> <p>(Indicate "S" for Sat. or "U" for Unsat.)</p> |
|--|--|

| | |
|--|---|
| <p>1. Obtain a copy of OM-53A, Procedure ECA-0.0, Attachment A-1.5.</p> <p>2. Take local control of diesel generator No. 1</p> | <p>Start time: _____</p> <div style="border: 1px solid black; padding: 5px;"> <p>EXAMINER NOTE: All actions must be simulated. The Examiner should obtain key 138 for the Excitation cabinet.</p> </div> <p>1. Candidate locates procedure and the attachment.</p> <p>COMMENTS: _____</p> <div style="border: 1px solid black; padding: 5px;"> <p>EXAMINER CUE: If asked, 2SWS*P21A is in AUTO.</p> </div> <p>2. Candidate inserts key into switch and selects the LOCAL position, at the local control panel.</p> <p>COMMENTS: _____</p> |
|--|---|

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #1

QUESTION: Given: the bus 2AE normal feeder breaker 2E07 has tripped open due to a ground fault (Type 51 inverse time relays on bus actuated).

Show, using the applicable references, whether 2E10 [EDG output breaker] will close manually or automatically.

Explain the reason for the above interlocks.

- ANSWER:
- 1) The automatic closure is blocked by the locked-in inverse time overcurrent signal (51-VE207X repeater relay). (Shown on circuit schematics 36-13 and 36-27 or logic 36-24G & Table of Contents.)
 - 2) Manual closure is still permitted by the circuit (circuit schematic 36-27 or logic 36-24G & Table of Contents).
 - 3) Severe damage could be caused to the Bus and/or the DG due to reenergizing a ground fault (The normal DG ground protection would not be available because the DG neutral ground transformer is disconnected and auxiliary DG electrical protection is defeated when running in the Emergency mode due to the bus undervoltage.)
(Completion may be prompted.)

TIME
ALLOTTED: 15 minutes

KSA #: 062A2.12 3.2/3.6
191005K1.03 2.7/2.8

REFERENCE Circuit diagram 36-13, Bus 2AE Normal Supply Bkr
: Circuit diagram 36-27, EDG 2-1 Air Circuit Bkr
Logic Diagram 36-24G, EDG Starting

COMMENTS; _____

ORAL QUESTION #2

Question; The Diesel Generator has been started and has energized the emergency bus due to a loss of offsite power. Does the Diesel Generator have ground fault protection at this time? Explain using the logic diagram.

ANSWER: No, the bus UV caused an emergency start. Since the motor operated ground switch is only closed in the "exercise" mode, no ground protection exists. (The M.O.G. switch automatically opens when the emergency bus tie breaker or diesel output breaker is open, as shown on schematic 36-8 and logic 36-24N.)

TIME ALLOTTED: 10 minutes

KSA #: 064 K1.01 4.1/4/4

REF: 20M-36.1

COMMENTS: _____

* * THIS SHEET TO BE GIVEN TO CANDIDATE * *

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #2

The Diesel Generator has been started and has energized the emergency bus due to a loss of offsite power. Does the Diesel Generator have ground fault protection at this time? Explain using the logic diagram.

* * THIS SHEET TO BE GIVEN TO CANDIDATE * *

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #1

QUESTION: Given: the bus 2AE normal feeder breaker 2E07 has tripped open due to a ground fault (Type 51 inverse time relays on bus actuated).

Show, using the applicable references, whether 2E10 [EDG output breaker] will close manually from the control room or automatically.

Explain the reason for the above interlocks.

CANDIDATE DIRECTION SHEET

* THIS SHEET TO BE GIVEN TO CANDIDATE *

Read:

Task: Locally Start the No. 1 Emergency Diesel Generator

INITIAL CONDITIONS:

A station blackout has occurred. OM 53A Procedure ECA-0.0 "Loss of All AC Power" has led to step 16, which requires local actions to be taken to restore power. Service water pump 2SWS*P21A is in AUTO.

INITIATING CUE:

Your supervisor directs you to use Attachment A-1.5 of ECA-0.0 to start the No. 1 Diesel Generator. You have been given the keys for the No. 1 Diesel Generator.

- At this time, ask the evaluator any questions you have on this JPM.
- When satisfied that you understand the assigned task, announce "I am now beginning the JPM".
- Simulate performance of the required task. Point to any indicator or component you verify or check and announce your observations.
- After the task is complete, announce "I have completed the JPM", then hand this sheet back to the evaluator.

BEAVER VALLEY JOB PERFORMANCE MEASURE
EVALUATOR COVER SHEET

JPM Number: 2CR-New #9

Rev: 0

System #:015

JPM Title: Perform a QPTR (Unsat)

K/A Reference: 015A4.02 3.9/3.9

Task ID #: 0150040201

JPM Application: Requal Initial Exam Training

Evaluation Method

Perform
 Simulate

LOCATION

Plant Site
 Simulator
 Classroom

TYPE

Training
 Annual Requal. Exam
 OJT
 Initial Operator Exam
 Other: _____

Administered By:

BV-T NRC
 Other:

Evaluation Results

Performer: Name: _____ Employee No: _____

Results SAT UNSAT*
Time (minutes) Allotted: 15 Actual: _____

Time Critical: Yes No

Administrative JPM Faulted

*Comments (Required for UNSAT Evaluation):

Evaluation Results

Check here if same as above

Observer 1: Name: _____ Employee No: _____
Observer 2: Name: _____ Employee No: _____
Observer 3: Name: _____ Employee No: _____
Observer 4: Name: _____ Employee No: _____

| | Question ID | Time (minutes) | | Results | |
|--------------|-------------|----------------|--------|--------------------------|--------------------------|
| | | Allotted | Actual | SAT | UNSAT* |
| Question #1 | _____ | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| Employee No: | _____ | | | | |
| Question #2 | _____ | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| Employee No: | _____ | | | | |

*Comments (Required for UNSAT Evaluation):

Evaluator (Print): _____ Organization: _____

Evaluator Signature _____ Date: _____

BEAVER VALLEY JOB PERFORMANCE MEASURE

EVALUATOR DIRECTION SHEET

JPM NUMBER: 2CR-New #9

JPM TITLE: Perform a QPTR

TASK STANDARD: QPTR is identified as being > 1.02 (unsat)

RECOMMENDED
STARTING LOCATION: Simulator

DIRECTIONS: You are to perform a manual Quadrant Power Tilt Ratio calculation.

INITIAL CONDITIONS: A QPTR alarm has been received. The Plant Computer is not available.

INITIATING CUE: The ANSS directs you to perform 2OST-2.4A, beginning at step VII.B to determine if the alarm is valid.

REFERENCES: 2OST-2.4A Issue 4 Rev. 2

TOOLS: Calculator

HANDOUT: 2OST-2.4A

| | |
|-------------------|-----------------------|
| NUMBER; 2CR-New#9 | TITLE: Perform a QPTR |
|-------------------|-----------------------|

| | |
|-------------------------------------|---|
| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|-------------------------------------|---|

| | |
|---|--|
| <div style="border: 1px solid black; padding: 5px;"> <p>EXAMINER NOTE: Provide candidate with Data Sheet 2OST-2.4A Page 8 with Normalization Factors inserted</p> </div> <p>1. Records uncorrected detector current values.</p> <p>2. Multiplies each detector current by its normalization factor</p> | <p>Start Time: _____</p> <div style="border: 1px solid black; padding: 5px;"> <p>EXAMINER NOTE: Initialize simulator in Mode 1, 100%N. Place rods in MANUAL. Activate CLF NIS XMT 14, 2, 1, ramp 60 second. Adjust N44 channel gain to clear channel deviation alarms. Print out computer PCS group GP048 if available. Write snap(IC 53 for exam).</p> </div> <p>1. Records eight power range detector currents.</p> <p>COMMENTS: _____</p> <p>2. Records eight corrected currents..</p> <p>COMMENTS: _____</p> |
|---|--|

| | |
|-------------------|-----------------------|
| NUMBER; 2CR-New#9 | TITLE: Perform a QPTR |
|-------------------|-----------------------|

| | |
|-------------------------------------|---|
| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|-------------------------------------|---|

| | |
|---|---|
| 3. Adds corrected currents. | 3. Adds each set of four corrected currents. COMMENTS: _____ |
| 4. Determines average corrected currents. | 4. Divides two current sums by four. COMMENTS: _____ |
| 5.C Checks results | 5.C Determines that N44B exceeds 1.02. COMMENTS: _____ |
| | <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>EXAMINER CUE: Computer group GP048 will be checked when the Plant Computer is restored to service. Examiner terminates JPM at this point.</p> </div> <p>Stop Time; _____</p> |

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #1

QUESTION: What effect would a drop of control rod D4 have on the indicated power in each quadrant at 100% power?

ANSWER: Power would be depressed on N43 and elevated on N44, (as well N41, & 42, probably resulting in an Out-of-Specification QPTR).

Note; Requires use of figure 2OM 2-5 to determine location of excore detectors relative to dropped rod.

TIME ALLOTTED: 5 minutes

KSA #: 015K1.03 3.1/3.1
001K5.07 3.3/4.0
015A1.04 3.5/3.7

REFERENCE: 2OM Figure 2-5

COMMENTS: _____

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #2

QUESTION: Using the appropriate drawing, compare the indications that would occur at 100% power due to lower power range detector N41B failing low to those that would occur if the N41 channel (N41 summing amplifier) failed low.

ANSWER: Both Failures would produce;
Negative rate trip alarm and bistable light
P-9 permissive light (probable on detector failure, would be close to the setpoint)
Channel current comparator (N46) alarm and light on NIS panel

Only the detector failure would produce;
Roughly 50% power channel indication on Main Control Board and the NIS panel
Channel comparator light on NIS panel
Zero current indicated on N41B meter on NIS
N41 delta-flux alarm
(An OTΔT bistable is theoretically possible due to ΔI penalties, but the calculation is not required due to saturation effects in the circuit.)

Only the summing amplifier failure would produce;
P-10 bistable light
P-8 bistable light
Zero power indicated on NIS panel and Main Control Board

(Completion may be prompted, i.e. "what bistable lights would change state?")

TIME ALLOTTED: 15 minutes

KSA #: 015K6.01 2.9/3.2
015A2.02 3.1/3.5

REF: Figure 2OM-2.5.A.4

COMMENTS: _____

* * THIS SHEET TO BE GIVEN TO CANDIDATE * *

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #2

QUESTION: Using the appropriate drawing, compare the indications that would occur at 100% power due to lower power range detector N41B failing low to those that would occur if the N41 channel (N41 summing amplifier) failed low.

* * THIS SHEET TO BE GIVEN TO CANDIDATE * *

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #1

QUESTION: What effect would a drop of control rod D4 have on the indicated power in each quadrant at 100% power?

BEAVER VALLEY JOB PERFORMANCE MEASURE

CANDIDATE DIRECTION SHEET

* THIS SHEET TO BE GIVEN TO CANDIDATE *

Read:

Task:

You are to perform a manual Quadrant Power Tilt Ratio calculation.

INITIAL CONDITIONS:

A QPTR alarm has been received. The Plant Computer is not available.

INITIATING CUE:

The ANSS directs you to perform 2OST-2.4A, beginning at step VII.B to determine if the alarm is valid.

At this time, ask the evaluator any questions you have on this JPM.

When satisfied that you understand the assigned task, announce "I am now beginning the JPM".

Perform the required task. Point to any indicator or component you verify or check and announce your observations.

After completing the task, announce "I have completed the JPM", then hand this sheet back to the evaluator.

EVALUATOR DIRECTION SHEET

JPM NUMBER: 2PL-019

JPM TITLE: Align Station Air Compressor for Operation

RECOMMENDED

STARTING LOCATION: Turbine Building

DIRECTIONS: You are to simulate the task "Align Station Air Compressor for Operation".

INITIAL CONDITIONS: The Control Room has been evacuated due to fire.

TASK STANDARD: 2SAS-C21A is aligned to Domestic Water and started with 2SAS-AOV105 closed.

INITIATING CUE: The NSS hands you a copy of OM-2.56C.4, Procedure E, Part 2 and tells you to perform Step 5.

REFERENCES: OM-2.56C.4, Procedure E, Part 2, Issue 1, Rev. 10

TOOLS: None

HANDOUT: 2OM-56C.4.E, Part 2

| | |
|-------------------|--|
| NUMBER 2PL-019 | TITLE Alternate Safe Shutdown - Turbine Building (N.O. #2) |
|-------------------|--|

| | |
|-------------------------------------|--|
| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|-------------------------------------|--|

| | |
|---|--|
| 1.C Isolate all unnecessary loads on SAS. | Start time: _____ 1.C Candidate closes 2SAS-AOV105 by isolating and bleeding air pressure off of the valve. <div style="border: 1px solid black; padding: 5px; margin: 10px 0;">EXAMINER CUE: 2SAS-AOV105 is closed. Regulator shows zero pressure.</div> COMMENTS: _____ |
|---|--|

| | |
|------------------------------|--|
| <p>NUMBER</p> <p>2PL-019</p> | <p>TITLE</p> <p>Alternate Safe Shutdown - Turbine Building (N.O. #2)</p> |
|------------------------------|--|

| | |
|--|--|
| <p>STEP</p> <p>("C" denotes critical step)</p> | <p>STANDARD</p> <p>(Indicate "S" for Sat. or "U" for Unsat.)</p> |
|--|--|

| | |
|--|--|
| <p>2.C Align cooling water to the 2SAS-C21A air compressor from the Domestic Water supply.</p> | <p>2.1.C Candidate closes 2CCS-78.</p> <div style="border: 1px solid black; padding: 2px;"> <p>EXAMINER CUE: 2CCS-78 is closed.</p> </div> <p>2.2.C Candidate closes 2CCS-83.</p> <div style="border: 1px solid black; padding: 2px;"> <p>EXAMINER CUE: 2CCS-83 is closed.</p> </div> <p>2.3.C Candidate opens 2CCS-AOV118.</p> <div style="border: 1px solid black; padding: 2px;"> <p>EXAMINER CUE: 2CCS-AOV118 is open.</p> </div> <p>2.4.C Candidate opens [2CCS*229].</p> <div style="border: 1px solid black; padding: 2px;"> <p>EXAMINER CUE: 2CCS-229 is open.</p> </div> <p>COMMENTS: _____</p> |
|--|--|

| | |
|-----------------------|--|
| NUMBER 2PL-019 | TITLE Alternate Safe Shutdown - Turbine Building (N.O. #2) |
|-----------------------|--|

| | |
|---|--|
| STEP ("C" denotes critical step) | STANDARD (Indicate "S" for Sat. or "U" for Unsat.) |
|---|--|

| | |
|---|---|
| <p>3.C Align compressor controls for 2SAS-C21A.</p> <div style="border: 1px solid black; padding: 5px;"><p>EXAMINER CUES: Oil pressure is 30# aftercooler discharge is 110# intercooler inlet is 36# intake vacuum is 8" Cooling water outlet is 100°F aftercooler water outlet is 30°C aftercooler air outlet is 32°C</p></div> | <div style="border: 1px solid black; padding: 5px;"><p>EXAMINER CUE: The VOLTAGE ON light and remote breaker lights are lit and no alarm status lights are lit.</p></div> <p>3.1.C Candidate places LOCAL-REMOTE switch in the LOCAL position.</p> <p>3.2.C Candidate depresses RESET/START pushbutton.</p> <div style="border: 1px solid black; padding: 5px;"><p>EXAMINER CUE: The compressor is running with no problems.</p></div> <p>3.3 Candidate notifies Supervisor of compressor status.</p> <p>COMMENTS: _____</p> <p>Stop Time: _____</p> |
|---|---|

ORAL QUESTION #1

Question; Show, using the appropriate diagram, how 2CHS HCV 186 will fail on a loss of Instrument Air pressure. Explain why the fail position is desirable following a Safety Injection.

ANSWER: HCV 186 fails open to preserve seal injection to the RCPs. (Valve is on VOND 7-3 at A1/B2.) (Seal injection is also desired following an accident: the seal injection throttle valves are positioned to limit the amount of flow diverted from the High Head SI flowpath.)

TIME

ALLOTTED: 5 minutes

KSA #: 065AK3.03 2.9/3.4

REF: VOND 7-3
2OM-7.1.C pg 29
Technical Specification 3.5.4 and basis

COMMENTS: _____

ORAL QUESTION #2

Question; Why does 2OM 56C line up Domestic Water as the cooling medium to the 21A air compressor?

Note; this is a closed reference question.

ANSWER: Domestic Water is utilized by OM2.56C because the normal supply, CCS, is unavailable. CCS is unavailable because procedure 56C deenergizes the BOP busses (to prevent undesired equipment operation). (Completion may be prompted, i.e. "Why will CCS be unavailable?".)

TIME

ALLOTTED: 5 minutes

KSA #: 000067AK3.04 3.3/4.1

REF: 2OM-28.1

COMMENTS: _____

RTL #A5.635.J

* * THIS SHEET TO BE GIVEN TO CANDIDATE * *

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #2

Why does 20M 56C line up Domestic Water as the cooling medium to the 21A air compressor?

Note; this is a closed reference question.

RTL #A5.635.J

* * THIS SHEET TO BE GIVEN TO CANDIDATE *

BVPS JOB PERFORMANCE MEASURE

ORAL QUESTION #1

Show, using the appropriate diagram, how 2CHS HCV 186 will fail on a loss of Instrument Air pressure.

Explain why this fail position is desirable following a Safety Injection.

CANDIDATE DIRECTION SHEET

* THIS SHEET TO BE GIVEN TO CANDIDATE *

Read:

Task: Align Station Air Compressor for Operation

INITIAL CONDITIONS: The Control Room has been evacuated due to fire.

INITIATING CUE: The NSS hands you a copy of OM-2.56C.4, Procedure E, Part 2 and tells you to perform Step 5.

- At this time, ask the evaluator any questions you have on this JPM.
- When satisfied that you understand the assigned task, announce "I am now beginning the JPM".
- Simulate the task. Point to any indicator or component you verify or check and announce your observations.
- After the task is completed, announce "I have completed the JPM", then hand this sheet back to the evaluator.

SCENARIO OVERVIEW

Facility: Beaver Valley Power Station Unit 2 Scenario No.: 1 Op-Test No.: 2LOT2B

Examiners: _____

Operators: _____

Objectives: To evaluate the applicants ability to use Normal, Abnormal, Emergency and Alarm Response procedures to raise power and respond to a VCT problem, a load rejection, a stuck rod, a steam flow problem a steam line break outside containment, coincident with one charging pump tripping and one charging pump failing to auto start.

Initial Conditions: IC-47, 75% power, BOL, steady state conditions. Rods are in Manual. One Charging Pump and one Motor Driven AFW pump are out of service. One PZR PORV is isolated. Tornado watch in effect. AOP 6.4 in effect due to tube leak on SG "B".

Turnover: The plant is at 75% power. RCS boron 990 PPM. Rods in Manual with CBD at 198 steps. [2CHS*P21B] and [2FWE*P23B] are OOS. 2FWE*38 shut, 2FWE*P22 aligned to 'B' header 2FWE-36 shut; 2FWE-102 open. 2RCS*PCV456 is isolated per T.S. 3.4.11.b action. AOP 6.4 is complete to step 18 due to 20 gpd tube leak on SG "B". Tornado watch in effect. AOP 75.1 complete through step 5.

| Event No. | Malf. No. | Event Type* | Event Description |
|-----------|--|----------------------|---|
| N/A | N/A | R RO N PO/ SRO | Raise power at 12%/hr |
| 1 | XMT LDS3 1,100,120,0 ,D | I RO/SRO | VCT level transmitter 2CHS*115 fails high diverting letdown and loss of auto makeup |
| 2 | MAL EHC6 ACT,54,0,0, D | C RO/PO/ SRO | Load rejection, load limiter lowers by 10% |
| 3 | MAL CRF8A ACT,B8,1,0, D | C RO N PO/SRO | Stuck rod, B8 (Preload) |
| 4 | XMT MSS20 1,0,10,0,D | I PO/SRO | SG "A" steam flow transmitter 2MSS*FT475 fails low |
| 5 | MAL MSS2B ACT,1.5E ⁶ ,300,0,D | M RO/ PO/ SRO | Steam line break outside containment on SG "B" |
| 6 | PMP CHS1 2,0,C,JBK35 2.EQ.0 | C RO/SRO | 2CHS*P21A trips on SI initiation (Preload) |
| 7 | MAL PPL7B ACT,2,0,D | C RO/SRO | 2CHS*P21C fails to auto start (Preload) |

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

INITIAL CONDITIONS: Drill File 845 IC-47

Reactor power = 75%, BOL, RCS boron = 990 ppm, CBD = 198 steps

| <u>ADDITIONAL LINEUP CHANGES</u> | <u>STICKERS</u> | <u>VOND MARKINGS</u> |
|---|---|--|
| Set CBD step counters at 198 steps Place BOL ΔI curve in RO operator aids 2000 - 4000 MWD/MTU Reactivity Plan | 2RCS*MOV536 YCT 2CHS-P21B YCT 2FWE*P23B YCT 2MSS*SOV120 YCT 2MSS*SOV105C YCT 2SVS*PCV101B YCT 2SVS*HCV104 YCT | 2FWE*38 shut 24-3 (G-6) 2FWE*P22 aligned to 'B' header 2FWE*36 shut; 2FWE*102 open 24-3 (E-6) 2MSS-16 shut 21-2 (C-1) 2SVS*28 shut 21-2 (E-9) |
| <u>EQUIPMENT STATUS</u> 2RCS*PCV456 2CHS*P21B 2FWE*P23B | <u>DATE/TIME OOS</u> 6 days ago/0759 4 days ago/1610 6 hrs ago/1031 | <u>TECHNICAL SPECIFICATION(S)</u> 3.4.11.b 3.1.2.4 & 3.5.2 (Info Only) 3.7.1.2.b |

SHIFT TURNOVER INFORMATION

1. The plant is at 75% power, BOL. RCS boron 990 ppm. CBD at 198 steps. Power was reduced 70 hours ago per System's request.
2. [2CHS-P21B] is removed from service for motor rewind. Motor is presently off site.
3. [2FWE*P23B] is OOS to replace the pump inboard bearing, return expected in 24 hours. Its discharge valve 2FWE*38 is shut.
4. 2FWE*P22 aligned to 'B' AFW header 2FWE-36 shut; 2FWE-102 open.
5. 2RCS*PCV456 OOS with block valve 2RCS*MOV536 closed with power removed.
6. AOP 2.6.4 is complete to step 18. Approximately 44 hours ago a tube leak was detected in SG "B". The leak rate is 20 gpd on the last HP and Chemistry estimate.
7. 2MSS-16 shut, 2MSS-15 and 17 verified open.
8. 2SVS*28 shut.
9. 2MSS*PCV101B auto with setpoint adjusted to 100%.
10. 2MSS*SOV105C open.
11. 2MSS*SOV120 open.
12. **Control rods are in Manual**
13. **Tornado Watch in effect 1/2 OM-75.1 performed through step 5. (There are NO new fuel containers on site)**

14. RCS Dose Equivalent I ¹³¹ Specific Activity is 3.1 X 10⁻³ uci/gm.

15. Raise power at 12%/hour to 100%.

SCENARIO SUPPORT MATERIAL REQUIRED

1/2OM-48.1.C(ISS3) Figure 48.1.C-2 (ANSS Turnover Checklist)

2OM-54.2.S1 Log S1-2 (NSS Operating Report)

2OM-54.2.S1 Log S1-5 (NCO Report)

2OM-54.2.S1 Log S1-17 (ANSS Operating Report)

2OM-52.4.B (Load Following)

Completed Tornado Watch Form

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL845(1)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--|--|-----------|---------------------------|
| Select DRILL 845, Initialize IC - 47, and establish initial plant conditions. | Reactor at approximately 75% power, BOL, steady state condition. Ready to raise power to 100%. RCS boron <u>990</u> ppm, CBD <u>198</u> steps. | | |
| Insert: MAL CRF8A ACT,B8,1,0,D PMP CHS1 2,0,C, JBK352.EQ.0 | Control rod B8 stuck. 2CHS*P21A trips on Main Generator trip 2CHS*P21C fails to auto start | | |
| MAL PPL7B ACT,2,0,D | | | |
| When PCS startup complete File STUFFON File LRTM5IC ANACK ANRSET FRZ | | | |
| Assign shift positions. | | | |
| NSS _____ ANSS _____ RO _____ PO _____ STA _____ | <u>Simulator Frozen</u> until after shift turnover unless it needs to be run momentarily for an alignment change. | | |

Conduct a shift turnover with
oncoming operators.

Oncoming ANSS should complete the
required checklist and carry out a
formal shift turnover.

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL845(2)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--------------------------|--------------------------|-----------|---------------------------|
|--------------------------|--------------------------|-----------|---------------------------|

When the shift turnover is completed, place the simulator in RUN and commence the drill.

Simulator running

ANSS assumes control and directs operators to commence raising power IAW 2OM-52.4.B, **Load Following**

EVENT #1

After power is raised $\geq 5\%$ insert:
XMT LDS3 1,100,120,0,D

VCT level transmitter 2CHS*LT115 fails high causing letdown to divert to the Waste Collection Tank and loss of Auto makeup

VCT level lowers, alarm A2-2G, VCT TROUBLE comes in

PO compares 2CHS*LI115 with 2CHS*LI112 (**on computer**) and determines that 2CHS*LT115 has failed high

ANSS refers to alarm response procedure, failed instrument section and directs RO to place 2CHS*LCV115A, VCT Level Control Switch in the V.C. TANK position

Loss of Auto transfer to RWST on LO LO level
Loss of Auto makeup to VCT

RO verifies 2CHS*LCV112 and 2CHS*LCV115A aligned to the VCT

Crew refers to 2OM-7.4.N, Blender Manual Makeup Operation

NOTE: Crew may initiate a Temporary Log to track VCT level **or instructs STA to monitor/trend**

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL845(3)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--------------------------|--------------------------|-----------|---------------------------|
|--------------------------|--------------------------|-----------|---------------------------|

EVENT #2

When ARP VCT trouble complete,
insert:

MAL EHC6 ACT,54,0,0,D

Valve Position Limiter failure
resulting in a load rejection and
SGWLC upset

Rods stepping in, **if in Auto**, due to
load rejection.
Various annunciators related to
temperature, rod position, and PZR
pressure in alarm

Governor Valves closing, turbine
load lowering

Power at approximately 65%

Load greater than 270 Mwe.
Condenser vacuum greater than
26.5 inches Hg

Crew determines load rejection in
progress. ANSS refers to AOP 2.35.2

**PO reports that turbine load is
lowering due to Valve Position
Limiter (VPL) problem**

RO reviews alarms, reports DNB T.S.
exceeded to ANSS (T.S. 3.2.5)
**RCS pressure < 2205 psig and
lowering.**

Crew checks plant status IAW AOP
2.35.2

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL845(4)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--------------------------|--------------------------|-----------|---------------------------|
|--------------------------|--------------------------|-----------|---------------------------|

EVENT #3

MAL CRF8A ACT,B8,1,0,D
Rod B8 stuck. (Preload)

Rod B8 stuck

RO observes that rod B8 did NOT move with other CB "D" rods and reports misalignment to ANSS

ANSS refers to AOP 2.1.8

Crew determines that SDM (T. S. 3.1.1.1) must be performed within one hour if rod declared inoperable.
Refers to T. S. 3.1.3.1.a.

Rods in manual

RO places rod control in Manual (Optional) may already be in manual

ANSS notifies I & C that rod B8 is not moving with rest of bank

RCS temperature controlled by adjusting RCS boron concentration

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL845(5)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--------------------------|--------------------------|-----------|---------------------------|
|--------------------------|--------------------------|-----------|---------------------------|

EVENT #4

XMT MSS20 1,0,10,0,D
SG 'A' Steam flow transmitter
2MSS*FT475 fails low

SG "A" channel IV steam flow
transmitter 2MSS*FT475 fails **low**.

SG "A" FRV 2FWS*FCV478
modulates **open**
SG "A" feed flow and level **rising**
A6-9F SG "A" FEED FLOW >
STEAM FLOW in alarm

PO acknowledges alarms, reviews
indications, informs ANSS that

ANSS refers to ARPs and 2OM-
24.4.IF, Instrument Failure Procedure,
Attachment 3

Following steam flow channel
failure A6-9H, SG "A" STEAM
FLOW > FEED FLOW and A6-9E
SG "A" LEVEL DEVIATION are still
in alarm

PO identifies 2MSS*FT475 as the
failed instrument

2FWS*FCV478 in Manual

ANSS directs PO to take manual
control of MFRV 2FWS*FCV478 and
restore SG level to normal.

A6-9E clears as NR level returns to
normal band

ANSS directs PO to select feedwater
control channel III (477)

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL845(6)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|---|---|---|---|
| <p>To select steam flow Ch. III: (OVR) SWI PCS11 CLR (OVR) SWI PCS11 ACT,2,0,D</p> | <p>SG B SGWLC selected to channel III Annunciator A1-4E, MAIN STEAM FLOW CHANNEL SELECTED TROUBLE lit</p> | <p>ANSS contacts I & C and directs that steam flow control be selected to Channel III (474)</p> | <p>ANSS directs PO to return MFRV 2FWS*FCV478 controller to automatic.</p> |
| <p>To open cabinet door and trip bistables, insert; LOA PCS3 T,0,D BST PCS38 1,0,D BST PCS29 1,0,D LOA PCS3 F,0,D</p> | <p>2FWS*FCV478 in automatic.</p> <p>2LS/476A, SG "A" Lo-Lo level Rx trip, 2LS/476C, Hi-Hi level turbine trip and FW isolation bistables tripped</p> <p>Annunciator A6-9D, SG 21A LEVEL HIGH/LOW</p> | <p>SG "A" level channel 2FWS*LT476 declared inoperable, T.S. 3.3.1.1 Table 3.3-1, item 14 (trip within 6 hrs)</p> | <p>ANSS directs PO to return MFRV 2FWS*FCV478 controller to automatic.</p> <p>ANSS contacts I & C and directs that 2LS/476A, SG "A" Lo-Lo level Rx trip, 2LS/476C, Hi-Hi level turbine trip and FW isolation bistables placed in trip</p> |
| | | | <p>RO/PO verifies I & C in correct rack, monitors bistable trip evolution, informs ANSS upon completion</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL845(7)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--------------------------|--------------------------|-----------|---------------------------|
|--------------------------|--------------------------|-----------|---------------------------|

Event #5

When 2.24.IF complete, insert:
MAL ACT MSS2B 1.5E⁶,300,0,D

SG "B" Steam line break outside
containment
A10-4F MAIN STEAM VALVE
AREA TEMPERATURE HIGH lit

Steam flow and reactor power
increase
Tave lowering

Reactor trip.
First Out: Manual reactor trip A5-
5H, Y0004D.

Throttle or governor valves closed,
reheat stops or interceptors closed.

ANSS directs RO to manually trip
reactor after diagnosing secondary
break

RO manually trips reactor.

ANSS refers to E-0 to verify immediate
actions while RO and PO commence
immediate actions.

RO sounds standby alarm, and
announces Unit 2 reactor trip.

NSS informed to evaluate EPP

PO verifies turbine trip.

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL845(8)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|-----------------------------|--|-----------|--|
| | MSR steam supply block valves closed. Reheat controller reset pushbutton depressed. | | PO ensures reheat steam isolation. |
| | Main generator output breakers open. Exciter circuit breaker open. | | PO verifies generator trip. |
| | 2AE and 2DF busses energized. | | PO verifies power to AC emergency busses. |
| | SI annunciator A5-4G lit SI actuation status light A12-1D lit | | Crew checks if SI is actuated/required. |
| Immediate actions complete. | Both trains of SI manually initiated | | ANSS directs RO to manually initiate SI, both trains |
| | EDGs running. | | PO verifies EDGs running. |
| | 2FWE*P23A running (2FWE*P23B OOS). 2MSS*SOV105A-F open. 2FWE*HCV100A-F open. | | PO verifies AFW status. |
| | Two service water pumps running (one per train). Service water header pressure 60-124 psig. | | RO verifies service water system in service. |
| | | | RO verifies SI status. |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL845(9)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--|---|-----------|---|
| <u>EVENT #6</u> PMP CHS1 2,0,C,JBK352.EQ.0 (Preload) | 2CHS*P21A trips on Main Generator trip | | |
| <u>EVENT #7</u> MAL PPL7B ACT,2,0,D (Preload) | 2CHS*P21C HHSI pump fails to auto start | | |
| CT - #1 Crew manually actuates at least one train of SIS-actuated safeguards before transition to any ORP (E-0.D) | No HHSI flow until 2CHS*P21C is manually started | | RO determines no HHSI pumps running, starts 2CHS*P21C and notifies ANSS |
| | CIA actuated, all indicating lights with orange CIA marks LIT. | | RO/PO verify CIA. |
| | All indicating lights with green marks lit. | | RO/PO verify FWI. |
| | All indicating lights with yellow marks lit. | | RO/PO check MSLI is required. |
| | CIB and containment spray NOT required. | | RO verifies CIB and containment spray status |
| | 2CCS-AOV118 opened. One station air compressor running. | | PO establishes filtered water cooling to station air compressors. |
| | CCP pump "A" running | | RO/PO verify CCP in service. |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL845(10)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--------------------------|---|-----------|--|
| | SR channels aligned properly. | | RO verifies SR detector high voltage switches in NORMAL. |
| | Total AFW flow > 365 gpm. | | PO verifies AFW flow greater than 365 gpm. |
| | Plant cooling down due to unisolable steam line break, RNO actions complete | | RO verifies RCS Tavg stable at or trending to 547°F. |
| | | | <p>RNO actions performed if Tavg is less than 547°F. Check steam dumps closed (condenser and atmospheric) Throttle AFW to > 365 gpm until level > 5%.</p> |
| | Recirc spray pumps secured. | | RO checks recirc spray pump status. |
| | PORVs closed (not leaking). Spray valves closed. Safeties closed (PSMS data). PRT conditions normal. | | RO checks PRZR isolated. |
| | RCPs running. CCP flow to RCPs. | | RO checks if RCPs should be stopped. |
| | SG "B" pressure dropping. | | PO checks if any SGs are faulted. |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL845(11)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|---|---|-----------|--|
| <p>Note: A and C SG pressures may be dropping due to effects of SG "B" fault, but should not be diagnosed as faulted.</p> | <p>Control Room Bottled Air System manually actuated</p> <p>All yellow SLI marks lit.</p> <p>A and C SG pressure stable.</p> | | <p>ANSS makes transition to E-2, and informs crew. Crew briefing held</p> <p>PO manually actuates Control Room Bottled Air System</p> <p>Crew verifies steam line isolation.</p> <p>PO checks for any non-faulted SG.</p> |
| <p>Crew transitions to ECA-2.1 if all SGs diagnosed as faulted</p> | <p>B SG pressure dropping uncontrollably.</p> | | <p>PO identifies faulted SG.</p> |
| <p>CT - #2</p> <p>Crew isolates faulted SG and directs operator to close isolation valve(s) from outside the control room prior to transition out of E-2. (E-2.A)</p> | | | <p>Crew isolates B SG.</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL845(12)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|---|--|-----------|------------------------------------|
| <p>If directed to verify 2MSS*16 closed, check IDA Status for LOA AFW26 0,0,0,D</p> | <p>CNMT isolation valve 2FWS*HYV157B closed. MFRV 2FWS*FCV488 closed. BFRV 2FWS*FCV489 closed. AFW throttle valves 2FWE*HCV100C & D closed.</p> <p>One MDAFW pump running. TD AFW pump running</p> | | <p>Crew verifies valves closed</p> |
| <p>If directed to check 2SVS*28 closed, Check IDA Status for LOA MSS10 0,0,0,D</p> | <p>2MSS*16 previously closed.</p> <p>Atmospheric Dump Valve 2SVS*PCV101B closed in Auto with setpoint at 100% RHR valve 2SVS*HCV104 closed.</p> | | <p>Crew verifies valves closed</p> |
| <p>Report when above actions completed.</p> | <p>2SVS*28 previously closed.</p> <p>SG blowdown valve 2BDG*AOV100B1 closed. Blowdown sample valves 2SSR*AOV117A, B, & C closed.</p> | | <p>Crew verifies valves closed</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL845(13)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--------------------------|--|-----------|--|
| | No SG levels rising uncontrollably. | | Crew checks if SG tubes are intact. |
| | | | ANSS makes transition to E-1, informs crew. Crew briefing held. (May be waived or very short depending on SG "B" status and PZR level) |
| | Control Room Bottled Air System previously actuated | | |
| | RCPs running. HHSI flow indicated, D/P and CCP flow satisfactory. | | RO checks if RCPs should be stopped. |
| | Recirc spray pumps not running. | | RO rechecks recirc spray pump status. |
| | CNMT sample amber lights lit. | | RO verifies both H ₂ analyzers running. |
| | B SG previously diagnosed as faulted and isolated (pending reports of local operator actions). | | PO checks if any SG is faulted. |
| | A and C SGs intact. | | PO maintains intact SG levels 5% to 50%. |
| | PORVs shut in auto and block valves energized. | | RO checks PORVs and block valves. |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL845(14)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|---|--|-----------|--|
| <p>No local action required to align compressor drain valves. 2CSS-229 & 230 Open 2CSS-73, 83 & 84 Closed</p> | <p>Subcooling > 41°F. Secondary heat sink satisfactory. RCS pressure stable or rising. PRZR level > 4%.</p> | | <p>RO/PO check if SI can be terminated.</p> |
| | <p>2CVS-P21A, B in PTL. 2DAS-P204A, B in STOP. 2DGS-P21A, B in PTL.</p> | | <p>ANSS makes transition to ES-1.1, informs crew. Crew briefing held (May be deferred)</p> |
| | <p>SI, CIA, (CIB), SI Recirc reset, A12-1C lit, A12-1D not lit.</p> | | <p>RO isolates CNMT vents and drains system.</p> |
| | <p>Domestic water previously aligned</p> | | <p>RO resets SI, CIA, (CIB), SI Recirc (both trains).</p> |
| | <p>2CCS-AOV118 opened (filtered water to station air compressors). Station air compressor running.</p> | | <p>PO verifies domestic water aligned to station air compressors</p> |
| | <p>2IAC-MOV131, 130 opened (station to CNMT instrument air cross-connect). CNMT instrument air header pressure > 85 psig.</p> | | <p>PO establishes instrument air to containment.</p> |
| | <p>Pressure stable or rising.</p> | | <p>RO checks RCS pressure stable or rising.</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL845(15)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--------------------------|--|-----------|--|
| | 2CHS*FCV122 closed. 2CHS*MOV289, 310 opened. | | ANSS directs RO to establish normal charging flow. |
| | 2SIS*MOV867A,B,C,D closed. | | ANSS directs RO to close HHSI cold leg isolation valves. |
| | 2CHS*FCV122 adjusted to maintain PRZR level | | RO controls charging flow to maintain PRZR level. |
| | LHSI pumps stopped and placed in auto. | | ANSS directs RO to stop LHSI pumps and place in auto. |
| | RCS subcooling > 41°F. PRZR level > 4%. | | RO verifies SI flow not required. |
| | No quench or recirc spray pumps running. | | RO checks if CNMT spray should be stopped. |
| | PRZR level > 14%. One CCP pump running. 2CHS*FCV122 adjusted to establish 30 - 50 gpm charging flow. 2CHS*AOV204 opened. 2CHS*PCV145 in manual and 50% open. 2CHS*LCV460A, B opened. 2CHS*AOV200A, B, C opened as appropriate. 2CHS*PCV145 adjusted to 260 psig and placed in auto. | | RO checks if letdown can be established, then establishes letdown. |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL845(16)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--|--|-----------|--|
| <p>Terminate scenario at Step 18 of ES-1.1. (align charging pumps suction to VCT).</p> <p>Collect and review logs after allowing operators to complete them.</p> | <p>CCP supply/return valves open 2CCP*175-1 & 2 2CCP*176-1 & 2 2CCP*177-1 & 2 2CCP*178-1 & 2</p> <p>Makeup control in Manual (due to 2CHS*LT115 failure) and set to greater than RCS boron concentration.</p> <p>2CHS*LCV115C, E opened. 2CHS*LCV115B, D closed.</p> | | <p>RO checks VCT makeup control system.</p> <p>RO aligns HHSI pump suction to VCT.</p> |
| | | | <p>Operator logs should be clear, accurate and concise.</p> |

SCENARIO OVERVIEW

Facility: Beaver Valley Power Station Unit 2 Scenario No.: 2 Op-Test No.: 2LOT2B

Examiners: _____ Operators: _____

Objectives: To evaluate the applicants ability to use Normal, Abnormal, Emergency and Alarm Response procedures to respond to a charging pump sheared shaft, impulse pressure transmitter failure, 2RCS*PT444 failing high, 2RCS*PCV455C sticking open with 2RCS*MOV535 failing to close, ATWS, 2CHS*MOV350 fails to open, 2FWE*P23A fails to auto start.

Initial Conditions: IC-47, 75% power, BOL, steady state conditions. Rods are in Auto. 2CHS*P21B and 2FWE*P23B are OOS. 2RCS*PCV456 is isolated. Tornado Warning in effect. Tube leak on SG "B".

Turnover: The plant is at 75% power. BOL, RCS boron 990 PPM. CBD at 198 steps. [2CHS*P21B] and [2FWE*P23B] are OOS. 2FWE*38 shut, 2FWE*P22 aligned to 'B' header 2FWE-36 shut; 2FWE-102 open. 2RCS*PCV456 is isolated per T.S. 3.4.11.b action. AOP 2.6.4 is complete to step 18 due to 20 gpd tube leak on SG "B". Tornado watch in effect. AOP 75.1 complete through step 5. Lower power to remove 2FWS-P21A from service.

| Event No. | Malf. No. | Event Type* | Event Description |
|-----------|---|------------------|---|
| N/A | N/A | R RO N PO/SRO | Lower power to remove 2FWS-P21A from service |
| 1 | PMP CHS1 4,0,D | C RO/SRO | Operating Charging Pump sheared shaft resulting in loss of all charging and seal injection flow |
| 2 | XMT MSS42 1,0,20,D | I PO/SRO | Impulse pressure transmitter 2MSS*PT446 fails low |
| 3 | XMT RCS30 1,2500,5,0,D | I RO/SRO | RCS pressure transmitter fails high causing spray valves and PORVs to open and heaters to turn off |
| 4 | VLV RCS32 4,75,0,C,PRC :444.GT.2400 | C RO/SRO | PZR PORV 2RCS*PCV455C fails to 75% open (Preload) |
| 5 | VLV RCS11 2,0,D | M ALL | PORV Block valve 2RCS*MOV535 fails to close causing RCS pressure to lower (Reactor trip and SI) (Preload) |
| 6 | MAL PPL1A & B ACT,2,0,D | M ALL | ATWS (Preload) |
| 7 | MAL PPL7A ACT,6,0,D | C PO/SRO | 2FWE*P23A fails to auto start, will manually start (Preload) |
| 8 | VLV BAT14 3,0,D | C RO/SRO | 2CHS*MOV350 fails closed, must alternate emergency borate (Preload) |

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

U2LOT-SIM-NRC EXAM-2LOT2B.2 (ic) REV 0

INITIAL CONDITIONS: Drill File 846 IC-47

Reactor power = 75%, BOL, RCS boron = 990 ppm, CBD = 198 steps

| <u>ADDITIONAL LINEUP CHANGES</u> | <u>STICKERS</u> | <u>VOND MARKINGS</u> |
|---|---|--|
| Set CBD step counters at 198 steps Place BOL ΔI curve in RO operator aids 2000 - 4000 MWD/MTU Reactivity Plan Ensure rods are in AUTO | 2RCS*MOV536 YCT 2CHS-P21B YCT 2FWE*P23B YCT 2MSS*SOV120 YCT 2MSS*SOV105C YCT 2SVS*PCV101B YCT 2SVS*HCV104 YCT | 2FWE*38 shut 24-3 (G-6) 2FWE*P22 aligned to 'B' header 2FWE*36 shut; 2FWE*102 open 24-3 (E-6) 2MSS-16 shut 21-2 (C-1) 2SVS*28 shut 21-2 (E-9) |
| <u>EQUIPMENT STATUS</u> | <u>DATE/TIME OOS</u> | <u>TECHNICAL SPECIFICATION(S)</u> |
| 2RCS*PCV456 2CHS*P21B 2FWE*P23B | 6 days ago/0759 4 days ago/1610 6 hrs ago/1031 | 3.4.11.b 3.1.2.4 & 3.5.2 (Info Only) 3.7.1.2.b |

SHIFT TURNOVER INFORMATION

1. The plant is at 75% power, BOL. RCS boron 990 ppm. Rods in Auto with CBD at 198 steps. Power was reduced 70 hours ago per System's request.
2. [2CHS-P21B] is removed from service for motor rewind. Motor is presently off site.
3. [2FWE*P23B] is OOS to replace the pump inboard bearing, return expected in 24 hours. Its discharge valve 2FWE*38 is shut.
4. 2FWE*P22 aligned to 'B' AFW header 2FWE-36 shut; 2FWE-102 open.
5. 2RCS*PCV456 OOS with block valve 2RCS*MOV536 closed with power removed.
6. AOP 2.6.4 is complete to step 18. Approximately 44 hours ago a tube leak was detected in SG "B". The leak rate is 20 gpd based on the last HP and Chemistry estimate.
7. 2MSS-16 shut, 2MSS-15 and 17 verified open.
8. 2SVS*28 shut.
9. 2MSS*PCV101B auto with its setpoint adjusted to 100%.
10. 2MSS*SOV105C open.
11. 2MSS*SOV120 open
12. Tornado Watch in effect 1/2 OM-75.1 performed through step 5. (There are NO new fuel containers on site)

- 13.RCS Dose Equivalent I ¹³¹ Specific Activity is 3.1 X 10⁻³ uci/gm.
14.Lower power at 12%/hour to remove 2FWS-P21A from service.

SCENARIO SUPPORT MATERIAL REQUIRED

- 1/2OM-48.1.C(ISS3) Figure 48.1.C-2 (ANSS Turnover Checklist)
2OM-54.2.S1 Log S1-2 (NSS Operating Report)
2OM-54.2.S1 Log S1-5 (NCO Report)
2OM-54.2.S1 Log S1-17 (ANSS Operating Report)
2OM-52.4.B (Load Following)
Completed Tornado Watch Form

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL846(1)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|---|--|-----------|---------------------------|
| <p>Select DRILL 846, Initialize IC - 47, and establish initial plant conditions.</p> <p>Insert:</p> <p>VLV RCS32 4,75,0,0,C,PRC:444.GT.2400 VLV RCS11 2,0,D</p> <p>MAL PPL1A ACT,2,0,D MAL PPL1B ACT,2,0,D MAL PPL7A ACT 6,0,D VLV BAT14 3,0,D</p> <p>File STUFFON File LRTM5IC</p> | <p>Reactor at approximately 75% power, BOL, steady state condition, RCS boron <u>990</u> ppm, CBD <u>198</u> steps. Ready to lower power to remove 2FWS-P21A from service.</p> <p>PZR PORV, 2RCS*PCV455C fails to 75% open PORV Block 2RCS*MOV535 fails open ATWS</p> <p>2FWE*P23A fails to auto start Emergency Borate Valve 2CHS*MOV350 fails closed</p> | | |
| <p>ANACK ANRSET FRZ</p> | | | |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL846(2)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--------------------------|--------------------------|-----------|---------------------------|
|--------------------------|--------------------------|-----------|---------------------------|

Assign shift positions.

| | |
|------------|--|
| NSS _____ | <p><u>Simulator Frozen</u> until after shift turnover unless it needs to be run momentarily for an alignment change.</p> |
| ANSS _____ | |
| RO _____ | |
| PO _____ | |
| STA _____ | |

Conduct a shift turnover with oncoming operators.

Oncoming ANSS should complete the required checklist and carry out a formal shift turnover.

When the shift turnover is completed, place the simulator in RUN and commence the drill.

Simulator running

ANSS assumes control and directs operators to commence lowering power IAW 2OM-52.4.B.

Power lowering

RO develops reactivity plan, ANSS reviews and approves. Crew commences power reduction

EVENT #1

After power is lowered $\geq 5\%$ insert:
PMP CHS1 4,0,D

2CHS*P21B shaft shears resulting in the loss of all normal charging and seal injection flow

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL846(3)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--------------------------|---|-----------|--|
| | <p>2CHS*P21A running with lower than normal amps. Alarm A2-3E, CHARGING FLOW PATH TROUBLE lit A2-4D, RCP SEAL TROUBLE lit</p> | | <p>RO notes that charging header flow and pressure are low, 2CHS*P21B amps are low, with PZR level lowering</p> |
| | <p>Annunciator A2-3F, LETDOWN FLOW PATH TROUBLE will illuminate if letdown is not quickly isolated</p> | | <p>ANSS refers to alarm response procedure A2-3E, charging flow or pressure low section and directs RO to close 2CHS*FCV122, Charging pump flow control valve Crew may isolate letdown per ARP A2-3F</p> |
| | <p>2CHS*FCV122 in Manual and closed</p> | | |
| | <p>2CHS*P21C running 2CHS*P21A off (PTL)</p> | | <p>Crew verifies that a common mode failure does not exist (VCT level and pressure) starts the standby charging pump and stops 2CHS*P21A</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL846(4)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--|---|-----------|--|
| <p>After an appropriate delay, report as local operator that the speed changer for 2CHS*P21B is damaged and very noisy (if pump is running) If asked local discharge pressure is 33 psig</p> | <p>Normal charging and letdown established 2CHS*FCV122 in Auto</p> | | <p>If letdown isolated, the following re-establishes normal charging and letdown. Throttle 2CHS*FCV122 to 30-50 gpm 2CHS*PCV145 in Manual at 50% Verify 2CHS*MOV100A or B open Verify 2CHS*LCV460A and B open Open 2CHS*AOV200A, B or C Adjust 2CHS*PCV145 to obtain 260 psig and place in Auto</p> <p>RO stabilizes PZR level, then places 2CHS*FCV122 in Auto</p> <p>Applicable T. S. 3.1.2.4 and 3.5.2</p> |
| <p><u>EVENT #2</u></p> <p>When PZR level stabilized, insert: XMT MSS42 1,0,20,0,D</p> | <p>Impulse pressure 2MSS*PT446 fails low Rods step in if Auto selected</p> | | |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL846(5)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--------------------------|--|-----------|---|
| | <p>Annunciators SG LEVEL DEVIATION, STEAM FLOW > FEED FLOW, PZR PRESSURE LOW, TAVE DEVIATION lit, DELTA FLUX OUTSIDE TARGET BAND may be lit</p> | | <p>ANSS refers to AOP 2.1.3, RCCA Control Bank Inappropriate Continuous Movement PO determines that 2MSS*PT446 has failed low</p> |
| | <p>Rod control in Manual Tave trending to Tref dl trending up</p> | | <p>ANSS directs RO to place rods in Manual and to restore Tave</p> |
| | <p>All four channels of QPTR are operable</p> | | <p>PO directed to perform OST-2.4A, QPTR Manual Calculation</p> <p>T. S. 3.2.5, DNB (restore within two hours) impacted If dl target exceeded T. S. 3.2.1, is applicable (less than 60 minutes outside target in last 24 hours)</p> |
| | <p>SG levels lowering FRVs in Manual</p> | | <p>ANSS refers to 2OM- 24.4.IF, Instrument Failure Procedure, Attachment 5</p> <p>ANSS directs PO to place FRVs in Manual and adjust to stabilize SG levels NOTE: May not be necessary</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL846(6)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|---|---|-----------|---|
| | Main turbine first stage pressure sensor selected to PT447 on BB-C | | ANSS directs PO to select PT447 |
| | FRVS in Auto | | ANSS directs PO to place FRVs in Auto when SG levels returned to normal |
| | Steam Dumps RESET and in STM PRESS Mode | | ANSS directs PO to place the Stm Dump Mode Selector Switch to RESET, then to STM PRESS Mode |
| | | | ANSS refers to ARP 20M-1.4.ACJ |
| To re-arm AMSAC, insert BST PCS14 1,0,D | TL/2MSS446 is on Trip Switch TPS/2MSS446 in the Test (up) position Annunciator A12-1E is off AMSAC re-armed | | ANSS contacts I & C and directs them to verify that Test Light TL/2MSS446 is off and to place Trip Switch TPS/2MSS446 in the Test (up) position |
| | | | ANSS refers to T.S. 3.3.1.1 Table 3.3-1, item 23.e |
| | Annunciator A12-2H not lit (Both inputs must be < 10% to illuminate this window, the annunciator being dark implies the other input is operable per the T.S. action) | | Crew determines that A12-2H is NOT lit |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL846(7)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--|---|------------------|--|
| <p>EVENTS #3, 4 & 5 After T. S. 3.3.1.1 compliance verified, insert: XMT RCS30 1,2500,5,0,D</p> | <p>2RCS*PT444 fails high causing PZR spray valves and PORV 2RCS*PCV455C to open</p> | <p>OBJECTIVE</p> | <p>EXPECTED STUDENT RESPONSE</p> |
| <p>VLV RCS32 4,75,0,C,PRC:444.GT.2400 (Preload) VLV RCS11 2,0,D (Preload)</p> | <p>2RCS*PCV455C fails 75% open 2RCS*MOV535, PORV Block fails open</p> | | |
| | <p>PZR CONTROL PRESSURE HIGH/LOW alarm, A4-1D</p> | | <p>RO notes alarm, informs ANSS and crew refers to ARPs as necessary.</p> |
| | <p>PZR CONTROL PRESSURE DEVIATION HIGH/LOW alarm. A4-1E, P0500D Various other PZR pressure and PRT alarms</p> | | <p>ANSS refers to ARP A4-1E, PRESSURIZER CONTROL PRESS DEVIATION HIGH/LOW</p> |
| | <p>Possible OTDT runback and rod stop. A4-4B, T0517D</p> | | <p>ANSS directs PORV 455C be closed and master pressure controller be placed in manual.</p> |
| | | | <p>PO places master pressure controller in manual, closes spray valves, and manually controls heaters.</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL846(8)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|---|---|-----------|---|
| <p>NOTE: Crew may decide to manually trip reactor prior to auto trip setpoint.</p> | <p>RCS pressure continues to drop.</p> | | <p>RO informs the ANSS that RCS pressure is still dropping with manual control of spray/heaters and that 2RCS*PCV455C indicates partially open. RO attempts to close 2RCS*535, PORV Block.</p> |
| <p><u>EVENT #6</u> MAL ACT PPL1A 2,0,D MAL ACT PPL1B 2,0,D (Preload)</p> | <p>ATWS Low PRZR pressure reactor trip annunciator actuates. First Out: A5-4H, P0488D. Reactor trip failure.</p> | | <p>RO notes a reactor trip has not occurred and attempts to trip the reactor, informs ANSS of ATWS condition.</p> |
| <p>Time directed to locally trip the reactor _____.</p> | | | <p>Operators commence immediate actions for E-O and FR-S.1; ANSS refers to E-O and makes transition to FR-S.1.</p> |
| <p>CT - #1 Crew inserts negative reactivity into the core by inserting RCCAs before completing the immediate action steps of FR-S.1 (FR-S.1.C)</p> | <p>Rods inserting.</p> | | <p>RO uses auto or manual rod control to insert rods. Crew sounds standby alarm and announces Unit 2 reactor trip failure.</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL846(9)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--|--|------------------|--|
| <p>Two minutes after receiving direction to locally open reactor trip breakers, insert MAL PPL2A ACT,0,0,D MAL PPL2B ACT,0,0,D</p> | <p>Reactor tripped</p> | <p>OBJECTIVE</p> | <p>Crew dispatches an operator to open the reactor trip breakers.</p> |
| <p>Then report RTBs manually opened.</p> | <p>Turbine manually tripped.</p> | <p>OBJECTIVE</p> | <p>NSS informed to evaluate EPP</p> |
| <p>CT - #2</p> | <p>Turbine manually tripped.</p> | <p>OBJECTIVE</p> | <p>PO manually trips turbine</p> |
| <p>Crew isolates the main turbine from the SGs before WR SG level is less than 10% in 2/3 SGs.</p> | <p>Throttle, governor, reheat stop, and interceptor valves all closed.</p> | <p>OBJECTIVE</p> | <p>PO verifies turbine trip.</p> |
| | <p>Steam dump bypass interlock selector switches in off.</p> | <p>OBJECTIVE</p> | <p>PO places condenser steam dump Selector Switches in OFF</p> |
| | <p>MSR steam supply block valves closed. Reheat controller reset.</p> | <p>OBJECTIVE</p> | <p>PO ensures reheat steam isolation and depresses reheat controller RESET pushbutton.</p> |
| <p><u>EVENT #7</u> 2FWE*P23A fails to auto start MAL ACT PPL7A 6,0,D (Preload)</p> | <p>MD AFW pump running. (2FWE*P23A manually started). TD AFW pump running if required. 2FWE*HCV100A-F full open.</p> | <p>OBJECTIVE</p> | <p>PO verifies AFW status, reports 2FWE*P23A auto start failure, manually starts pump.</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL846(10)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|------------------------------|---|-----------|---|
| <u>EVENT #8</u> | | | |
| VLV BAT14 3,0,D (Preload) | <p>HHSI pumps running. 2CHS*MOV350 failed closed</p> <p>2CHS*SOV206 open Makeup Mode Selector in BORATE 2CHS*FCV113A set to > 30 gpm Boric Acid Flow Totalizer set to > 1000 gpm Boric acid pump in Auto BA Makeup Blender Control in Start 2CHS-FR113 BA to Blender flow > 30 gpm 2CHS*FCV122 manually opened Charging flow > 40 gpm</p> <p>PRZR pressure < 2335 psig.</p> <p>SI Annunciator A5-4G, PZR LOW PRESSURE SAFETY INJECTION/REACTOR TRIP lit</p> <p>SG levels < 5% NR.</p> | | <p>Crew attempts to initiates emergency boration.</p> <p>Crew establishes alternate emergency boration</p> <p>RO checks PRZR pressure less than 2235 psig.</p> <p>Crew checks SI signal status, performs first fifteen steps of E-0 when time permits</p> <p>PO checks SG levels, verifies AFW flow is greater than 700 gpm. PO controls feed flow to maintain 5 - 50% SG narrow range level.</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL846(11)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--------------------------|--|-----------|--|
| | 2CHS*FCV113B closed. 2CHS*FCV114A closed. 2CHS*FCV114B closed. | | RO verifies dilution paths isolated. |
| | Uncontrolled cooldown not in progress. | | RO monitors RCS for uncontrolled cooldown. |
| | PR NIs less than 5%. IR NIs negative SUR. | | ANSS goes to Step 16 of FR-S.1. |
| | Reactor locally tripped Rods bottom lights lit Flux decreasing | | RO verifies reactor subcritical. |
| | | | ANSS makes transition from FR-S.1 back to E-0 and informs control room to perform E-0 immediate actions. |
| | | | RO verifies reactor trip |
| | | | RO sounds standby alarm, and announces Unit 2 Safety Injection |
| | | | NSS informed to evaluate EPP |
| | Throttle or governor valves closed, reheat stops or interceptors closed. | | PO verifies turbine trip. |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL846(12)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|------------------------------------|--|-----------|--|
| <p>Immediate actions complete.</p> | <p>MSR steam supply block valves closed. Reheat controller reset pushbutton depressed.</p> <p>Main generator output breakers open. Exciter circuit breaker open.</p> <p>2AE and 2DF busses energized.</p> <p>SI annunciator A5-4G, PZR LOW PRESSURE SAFETY INJECTION/REACTOR TRIP lit SI actuation status light, A12-1D lit</p> <p>Both trains of SI manually initiated</p> <p>EDGs running.</p> <p>2FWE*P23A running (2FWE*P23B OOS). 2MSS*SOV105A-F open. 2FWE*HCV100A-F open.</p> | | <p>PO ensures reheat steam isolation.</p> <p>PO verifies generator trip.</p> <p>PO verifies power to AC emergency busses.</p> <p>Crew checks if SI is actuated/required.</p> <p>ANSS directs RO to manually initiate SI, both trains</p> <p>PO verifies EDGs running.</p> <p>PO verifies AFW status.</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL846(13)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--------------------------|--|-----------|---|
| | Two service water pumps running (one per train). Service water header pressure 60-124 psig. | | RO verifies service water system in service |
| | 2CHS*P21C running 2SIS*943 indicates approximately 330 gpm of SI flow | | RO verifies SI pump status |
| | SI valve alignment - all indicating lights with red SIS marks lit | | RO/PO verify SI status |
| | CIA actuated, all indicating lights with orange CIA marks LIT. | | RO/PO verify CIA |
| | All indicating lights with green marks lit. | | RO/PO verify FWI |
| | MSLI NOT required | | RO/PO check MSLI required. |
| | CIB and Containment Spray NOT required. | | RO verifies CIB and containment spray status |
| | 2CCS-AOV118 opened. One station air compressor running. | | PO establishes filtered water cooling to station air compressors. |
| | CCP pump "A" running | | RO/PO verify CCP in service. |
| | SR channels aligned properly. | | RO verifies SR detector high voltage switches in NORMAL. |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL846(14)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--------------------------|---|-----------|---|
| | Total AFW flow > 365 gpm. | | PO verifies AFW flow greater than 365 gpm. |
| | Plant NOT cooling down due to hot leg break | | RO verifies RCS Tavg stable at or trending to 547°F ANSS directs performance of emergency safety function checklists when time permits |
| | Recirc spray pumps secured. | | RO checks recirc spray pump status. |
| | PORV 2RCS*PCV455C NOT closed and NOT isolated | | RO checks PRZR isolated. (Transition required by RNO) ANSS makes transition to E-1, informs crew. Briefing held |
| | CREBAPS not required. | | PO checks control room habitability. |
| | RCPs running. HHSI flow indicated, D/P and CCP flow satisfactory. | | RO checks if RCPs should be stopped. |
| | Recirc spray pumps not running. | | RO rechecks recirc spray pump status. |
| | CNMT sample amber lights lit. | | RO verifies both H ₂ analyzers running. |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL846(15)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|---|--|-----------|--|
| <p>Collect and review logs after allowing operators to complete them.</p> | All SGs intact | | PO checks if any SG is faulted. |
| | SG level between 5% and 50% | | PO maintains intact SG levels 5% to 50%. |
| | PORV 2RCS*PCV455C open PORV 2RCS*PCV455D in auto with block valve energized | | RO checks PORVs and block valves. |
| | Subcooling > 41°F. Secondary heat sink satisfactory RCS pressure stable or rising PRZR level > 4% | | RO/PO check if SI can be terminated. |
| | | | ANSS makes transition to ES-1.1, informs crew. |
| | | | Operator logs should be clear, accurate and concise. |

SCENARIO OVERVIEW

Facility: Beaver Valley Power Station Unit 2 Scenario No.: _3_ Op-Test No.: 2LOT2B

Examiners: _____ Operators: _____

Objectives: To evaluate the applicants ability to use Normal, Abnormal, Emergency and Alarm Response procedures to respond to a plugged boric acid filter, NI failure, MFW pump trip, LOOP, one EDG trips, one EDG breaker fails to close (loss of all AC power), TD AFW pump trips on overspeed (able to reset), RCP "A" #1 seal leak (50 gpm).

Initial Conditions: IC-49, 21% power, BOL. Rods are in Manual. 2CHS*P21B, 2FWE*P23B and 2FWS-P21A are OOS. 2RCS*PCV456 is isolated. Tornado Warning in effect. Tube leak on SG "B". Shutdown in progress.

Turnover: The plant is at 21% power. BOL, RCS boron 1307 PPM. Rods in Manual with CBD at 121 steps. [2CHS-P21B] and [2FWE*P23B] are OOS. 2FWE*38 shut, 2FWE*P22 aligned to 'B' header 2FWE-36 shut; 2FWE-102 open. 2FWS-P21A OOS to repair motor MB1 leads. 2RCS*PCV456 is isolated per T.S. 3.4.11.b action. AOP 2.6.4 is complete to step 18 due to 75 gpd tube leak on SG "B". Tornado watch in effect. AOP 75.1 complete through step 5. 2OM52.4.C complete to step 11. Continue shutdown.

| Event No. | Malf. No. | Event Type* | Event Description |
|-----------|---|------------------|---|
| N/A | N/A | R RO N PO/SRO | Continue plant shutdown IAW 2OM-52.4.C |
| 1 | MAL LDS3D ACT,100,15, 0,0,C,PBATD ISA.GT.100 | C RO/SRO | F21, Boric Acid Filter to Blender plugs (Preload) |
| 2 | MAL NIS7A ACT,1,0,0,D | I PO/SRO | IR N35 blown instrument power fuse, must manually energize both source ranges when power drops to less than P-6 |
| 3 | BST CFW24 1,0,D VLV CFW27 1,0,D | I RO/SRO | 2CNM-PS118B, MFW Pump suction pressure fails low causing trip of running MFW pump SU FW Pump recirc valve fails closed (Preload) |
| 4 | MAL SWD1 ACT,0,0,D | M ALL | LOOP |
| 5 | MAL DSG1A ACT,0,0,D BKR HIV13 2,0,D | C ALL | EDG 2-1 trips (Preload) EDG 2-2 output breaker trips (Preload) Loss of ALL AC power |
| 6 | MAL AFW3A ACT,5440,0, D | C RO/PO/ SRO | TD AFW Pump trips (able to reset) (Preload) |

| | | | |
|---|-----------------------------------|-------|-------------------------------|
| 7 | MAL RCP1A ACT,50,300, 0,0,D | M ALL | RCP "A" #1 seal leak (50 gpm) |
|---|-----------------------------------|-------|-------------------------------|

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

| | | | |
|---|-----------------------------------|-------|-------------------------------|
| 7 | MAL RCP1A ACT,50,300, 0,0,D | M ALL | RCP "A" #1 seal leak (50 gpm) |
|---|-----------------------------------|-------|-------------------------------|

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

U2LOT-SIM-NRC EXAM-2LOT2B.3 (ic) REV 0

INITIAL CONDITIONS: Drill File 847 IC-49

Reactor power = 21%, BOL, RCS boron = 1307 ppm, CBD = 121 steps

| <u>ADDITIONAL LINEUP CHANGES</u> | <u>STICKERS</u> | <u>VOND MARKINGS</u> |
|--|--|--|
| Set CBD step counters at 121 steps Place BOL ΔI curve in RO operator aids 0000 - 2000 MWD/MTU Reactivity Plan Ensure Rods in Manual Ensure computer trends set up per procedure | 2RCS*MOV536 YCT 2CHS-P21B.YCT 2FWE*P23B YCT 2FWS-P21A YCT 2FWS-MOV150A YCT 2MSS*SOV120 YCT 2MSS*SOV105C YCT 2SVS*PCV101B YCT 2SVS*HCV104 YCT | 2FWE*38 shut 24-3 (G-6) 2FWE*P22 aligned to 'B' header 2FWE*36 shut; 2FWE*102 open 24-3 (E-6) 2MSS-16 shut 21-2 (C-1) 2SVS*28 shut 21-2 (E-9) 2FWS-MOV150A shut 24-1 (B-8) |
| <u>EQUIPMENT STATUS</u> | <u>DATE/TIME OOS</u> | <u>TECHNICAL SPECIFICATION(S)</u> |
| 2RCS*PCV456 | 6 days ago/0759 | 3.4.11.b |
| 2CHS*P21B | 4 days ago/1610 | 3.1.2.4 & 3.5.2 (Info Only) |
| 2FWE*P23B | 6 hrs ago/1031 | 3.7.1.2.b |

SHIFT TURNOVER INFORMATION

1. The plant is at 21% power, BOL. RCS boron 1307 ppm. Rods in manual with CBD at 121 steps.
2. [2CHS-P21B] is removed from service for motor rewind. Motor is presently off site.
3. [2FWE*P23B] is OOS to replace the pump inboard bearing, return expected in 24 hours. Its discharge valve 2FWE*38 is shut.
4. 2FWE*P22 aligned to 'B' AFW header 2FWE-36 shut; 2FWE-102 open.
5. 2RCS*PCV456 OOS with block valve 2RCS*MOV536 closed with power removed.
6. AOP 2.6.4 is complete to step 18. Approximately 44 hours ago a tube leak was detected in SG "B". The initial leak rate was 20 gpd. 6 hours ago the leak rose to 50 gpd and has slowly raised to its present value of 75 gpd. (Monitoring at 15 minute intervals IAW the AOP). The decision was made to shutdown and repair the leaking tube following the leak rate rise to 50 gpd. The shutdown was started three hours ago.
7. 2MSS-16 shut, 2MSS-15 and 17 verified open.
8. 2SVS*28 shut.
9. 2MSS*PCV101B auto with setpoint adjusted to 100%.
10. 2MSS*SOV105C open.
11. 2MSS*SOV120 open.

12. 2FWS-P21A OOS to repair motor MB1 leads. 2FWS-MOV150A, discharge closed IAW 2OM-24.4.F.
13. Tornado Watch in effect 1/2 OM-75.1 performed through step 5. (There are NO new fuel containers on site)
14. RCS Dose Equivalent I ¹³¹ Specific Activity is 3.1 X 10⁻³ uci/gm.
15. 2OM-52.4.C complete to step 11. Continue the shutdown at 12%/hr.

SCENARIO SUPPORT MATERIAL REQUIRED

- 1/2OM-48.1.C(ISS3) Figure 48.1.C-2 (ANSS Turnover Checklist)
 - 2OM-54.2.S1 Log S1-2 (NSS Operating Report)
 - 2OM-54.2.S1 Log S1-5 (NCO Report)
 - 2OM-54.2.S1 Log S1-17 (ANSS Operating Report)
 - 2OM-52.4.C (Decreasing Power from \leq 40% to Turbine Shutdown and Reactor at Approximately 5% Power)
- Completed Tornado Watch Form**

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL847(1)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|---|--|-----------|---------------------------|
| Select DRILL 847, Initialize IC - 49, and establish initial plant conditions. | Reactor at approximately 21% power, BOL. Shutting down to repair SGTL. RCS boron _1307_ ppm, CBD at _121_ steps. | | |
| Insert: | | | |
| MAL DSG1A ACT,0,0,D BKR HIV13 2,0,D MAL AFW3A ACT,5440,0,0,0,D VLV CFW27 1,0,D | Trip of EDG 2-1 Trip of EDG 2-2 Output Breaker Trip of TD AFW Pump (can reset) SU FW pump recirc valve fails closed | | |
| MAL LDS3D ACT,100,15,0,0,C,PBATDISA.GT .100 | F21, Boric Acid Filter to Blender plugs | | |
| File STUFFON File LRTM5IC ANACK ANRSET FRZ | | | |
| Assign shift positions. | | | |
| NSS _____ ANSS _____ RO _____ PO _____ STA _____ | Simulator Frozen until after shift turnover unless it needs to be run momentarily for an alignment change. | | |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL847(2)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|---|---|-----------|---|
| Conduct a shift turnover with oncoming operators. | | | Oncoming ANSS should complete the required checklist and carry out a formal shift turnover. |
| When the shift turnover is completed, place the simulator in RUN and commence the drill. | <p>Simulator running</p> <p>Turbine load and reactor power lowering at 12%/hr</p> | | ANSS assumes control and directs operators to continue the shutdown IAW 2OM-52.4.C, step 11 |
| <u>EVENT #1</u> | | | |
| <p>After boration is started: MAL LDS3D ACT, 100,15,0,0,C,PBATDISA.GT .100 (Preload)</p> | <p>F21, Boric Acid Filter to Blender plugs</p> <p>Boric acid flow to blender low A2-2E, BORIC ACID BLENDER INLET/OUTLET DEV FROM SP lit</p> | | RO announces alarm A2-2E ANSS refers to ARP |
| <p>After an appropriate time delay report filter d/p is 24 psid NOTE: Must be borating to obtain a dP.</p> | <p>Filter d/p > 20 psid as read on 2CHS-PI111A & B</p> | | Crew dispatches PAB operator to check Boric Acid Filter d/p |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL847(3)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--|---|-----------|--|
| <p>After an appropriate time delay Clear MAL LDS3D and report Filter Bypass Valve 2CHS-104 open</p> | <p>Filter Bypass Valve 2CHS-104 open</p> | | <p>ANSS directs PAB operator to open BA Filter Bypass Valve</p> |
| | <p>Plant shutdown continues</p> | | <p>ANSS directs crew to continue the shutdown</p> |
| <p><u>EVENT #2</u></p> | | | |
| <p>When power is 12-15%, insert: MAL NIS7A ACT,1,0,0,D</p> | <p>IR N35 blown instrument power fuse</p> | | |
| | <p>Annunciator A4-4E, NIS DETECTOR/COMPENSATOR LOSS OF VOLTAGE lit</p> | | <p>RO announces alarm A4-4E</p> |
| | <p>The following status lights are lit on the N35 drawer: LOSS OF COMP VOLTS BISTABLE TRIP SPARE LOSS OF DETECTOR VOLTS INSTRUMENT PWR ON status light is off</p> | | <p>ANSS refers to ARP A4-4E and directs PO to check LOSS OF COMP VOLT status light on IR drawer ON</p> |
| | <p>Power is greater than P10</p> | | <p>ANSS refers to AOP 2.2.1B, IR Channel Malfunction</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL847(4)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--|--|-----------|---|
| <p>T. S. 3.3.1.1 applicable when power reduced to less than 5% or P6 (can't raise power above these values if power is below these values)</p> | <p>Status light "LEVEL TRIP BYPASS" lit Annunciator A4-5E, NIS SOURCE/INT RANGE HIGH FLUX TRIP BYPASS lit Computer point N0096D tripped Level Trip Switch caution tagged</p> | | <p>Crew places both IR train A & B Block switches in INTERRANGE BLOCK position</p> <p>ANSS directs crew to place a Caution Tag on SR N31 stating "Manually unblock Source Range on Shutdown"</p> <p>Crew places "Level Trip Switch" to BYPASS on N35 drawer and affixes a Caution Tag to the switch</p> <p>Computer point status verified using CRT Inter Range screen or computer print out</p> |
| <p><u>EVENT #3</u></p> <p>When AOP 2.2.1B complete, insert: 2FWS-P21B Suction Pressure Switch 2FWS-PSL118B fails BST CFW24 1,0,D</p> | <p>2FWS-P21B trips (loss of all main feedwater)</p> | | <p>2FWS-P21B Trips MD AFW pump 2FWE*P23A Auto start</p> |
| <p>VLV CFW27 1,0,D</p> | <p>Fail 2FWR*FCV155, SU Feed Pump Recirc shut (Preload)</p> | | |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL847(5)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--------------------------|---|-----------|---|
| | <p>A6-10A, STM GEN FEEDPUMP 21A/B AUTO STOP lit A6-11A, AUX FW PUMP AUTO START/AUTO STOP MD AFW pump "A" running</p> | | <p>PO announces alarm A6-10A and 11A</p> |
| | <p>SG levels lowering</p> | | <p>ANSS refers to ARP A6-10A</p> |
| | <p>Startup Feedwater Pump Recirc Valve does not fully open, unable to start the Startup Feedwater Pump</p> | | <p>ANSS directs PO to start the Startup Feedwater Pump</p> |
| | <p>SG levels lowering</p> | | <p>ANSS refers to AOP 2.24.1, Loss of Main Feedwater</p> |
| | <p>Two Condensate pumps and heater drain pumps running</p> | | <p>Crew checks condensate pump, heater drain pump and separator drain pump status</p> |
| | | | <p>ANSS directs RO to manually trip the reactor and refers to E-O to verify immediate actions while operators perform immediate actions</p> |
| | <p>Turbine trip due to reactor trip alarm A5-6D lit. Rod bottom lights lit. Neutron flux dropping</p> | | <p>RO verifies reactor trip.</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL847(6)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|---|---|-----------|---|
| <p>2AE and 2DF busses energized.</p> <p>NOTE: If SIS occurs, ensure crew implements E-0 and ES-1.1 correctly (SI is not anticipated for this transient)</p> | <p>MSR steam supply block valves closed. Reheater controller reset pushbutton depressed.</p> <p>Main generator output breakers open. Exciter circuit breaker open.</p> <p>No SI annunciator or SI actuation status light lit. CNMT pressure < 1.5 psig. PRZR pressure > 1855 psig. SG pressure > 500 psig.</p> | | <p>RO/PO sounds standby alarm, announces Unit 2 reactor trip</p> <p>NSS notified to evaluate EPP</p> <p>PO verifies turbine trip</p> <p>PO ensures reheat steam isolation</p> <p>PO verifies generator trip</p> <p>PO verifies power to AC emergency busses</p> <p>RO checks if SI is actuated or required</p> <p>ANSS makes a transition to ES-0.1 and informs the control room</p> <p>STA monitors status trees</p> |
| <p><u>EVENT #4</u></p> <p>One minute after completion of shift brief for ES-0.1 entry, Insert: MAL SWD1 ACT,0,0,D</p> | <p>LOOP</p> | | |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL847(7)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|---|--|-----------|---|
| EVENT #5 | | | |
| <p>MAL DSG1A ACT,0,0,D BKR HIV13 2,0,D</p> <p>Loss of all AC power EDG 2-1 tripped EDG 2-2 running, output breaker will not close. No cooling water</p> | <p>EDG 2-1 trips (Preload) EDG 2-2 output breaker trips (Preload)</p> <p>Annunciator A5-6D lit. Neutron flux dropping.</p> <p>SLI manually actuated. MSIVs and bypass valves closed.</p> <p>Exciter and output breakers open.</p> <p>PRZR PORVs closed, orifice isolation valves closed, Regen HX inlet valves closed.</p> | | <p>PO announces loss of all power to AC emergency busses</p> <p>ANSS makes transition to ECA-0.0, directs RO and PO to perform appropriate immediate actions.</p> <p>STA monitors CSF status trees for information only.</p> <p>RO re-verifies reactor trip.</p> <p>RO sounds standby alarm and announces Unit 2 loss of power.</p> <p>NSS notified to evaluate EPP</p> <p>PO ensures steamlines isolated.</p> <p>PO verifies generator trip.</p> <p>RO checks if RCS is isolated</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL847(8)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--------------------------|--------------------------|-----------|---------------------------|
|--------------------------|--------------------------|-----------|---------------------------|

EVENTS #6 & 7

MAL AFW3A ACT,5440,0,D
(Preload)

TD AFW Pump trips
No AFW flow (all AFW pumps stopped).
2MSS*SOV105A - F open.

PO reports no AFW flow

Two minutes after ECA-0.0 entered, insert;
MAL RCP1B ACT,50,300,0,0,D

RCP 'C' #1 seal leak (50 gpm)

CT #1

Crew establishes the minimum required AFW flow to the SGs before SG dry out occurs.
(ECA-0.0.B)

Crew dispatches plant operator to South Safeguards to restore AFW flow using Attachments A-1.12 and A-1.11

3-4 minutes after being directed to locally restore AFW flow, report that 2FWE*P22 has apparently tripped on overspeed, and can reset and open TTV. Insert:
MAL AFW3A CLR,0
LOA AFW22 0,0,D

Governor failure cleared
TTV reset
2FWE*P22 starts. AFW flow available to SGs.

PO notes AFW flow to SGs, informs ANSS.

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL847(9)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--|--|-----------|--|
| <p>As System Operator, report that several lightning strikes have deenergized offsite busses and transformers; investigation commencing immediately.</p> | <p>SR channels aligned properly.</p> <p>IR 36 less than P6, 10^{-10} amps Both SR detectors energized</p> <p>2-2 EDG breaker will not manually close</p> <p>AC emergency busses deenergized.</p> <p>2AE bus selected as cross-tie path.</p> | | <p>RO verifies source range detector high voltage switches in NORMAL, transfers NR45 to operable Source and Intermediate Range</p> <p>RO manually energizes both Source Range detectors</p> <p>PO tries to restore power to any AC emergency bus using diesel generator EDG 2-1. Personnel dispatched to investigate EDG 2-1 failure and EDG 2-2 breaker failure</p> <p>ANSS goes to Step 11 after PO verifies emergency busses deenergized and reports same to ANSS.</p> <p>PO attempts to restore offsite power with Attachment A-1.4. Refer to BLUE pages attached to back of drill.</p> <p>Crew checks power restored to AC emergency bus (go to procedure step 34 when power is restored).</p> <p>Crew selects cross-tie path.</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL847(10)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|---|--|-----------|---|
| Local reset and EDG control actions per Attachment A-1.5 are in progress. | Service water pump 2SWS*P21B should remain in auto for possible automatic loading (EDG 2-2 cooling). | | Crew dispatches operator(s) to perform Attachment A-1.13AE. Crew notifies U1 NSS/ANSS that Attachment A-1.14 should be performed by BV-1 personnel. ANSS reviews SWS pump caution, informs crew. RO/PO place switches in pull-to-lock for equipment listed in Step 15. Refer to BLUE pages attached to back of drill. Crew dispatches plant personnel to locally restore power using Attachment A-1.5. Emphasis is placed on local start of Emergency Generator 2-1. |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL847(11)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|---|---|-----------|---|
| <p>After appropriate delay, use the following for local actions: LOA SEA1 0,0,0,D LOA SEA2 0,0,0,D LOA SEA3 0,0,0,D VLV SEA16 3,0,D VLV CCP58 3,0,D VLV CCP60 3,0,D</p> | <p>2CHS*178 closed. 2CHS*179 closed. 2CHS*180 closed. 2CHS*MOV381 closed. 2CCP*MOV156-1 closed. 2CCP*MOV157-1 closed.</p> | | <p>Crew requests Rad Con support to isolate RCP seals, dispatches plant operator to locally close valves.</p> |
| <p>Report valves closed.</p> | <p>Blowdown isolation valves closed. Main and bypass feed regulating valves closed.</p> | | <p>Crew checks SG isolation.</p> |
| | <p>All PORVs closed.</p> | | <p>RO checks PRZR PORVs.</p> |
| | <p>No SG pressure dropping in an uncontrolled manner or completely depressurized.</p> | | <p>PO checks if any SGs are faulted.</p> |
| | <p>No SG levels rising in an uncontrolled manner.</p> | | <p>Crew checks if SG tubes are intact, requests Rad Con surveys.</p> |
| | <p>SG levels responding to AFW flow.</p> | | <p>PO checks intact SG levels.</p> |
| | <p>Annunciator A6-4A not lit.</p> | | <p>PO checks, PDWST level greater than 80 inches.</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL847(12)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--|--|-----------|---|
| <p>When the RCP seals are isolated, clear the LOOP and insert LOA SWD4 1,0,D LOA HIV1 1,0,D LOA HIV2 1,0,D</p> <p>As System Operator report that power is available to Switchyard 138 kv bus 1</p> | <p>Air temperature normal.</p> <p>All PORVs closed.</p> <p>Power restored to 138 kv bus 1. 135 kv relays reset 4 kv relays reset</p> | | <p>Crew checks control room ambient air less than 104°F.</p> <p>RO checks PRZR PORVs.</p> <p>ANSS directs plant operator to energize 2DF IAW Attachment A-1.4 and 36.4.G</p> <p>PO closes breakers 2D10 and 2F7 to energize 2DF</p> <p>PO monitors 2DF bus, informs ANSS that bus is energized.</p> |
| <p>Transition to Step 34 directed by continuous action Step 12.</p> | | | <p>ANSS proceeds to ECA-0.0 Step 34, informs crew.</p> |
| <p>Insert the following to energize the train "B" 480 volt busses LOA LOV1 1,0,D LOA LOV86-92 1,0,D</p> | <p>Train "B" 480 volt busses energized</p> <p>SI annunciator status dependent on RCP "C" #1 seal leak</p> | | <p>Crew directs local operator to energize Train "B" 480 V busses 2, 4, 6, 8, 10, 12 & 14.</p> <p>RO checks SI signal status, resets SI (if required).</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL847(13)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|---|---|-----------|--|
| <p>Note: Alarm A1-1C actuated due to vital bus 1 and 3 powered from respective batteries.</p> | <p>480V emergency bus 2P energized. Battery charger 2-2 and inverter 2-4 energized.</p> | | <p>Crew verifies equipment loaded on 2DF emergency bus.</p> |
| | <p>2SWS*P21B running. Service water header pressure between 60 and 124 psig. EDG cooling valve 2SWS*MOV113D open.</p> | | <p>RO verifies service water system in service.</p> |
| | <p>RCS subcooling > Attachment A-5.1 value. PRZR level > 4%. SI valves not automatically aligned in SI mode.</p> | | <p>Crew dispatches operator(s) to restore Unit 2 station blackout equipment per Attachment A-1.16AE.</p> |
| <p>Scenario assumes that SI is required; if conditions warrant a transition to ECA-0.1, monitor crew actions.</p> | | | <p>ANSS selects recovery procedure based on operator reports.</p> |
| | <p>SI annunciator and SI actuation status light A12-1D lit</p> | | <p>ANSS makes transition to ECA-0.2, informs crew.</p> |
| | | | <p>RO checks SIS status</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL847(14)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--------------------------|---|-----------|---|
| | SI reset (both trains) AUTO SAFETY INJECTION BLOCKED A12-1C lit SI actuation status light A12-1D not lit RWST level greater than 444 inches | | RO resets SI (both trains) |
| | SI Train "B" injection equipment aligned IAW Attachment A-0.1 | | Crew manually aligns SI injection components |
| | CCP pumps stopped 2CCP*AOV107A, B & C closed HHSI pumps stopped RCP seals isolated | | Crew checks RCP seal isolation status |
| | One HHSI pump running | | ANSS directs RO to start one HHSI pump |
| | One CCP pump, LHSI pump CRDM shroud fans, CNMT recirc fans running as required | | Crew starts One CCP pump, LHSI pump, CRDM shroud fans, CNMT recirc fans as required |
| | PDWST level greater than 80 inches | | PO checks PDWST level |
| | SG narrow range level between 5% and 50% | | PO checks SG narrow range level greater than 5% and controls AFW flow to maintain 5-50% level |
| | All train "B" CIA components correctly aligned | | ANSS directs RO/PO to verify all indicating lights with orange CIA marks lit |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL847(15)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|---|--|-----------|--|
| <p>Insert; VLV CCP58 2,0,D VLV CCP60 2,0,D</p> | <p>Annunciator A1-2H not lit CNMT pressure has remained less than 8 psig Quench and Recirc Spray Pumps in Auto Chemical Injection Pump in Auto</p> <p>CCP supply temperature is less than 105°F 2CCP*MOV156-1,157-1 are open</p> <p>2CCP*107B & C are open 2CCP*AOV107A loss of power (Orange power)</p> | | <p>RO checks CIB and spray status</p> <p>ANSS direct RO to place Quench and Recirc Spray pumps in Auto</p> <p>Crew establishes seal cooling IAW Attachment A-1.2</p> |
| <p>CT - 2</p> <p>Crew isolates RCP seal injection before a charging pump starts or is started. (ECA-0.0.H)</p> <p>To open 2CHS*178, 179, 180, Insert; LOA SEA1 0.01,0,0,D LOA SEA2 0.01,0,0,D LOA SEA3 0.01,0,0,D Adjust as necessary in 0.01 gpm increments.</p> | <p>VCT temperature is less than 235°F 2CHS*178, 179, 180 checked closed 2CHS*MOV308A, B & C checked open 2CHS*HCV186 checked open 2CHS*178, 179, 180 opened until flow just indicated</p> | | |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL847(16)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|---|--------------------------|-----------|---|
| Collect and review logs after allowing crew time to complete. | | | Crew logs should be accurate, clear, and concise. |

SCENARIO OVERVIEW

Facility: Beaver Valley Power Station Unit 2 Scenario No.: 4 Op-Test No.: 2LOT2B

Examiners: _____ Operators: _____

Objectives: To evaluate the applicants ability to use Normal, Abnormal, Emergency and Alarm Response procedures to respond to a failure of the flow totalizer which does not terminate dilution flow at the setpoint, failure of controlling steam flow channel pressure compensation for SG "C", PZR pressure control problem, and a SGTR with loss of PZR pressure control

Initial Conditions: IC-50, BOL, 48% power, steady state conditions. Rods are in Manual. 2CHS*P21B and 2FWE*P23B are OOS. 2RCS*PCV456 is isolated. 2RCS*PCV455A OOS. Tornado Warning in effect. Tube leak on SG "B". Ready to raise power to 100%.

Turnover: The plant is at 48% power. RCS boron 1072 PPM. Rods in auto with CBD at 180 steps. [2CHS*P21B] and [2FWE*P23B] are OOS. 2FWE*38 shut, 2FWE*P22 aligned to 'B' header, 2FWE-36 shut; 2FWE-102 open. 2RCS*PCV456 is isolated per T.S. 3.4.11.b action. 2RCS*PCV455A OOS due to a ruptured diaphragm. AOP 6.4 is complete to step 18 due to a.10 gpd tube leak on SG "B". Tornado watch in effect. AOP 75.1 complete through step 5.

| Event No. | Malf. No. | Event Type* | Event Description |
|-----------|---|------------------|---|
| N/A | N/A | R RO N PO/SRO | Raise power at 12%/hr |
| 1 | (OVR) SWI BAT8A 2,0,D | I RO/SRO | Total makeup flow totalizer fails to terminate dilution at setpoint (Preload) |
| 2 | XMT MSS53 1,10,10,0,D | I PO/SRO | Steam flow pressure compensation PT496 failure causes 2MSS* FT495 to fail low |
| 3 | MAL RCS4C ACT,600,60, 0,D | M ALL | Start as small leak (0.5 gpm) on SG "C" that progressively worsens until SGTR (600 GPM) |
| 4 | CNH PCS10 5,90,20,0,D VLV RCS32 4,70,5,0,D | C RO/SRO | PZR Master Pressure Controller fails and 2RCS*PCV455C sticks open |
| 5 | MAL RCP4C ACT,60,0,C,J BK352.EQ.0 | C RO/SRO | RCP "C" trips when Main Generator tripped (Preload) |
| 6 | VLV RCS11 1,0,C,JBK35 2.EQ.0 | C RO/SRO | PORV 2RCS*PCV455C block valve 2RCS*MOV535 fails closed on Main Generator trip (Preload) |
| 7 | VLV RCS33 4,0,0,0,C, JBK352.EQ. 0 | C RO/SRO | PORV 2RCS*PCV455D fails closed when Main Generator trips (Preload) |

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

U2LOT-SIM-NRC EXAM-2LOT2B.4 (ic) REV 0

INITIAL CONDITIONS: Drill File 848 IC-50

Reactor power = 48%, BOL, RCS boron = 1072 ppm, CBD = 180 steps

| <u>ADDITIONAL LINEUP CHANGES</u> | <u>STICKERS</u> | <u>VOND MARKINGS</u> |
|---|---|--|
| Set CBD step counters at 180 steps Place BOL ΔI curve in RO operator aids 0000 - 2,000 MWD/MTU Reactivity Plan Place rods in Manual | 2RCS*MOV536 YCT 2CHS-P21B.YCT 2FWE*P23B YCT 2MSS*SOV120 YCT 2MSS*SOV105C YCT 2SVS*PCV101B YCT 2SVS*HCV104 YCT 2RCS*PCV455A YCT | 2FWE*38 shut 24-3 (G-6) 2FWE*P22 aligned to 'B' header 2FWE*36 shut; 2FWE*102 open 24-3 (E-6) 2MSS-16 shut 21-2 (C-1) 2SVS*28 shut 21-2 (E-9) |
| <u>EQUIPMENT STATUS</u> | <u>DATE/TIME OOS</u> | <u>TECHNICAL SPECIFICATION(S)</u> |
| 2RCS*PCV456 2CHS*P21B 2FWE*P23B | 6 days ago/0759 4 days ago/1610 6 hrs ago/1031 | 3.4.11.b 3.1.2.4 & 3.5.2 (Info Only) 3.7.1.2.b |

SHIFT TURNOVER INFORMATION

1. The plant is at 48% power, BOL. RCS boron 1072 ppm. Rods in manual with CBD at 180 steps. Power has been at 48% for the past 4 days.
2. [2CHS-P21B] is removed from service for motor rewind. Motor is presently off site.
3. [2FWE*P23B] is OOS to replace the pump inboard bearing, return expected in 24 hours. Its discharge valve 2FWE*38 is shut.
4. 2FWE*P22 aligned to 'B' AFW header 2FWE-36 shut; 2FWE-102 open.
5. 2RCS*PCV456 OOS with block valve 2RCS*MOV536 closed with power removed.
6. 2RCS*PCV455A OOS due to a ruptured diaphragm.
7. AOP 2.6.4 is complete to step 18. Approximately 44 hours ago a tube leak was detected in SG "B". The leak rate is 10 gpd and has remained there for the past 24 hours.
8. 2MSS-16 shut, 2MSS-15 and 17 verified open.
9. 2SVS*28 shut.
10. 2MSS*PCV101B auto with setpoint adjusted to 100%.
11. 2MSS*SOV105C open.
12. 2MSS*SOV120 open.
13. Tornado Watch in effect 1/2 OM-75.1 performed through step 5. (There are NO new fuel containers on site)

14. RCS Dose Equivalent I ¹³¹ Specific Activity is 3.1 X 10⁻³ uci/gm.
15. Raise power at 12%/hr to 100% IAW 2OM-52.4.B, Load Following.

SCENARIO SUPPORT MATERIAL REQUIRED

- 1/2OM-48.1.C(ISS3) Figure 48.1.C-2 (ANSS Turnover Checklist)
2OM-54.2.S1 Log S1-2 (NSS Operating Report)
2OM-54.2.S1 Log S1-5 (NCO Report)
2OM-54.2.S1 Log S1-17 (ANSS Operating Report)
2OM-52.4.B (Load Following)
Completed Tornado Watch Form
2OST-6.2 (RCS Water Inventory Balance)

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL848(1)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--|--|-----------|---------------------------|
| <p>Select DRILL 848, Initialize IC - 50, and establish initial plant conditions.</p> | <p>Reactor at approximately 48% power, BOL, steady state condition. Ready to raise power to 100%. RCS boron _1072_ ppm, CBD _180_ steps.</p> | | |
| <p>Insert:</p> | | | |
| <p>VLV RCS33 4,0,0,0,C,JBK352.EQ.0 VLV RCS11 4,0,C,JBK352.EQ.0 MAL RCP4C ACT,60,0,C,JBK352.EQ.0</p> | <p>2RCS*PCV455D fails closed 2RCS*MOV535 fails closed RCP 'C' trips after main generator trip</p> | | |
| <p>(OVR) SWI BAT8A 2,0,D</p> | <p>Blender total makeup flow totalizer does not stop makeup at setpoint</p> | | |
| <p>File STUFFON File LRTM5IC ANACK ANRSET FRZ</p> | | | |
| <p>Assign shift positions.</p> | | | |
| <p>NSS _____ ANSS _____ RO _____ PO _____ STA _____</p> | <p><u>Simulator Frozen</u> until after shift turnover unless it needs to be run momentarily for an alignment change.</p> | | |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL848(2)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--|--|-----------|---|
| Conduct a shift turnover with oncoming operators. | | | Oncoming ANSS should complete the required checklist and carry out a formal shift turnover. |
| When the shift turnover is completed, place the simulator in RUN and commence the drill. | Simulator running | | ANSS assumes control and directs operators to commence raising power IAW 2OM-52.4.B. |
| <u>EVENT #1</u> | | | Crew develops reactivity plan and commences power escalation |
| (OVR) SWI BAT8A 2,O,D | Blender makeup flow totalizer fails to stop flow at setpoint resulting in an over dilution (Preload) | | Dilution started |
| | RCS temperature and pressure rising | | Crew determines that an over dilution has occurred due to malfunction of the Total Flow Totalizer |
| | | | Annunciator A4-3C, TAVE DEV FROM TREF (2RCS-TS408S High) lit if a severe over dilution occurs |
| | | | ANSS refers to ARP A4-3C |
| | Tave within 2°F of Tref | | If necessary crew reduces Tave by borating, inserting rods or raising turbine load |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL848(4)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|---|---|-----------|---|
| <p>To select steam flow channel III, clear (OVR) SWI PCS13 CLR (OVR) SWI PCS13 2,0,D</p> | <p>A6-11E clears as NR level returns to normal band</p> <p>SG "C" SGWLC selected to channel III Annunciator A1-4E, MAIN STEAM FLOW CHANNEL SELECTED TROUBLE lit</p> | | <p>ANSS directs PO to select feedwater control channel III (497)</p> <p>ANSS contacts I & C and directs that steam flow control be selected to Channel III (494)</p> |
| <p>To trip bistables, insert; LOA PCS3 T,0,D BST PCS44 1,0,D BST PCS35 1,0,D LOA PCS3 F,0,D</p> | <p>2FWS*FCV498 in automatic</p> <p>2LS/496A, SG "C" Lo-Lo level Rx trip, 2LS/496C, Hi-Hi level turbine trip and FW isolation bistables tripped</p> | | <p>ANSS directs PO to return MFRV 2FWS*FCV498 controller to automatic</p> <p>SG "B" level channel 2FWS*LT496 declared inoperable</p> <p>ANSS contacts I & C and directs that 2LS/496A, SG "C" Lo-Lo level Rx trip, 2LS/496C, Hi-Hi level turbine trip and FW isolation bistables placed in trip</p> <p>RO/PO verifies I & C in correct rack, monitors bistable trip evolution, informs ANSS upon completion</p> |
| <p><u>EVENT #3</u></p> | <p>MAL RCS4C ACT,0.05,120,0,D</p> <p>SG "C" tube leak (0.05 gpm, 72 gpd)</p> | | |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL848(5)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|---|--|-----------|---|
| <p>SG blowdown automatically isolates upon 2SSR-RQ100 high alarm actuation</p> <p>2OST-6.2 is applicable at this leak rate.</p> | <p>Rad monitor alarms on condenser air ejector and SG blowdown. A4-5A, 5C.</p> <p>0.05 gpm leak < T.S. limit. Activity value pending Chemistry reports.</p> | | <p>Crew notes alarms and informs ANSS of indications of a SG tube leak, verifies alarms valid.</p> <p>Crew refers to ARPs as necessary.</p> <p>Crew monitors DRMS RM-11 console for affected radiation monitor channels.</p> <p>ANSS refers to AOP-2.6.4.</p> <p>Crew requests Chemistry support (leak rate and isotopic analysis).</p> <p>Crew requests Health Physics support (leak rate). May request survey of blowdown sample cation columns.</p> <p>NSS verifies compliance with T.S. 3.4.6.2 and 3.7.1.4.</p> <p>PO verifies main steamline radiation monitors available.</p> |
| <p>Note: Crew may wait for Rad Con or Chemistry verification of tube leak prior to isolating SG.</p> | <p>Steamline monitors in service (2MSS*SOV120 open).</p> | | |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL848(6)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--|--|-----------|--|
| <p>6-7 minutes after being contacted as Rad Con to determine leak rate using the rad monitors, report leak rate at 75 gpd.</p> <p>7-8 minutes after being contacted as Rad Con, to survey cation columns report "C" SG radiation is significantly higher than "A" and "B" SGs.</p> | <p>2MSS*16 and 17 closed 2MSS*15 open</p> <p>2SVS*PCV101B & C controller setpoints = 100%.</p> <p>2SVS*28 & 29 closed.</p> | | <p>Steam supply from "B" SG to 2FWE*P22 previously closed Crew directs operator to close steam supply from "C" SG to 2FWE*P22, 2MSS*17</p> <p>2MSS*SOV105C previously hardened No hardening required for SG "C"</p> <p>SG "C" atmospheric steam dump valve controller setpoint adjusted to 100%. (2SVS*PCV101C)</p> <p>RHR valve isolation valve from SG "B" previously closed. Crew directs operator to close RHR isolation valve from SG "B", 2SVS*29</p> <p>Crew requests Health Physics to perform water and air sampling and survey SG blowdown</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL848(7)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--|--|-----------|---|
| AOP-2.6.4 complete. | | | Crew may transfer auxiliary steam to Unit 1 or aux. boilers. |
| | High rad monitor alarm | | |
| <u>EVENT #3A</u> | | | |
| After reporting leaking SG, insert; | | | |
| MAL RCS4C ACT,10,180,0,0,D | SG "C" tube leak rises to 10 gpm over 3 minutes. | | |
| | Charging flow rises to maintain PZR level | | RO notes changing RCS parameters and informs ANSS. |
| If required, contact crew as U2 Operations Manager and direct a plant shutdown commence at 1%/min. | | | Crew determines that leakage exceeds 150 gpd plant must be in Mode 3 within 5 hours. NSS/ANSS directs crew to commence a normal plant shutdown, refers to 2OM-52.4.B Load Following. |
| Crew may have previously implemented AOP 2.51.1. | | | NSS evaluates EPP NSS either directs crew to raise rate of load reduction or implement Emergency Shutdown AOP 2.51.1. |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL848(8)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--------------------------|--|-----------|---|
| | Two PORVs in Auto with block valves open | | <p>RO sounds standby alarm and announces Unit 2 Emergency Shutdown</p> <p>RO ensures one PORV in auto with its associated block valve open.</p> <p>PO sets turbine load setter as directed by ANSS *</p> <p>RO utilizes Reactivity Plan for rapid power reduction activities</p> <p>RO commences boration</p> <p>RO ensures rods in Auto and verifies maintaining Tavg within 5°F of Tref.</p> <p>PO depresses Reference Control GO pushbutton</p> <p>System Operator notified of emergency load reduction and rate</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL848(9)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--|---|-----------|--|
| <u>EVENT #4</u> | | | |
| <p>3 minutes after load reduction commenced, insert; CNH PCS10 5,90,20,0,D VLV RCS32 4,70,5,0,D</p> | <p>PZR master pressure controller fails high PZR PORV 2RCS*PCV455C sticks open Annunciator A4-1D, PRESSURIZER CONTROL PRESSURE HIGH/LOW lit</p> | | <p>RO announces alarm and attempts to close PORV, then closes 2RCS*MOV535, informs ANSS</p> |
| | <p>Pressurizer pressure and level stable</p> | | <p>RO verifies spray valves closed RO keeps crew informed of PRZR pressure and level.</p> |
| <u>EVENT #3B</u> | | | |
| <p>When pressurizer parameters stabilized, insert MAL RCS4C ACT,600,240,0,D</p> | <p>SGTR (600 gpm, ramped over 4 minutes) PZR pressure and level lowering, charging flow rising</p> | | <p>Crew determines that a manual reactor trip is required</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL848(11)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|------------------------------------|---|-----------|--|
| <p>Immediate actions complete.</p> | <p>PCBs 352 and 362 open, ACB 41 open</p> | | <p>PO verifies generator trip.</p> |
| | <p>2AE and 2DF energized by offsite power</p> | | <p>PO verifies power to AC emergency busses.</p> |
| | <p>SI actuated/required</p> | | <p>RO checks if SI is actuated. RO manually actuates both trains of Safety Injection</p> |
| | <p>Both EDGs running.</p> | | <p>PO verifies EDGs running.</p> |
| | <p>MDAFW pump "A" running. TDAFW pump steam supply valves open. AFW throttle valves full open.</p> | | <p>PO verifies AFW status.</p> |
| | <p>Service water pumps running (one per train). Service water header pressure 60-124 psig.</p> | | <p>RO verifies service water system in service.</p> |
| | <p>Two HHSI pumps running. HHSI flow indicated. Both LHSI pumps running. All indicating lights with red SI marks lit.</p> | | <p>RO/PO verifies SI status.</p> |
| | <p>All indicating lights with orange CIA marks lit.</p> | | <p>RO/PO verifies CIA.</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL848(12)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--------------------------|---|-----------|--|
| | All indicating lights with green FWI marks lit. | | RO/PO verifies FWI. |
| | CNMT pressure < 3 psig. Steamline pressure > 500 psig. No steamline pressure high rate bistables lit. | | RO/PO checks if main steamline isolation required. |
| | Annunciator A1-2H not lit. CNMT pressure < 8 psig. | | RO checks CIB and CNMT spray status. |
| | 2CCS-AOV118 opened. One station air compressor running. | | PO establishes filtered water cooling to station air compressors. |
| | CCP pump running. | | RO/PO verify CCP in service. |
| | SR channels in proper alignment. | | RO verifies source range detector high voltage switches in normal. |
| | Total AFW flow > 365 gpm. | | PO verifies total AFW flow > 365 gpm. |
| | Tavg may be dropping due to the influence of AFW flow. | | RO checks RCS Tavg stable at or trending to 547°F. |
| | | | PO stops dumping steam and reduces AFW flow. |
| | | | ANSS directs performance of ESF checklists when time permits. |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL848(13)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--------------------------|---|-----------|--|
| | Recirc spray pumps secured. | | RO checks recirc spray pump status. |
| | PORVs closed (not leaking). Spray valves closed. Safeties closed (PSMS data). PRT conditions normal. | | RO checks PRZR isolated. |
| | 2RCS*P21A & B running. CCP flow indicated. | | RO checks if RCPs should be stopped. |
| | No SGs are faulted. | | PO checks if any SGs are faulted. |
| | SG "C" level rising uncontrollably. Secondary radiation high. SGTR. | | RO/PO check if SG tubes are intact. |
| | | | ANSS makes transition to E-3 and informs crew. |
| | | | STA begins monitoring status trees. |
| | CREBAPS not actuated. CR radiation not in high alarm. CIB has not occurred. | | PO verifies control room habitability. |
| | 2RCS*P21A & B running. CCP flows indicated. | | RO checks if RCPs should be stopped. |
| | 2CVS-P21A, B PTL. 2DAS-P204A, B STOP. 2DGS-P21A, B PTL. | | RO isolates CNMT vents and drains system. |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL848(14)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--|--|-----------|---|
| | Auto SI blocked A12-1C lit. SI signal status light A12-1D not lit. | | RO resets SI (both trains). |
| | Both trains of CIA reset. | | RO resets CIA and CIB (both trains). |
| | SG "C" ruptured. Unexpected rise in level. Rad Con survey results. | | Crew identifies ruptured SG. |
| | | | ANSS directs Rad Con to initiate steamline surveys. |
| CT - #1 Crew isolates feed flow into and steam flow from the ruptured SG before a transition to ECA-3.1 occurs. (E-3.A) | 2SVS*PCV101B & C setpoints = 100% and closed. 2SVS*HCV104 closed. 2SVS*28 & 29 previously closed. 2MSS*16 & 17 previously closed. 2BDG*AOV100C1 closed. 2SDS*AOV111C1 closed. 2SDS*AOV129A closed. 2MSS*AOV101C, 102C closed. | | Crew isolates flow from the ruptured SG. |
| No action necessary to close TDAFW pump drains 2MSS*348 and 2SDS-261. | SG "C" level > 5%. | | PO checks ruptured SG level. |
| | Main feedwater isolated. AFW throttle valves closed. | | Crew isolates feed flow to SG "C". |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL848(15)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--------------------------|---|-----------|---|
| | <p>Power to MOV isolation valves available. PORVs closed (not leaking). At least one MOV open. Safeties closed (PSMS data). PRT conditions normal.</p> <p>No SGs are faulted.</p> <p>SG "C" pressure > 265 psig.</p> <p>A12-1B, STEAMLINE ISOLATION SAFETY INJECTION BLOCKED lit</p> | | <p>RO checks PORVs, block valves, and safeties.</p> <p>PO checks if any SGs are faulted.</p> <p>PO checks intact SG levels > 5%, maintains 5-50%.</p> <p>PO checks ruptured SG pressure > 265 psig.</p> <p>ANSS determines target cooldown temperature.</p> <p>PO transfer Steam Dumps to MANUAL and STM PRESS Mode</p> <p>PO verifies condenser available and initiates cooldown at maximum rate.</p> <p>STA trends temperature using core exit TC computer display</p> <p>RO blocks steamline SI when RCS pressure is below 1950 psig.</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL848(16)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|---|--|-----------|--|
| <p>With RCPs "A" & "B" running, spray flow through 2RCS*PCV455B is unlikely</p> <p><u>EVENTS #6 & 7</u></p> <p>VLV RCS11 1,0,C,JBK352.EQ.0 (Preload)</p> <p>VLV RCS33 4,0,0,0,C,JBK352.EQ.0 (Preload)</p> | <p>LO-LO Tavg interlock defeated</p> <p>SG "B" pressure stable.</p> <p>Subcooling > 61°F.</p> <p>No spray valves available. RCP "C" tripped. 2RCS*PCV455A OOS</p> <p>No PZR PORVs are available 2RCS*PCV456 turned over OOS 2RCS*PCV455C block, 2RCS*MOV535 failed closed</p> <p>2RCS*PCV455D failed closed</p> | | <p>PO places both Steam Dump Bypass Selector Switches to DEFEAT TAVG position</p> <p>PO recommences dumping steam</p> <p>PO stops cooldown when core temperature is less than target temperature.</p> <p>PO checks ruptured SG pressure stable or rising.</p> <p>PO checks RCS subcooling greater than 61°F.</p> <p>RO determines that no spray valves are available</p> <p>RO attempts to depressurize RCS using PZR PORV</p> <p>ANSS transitions to ECA-3.3, SGTR without Pressurizer Control</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL848(17)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|---|--|-----------|--|
| <p>CT - #2</p> <p>Crew terminates SI when ECA-3.3 termination criteria are met and prior to completion of "SI flow verification" step of ECA-3.3. (ECA-3.3.A)</p> | <p>SG "C" level > 75%</p> <p>Subcooling > 41°F or > required by Attachment A-5.1</p> <p>AFW available > 365 gpm or Intact SG levels > 5%</p> <p>RVLIS dynamic head > 43%</p> <p>Ruptured SG level on scale</p> | | <p>PO checks ruptured SG level</p> <p>Crew checks if SI flow can be terminated. ANSS goes to step 10 to terminate SI</p> |
| | <p>One HHSI pump stopped</p> | | <p>RO stops one HHSI pump</p> |
| | <p>2CHS*MOV289 and 310 open</p> <p>2CHS*FCV122 adjusted to maintain PZR level</p> | | <p>RO establishes normal charging</p> |
| | <p>2SIS*MOV867A, B, C, & D closed</p> | | <p>RO closes high head SI cold leg injection valves</p> |
| | <p>Subcooling > 41°F or > than required by Attachment A-5.1</p> <p>RVLIS dynamic head > 43%</p> | | <p>Crew verifies high head flow not required</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL848(18)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|---|--|-----------|--|
| <p>CT - #3</p> <p>Crew depressurizes RCS to meet SI termination criteria before water release from the ruptured SG Safety or Atmospheric Relief Valve. (E-3.C)</p> <p>Terminate scenario upon completion of RCS depressurization.</p> | <p>2CHS*MOV311 open 2CHS*MOV310 closed 2CHS*FCV122 throttled</p> <p>PZR level stable or rising and > 4%</p> <p>PRZR level > 76%, or RCS subcooling < Attachment A-5.1, or RCS pressure < SG "C" pressure and PRZR level > 4%.</p> <p>RCS subcooling > 41°F. SG NR level(s) > 5% or > 365 gpm total feed flow available. RCS pressure stable or rising. PRZR level > 4%.</p> | | <p>RO establishes Aux spray</p> <p>RO checks PZR level</p> <p>ANSS transitions to E-3, SGTR, step 16.b</p> <p>RO stops depressurization by closing aux. spray valve.</p> <p>Crew checks if SI can be terminated.</p> |

DUQUESNE LIGHT COMPANY
Nuclear Power Division
Training Administrative Manual

U2DRILL848(19)REV0

| INSTRUCTIONAL GUIDELINES | PLANT STATUS OR RESPONSE | OBJECTIVE | EXPECTED STUDENT RESPONSE |
|--------------------------|--------------------------|-----------|---------------------------|
|--------------------------|--------------------------|-----------|---------------------------|

Collect and review logs after allowing crew time to complete them.

Crew logs should be accurate, clear, and concise.

| Facility: BVPS Unit 2 | | | Date of Exam: 3/22/99 | | | | | Exam Level: RO | | | | | |
|---|-------------|---------------------|-----------------------|-----|-------|-----|-------|----------------|-------|-----|-------|---|-------------|
| Tier | Group | K/A Category Points | | | | | | | | | | | Point Total |
| | | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | |
| 1. Emergency & Abnormal Plant Evolutions | 1 | 3 | 3 | 6 | | | | 1 | 2 | | | 1 | 16 |
| | 2 | 5 | 4 | 3 | | | | 1 | 3 | | | 1 | 17 |
| | 3 | 1 | 0 | 1 | | | | 0 | 0 | | | 1 | 3 |
| | Tier Totals | 9 | 7 | 10 | | | | 2 | 5 | | | 3 | 36 |
| 2. Plant Systems | 1 | 4 | 1 | 2 | 2 | 2 | 1 | 2 | 3 | 4 | 1 | 1 | 23 |
| | 2 | 3 | 1 | 1 | 5 | 0 | 2 | 4 | 2 | 0 | 1 | 1 | 20 |
| | 3 | 0 | 0 | 1 | 2 | 1 | 1 | 1 | 2 | 0 | 0 | 0 | 8 |
| | Tier Totals | 7 | 2 | 4 | 9 | 3 | 4 | 7 | 7 | 4 | 2 | 2 | 51 |
| 3. Generic Knowledge and Abilities | | | | | Cat 1 | | Cat 2 | | Cat 3 | | Cat 4 | | 13 |
| | | | | | 4 | | 4 | | 0 | | 5 | | |
| <p>Note: - Attempt to distribute topics among all K/A categories; select at least one topic from every K/A category within each tier.</p> <p>- Actual point totals must match those specified in the table.</p> <p>- Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.</p> <p>- Systems/evolutions within each group are identified on the associated outline.</p> <p>- The shaded areas are not applicable to the category tier.</p> | | | | | | | | | | | | | |

| PWR RO Examination Outline | | | | | | | (Follows Form ES-401-4) | | |
|--|--------|--------|--------|--------|--------|-------|---|------|--------|
| Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1 | | | | | | | | | |
| E/APE # / Name / Safety Function | K 1 | K 2 | K 3 | A 1 | A 2 | G | K/A Topic(s) | Imp. | Points |
| 000005 Inoperable/Stuck Control Rod / I | 1.03 | | | | | | Operational implications of Xenon Transient | 3.2 | 1 |
| 000015/17 RCP Malfunction / IV | | | 3.03 | | | | Sequence of events for tripping Rx and RCPs | 3.7 | 1 |
| W/E09 & E10 Natural Circ. / IV | | 2.2 | | | | | Relationship between heat removal systems | 3.6 | 1 |
| W/E09 & E10 Natural Circ. / IV | | | 3.1 | | | | Operating Characteristics during transient conditions | 3.3 | 1 |
| 000024 Emergency Boration / I | 1.02 | | | | | | Relationship between boron addition and Rx power | 3.6 | 1 |
| 000026 Loss of Component Cooling Water / VIII | X | X | | | 2.03 | | Determine lineup to restore CCW | 2.6 | 1 |
| 000027 Pressurizer Pressure Control System Malfunction / III | | 2.03 | | | | | Relation of pressure control failure and controllers | 2.6 | 1 |
| 000040 (W/E12) Steam Line Rupture - Excessive Heat Transfer / IV | | | 3.2 | | | | EOPs associated with uncontrolled depressurization of all SGs | 3.3 | 1 |
| W/E08 RCS Overcooling - PTS / IV | | | 3.2 | | | | Reasons for EOP responses to PTS | 3.6 | 1 |
| * 000051 Loss of Condenser Vacuum / IV | 1.01 | X | | | | | Relation of Condenser Vacuum to CW flow (LER) | 2.4 | 1 |
| 000055 Station Blackout / VI | | | | | | 2.4.1 | Knowledge of EOP entry conditions | 4.3 | 1 |
| 000057 Loss of Vital AC Elec. Inst. / VI | | | | | 2.19 | | Impact of loss of Vital AC bus on SG level control | 4.0 | 1 |
| 000067 Plant Fire On-site / IX | | X | 3.02 | | | | Steps called out in site Fire Plans, etc. | 2.5 | 1 |
| 000068 Control Room Evacuation. / VIII | | | 3.06 | | | | Local operation of dumps to control Tave | 3.9 | 1 |
| 000069 (W/E14) Loss of CTMT Integrity / V | | | | 1.01 | | | Effect of containment pressure on leak rate | 2.6 | 1 |
| 000076 High Reactor Coolant Activity / IX | | 2.01 | | | | | Relation of RCS activity to radiation monitors | 2.6 | 1 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| K/A Category Totals: | 3 | 3 | 6 | 1 | 2 | 1 | Group Point Total: | | 16 |

* Question # 10 on written. Licensee will provide justification on question for master. Had recent events on both units involving loss of vacuum. Licensee placed justification on question for final version. John B. Cunn 3/15/99

John B. Cunn 4/7/99

| PWR RO Examination Outline | | | | | | | (Follows Form ES-401-4) | | |
|---|--------|--------|--------|--------|--------|-------|--|------|--------|
| Emergency and Abnormal Plant Evolutions - Tier 1 /Group 2 | | | | | | | | | |
| E/APE # / Name / Safety Function | K 1 | K 2 | K 3 | A 1 | A 2 | G | K/A Topic(s) | Imp. | Points |
| 000003 Dropped Control Rod / I | | | 3.04 | | | | Reasons for actions in the AOP | 3.8 | 1 |
| 000007 Reactor Trip Stabilization Recovery / I | | | | | | 2.4.8 | How event-based EOPs are used | 3.0 | 1 |
| 000008 Pressurizer Vapor Space Accident / III | | | | | 2.25 | | Expected leak rate for open PORV or Code Safety | 2.8 | 1 |
| 000011 Large Break LOCA / III | | 2.02 | | | | | Relation of pumps and a Large Break LOCA | 2.6 | 1 |
| W/E04 LOCA Outside Containment / III | | 2.2 | | | | | Interrelation between LOCA ORC and Heat Removal | 3.8 | 1 |
| W/E11 Loss of Emergency Coolant Recirc. / IV | 1.3 | | | | | | Indications of a Loss of Recirculation | 3.6 | 1 |
| W/E02 SI Termination / III | | 2.1 | | | | | Interlocks and auto features associated with SI Termination | 3.4 | 1 |
| 000025 Loss of RHR System / IV | | | 3.02 | | | | Isolation of RHR due to pressure increase | 3.3 | 1 |
| 000029 Anticipated Transient w/o Scram / I | | | | | 2.09 | | Interpret Main Turbine Trip as related to ATWS | 4.4 | 1 |
| 000037 Steam Generator Tube Leak / III | | X | 3.02 | | | | Check of Condenser Air Ejector exhaust monitor | 3.2 | 1 |
| 000038 Steam Generator Tube Rupture / III | 1.02 | | | | | | Leak rate vs. Pressure change | 3.2 | 1 |
| 000038 Steam Generator Tube Rupture / III | 1.01 | | | | | | Consequences of PTS | 4.1 | 1 |
| 000054 Loss of Main Feedwater / IV | | | | | 2.03 | | Reasons and conditions for AFW pump startup | 4.1 | 1 |
| W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / IV | 1.2 | | | | | | EOPs associated with Loss of Heat Sink | 3.9 | 1 |
| 000059 Accidental Liquid Rad Waste Rel. / IX | | 2.02 | | | | | <i>Relationship of proper performance of setup for liquid release.</i> | 2.9 | 1 |
| 000061 ARM System Alarms / VII | 1.01 | | | | | | Detector Limitations | 2.5 | 1 |
| W/E16 High Containment Radiation / IX | | | | 1.2 | | | Ability to monitor operating characteristics of the facility | 2.9 | 1 |
| | | | | | | | | | |
| K/A Category Totals: | 5 | 4 | 3 | 1 | 3 | 1 | Group Point Total: | | 17 |

PWR RO Examination Outline
Emergency and Abnormal Plant Evolutions - Tier 1 /Group 3

(Follows Form ES-401-4)

| E/APE # / Name / Safety Function | K 1 | K 2 | K 3 | A 1 | A 2 | G | K/A Topic(s) | Imp. | Points |
|---|--------|--------|--------|--------|--------|-------|---|------|--------|
| 000028 Pressurizer Level Malfunction / II | | | | | | 2.4.4 | Ability to recognize AOP entry conditions | 4.0 | 1 |
| 000036 Fuel Handling Accident / VIII | 1.01 | | | | | | Radiation exposure hazards | 3.5 | 1 |
| 000056 Loss of Offsite Power / VI | | | 3.02 | | | | Actions in EOP for loss of Offsite Power | 4.4 | 1 |
| | | | | | | | | | |
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| K/A Category Totals: | 1 | | 1 | | | 1 | Group Point Total: | | 3 |

| PWR RO Examination Outline Plant Systems - Tier 2 /Group 1 | | | | | | | | | | | | (Follows Form ES-401-4) | | |
|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---|------|--------|
| System # / Name | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | K/A Topic(s) | Imp. | Points |
| 001 Control Rod Drive | 1.05 | | | | | | | | | | | Error Inhibit on SSPS | 4.5 | 1 |
| 001 Control Rod Drive | | | | | | 6.08 | | | | | | Purpose of High Flux at Shutdown alarm | 2.9 | 1 |
| 001 Control Rod Drive | | | | | 5.04 | | | | | | | Rod Insertion Limits | 3.0 | 1 |
| 003 Reactor Coolant Pump | 1.03 | | | | | | | | | | | Relationship of Seal Bypass | 3.3 | 1 |
| 003 Reactor Coolant Pump | | | | 4.07 | | | | | | | | Mechanical seal leakage | 3.2 | 1 |
| 004 Chemical and Volume Control | | | | | | | | 2.32 | | | | Predict impact of valving in an unborated bed | 3.4 | 1 |
| 004 Chemical and Volume Control | | | | | | | | 2.14 | | | | Emergency Borate Req. | 3.8 | 1 |
| 004 Chemical and Volume Control | | | | | 5.09 | | | | | | | Operational implications of thermal shock | 3.7 | 1 |
| 013 Engineered Safety Features Actuation | | 2.01 | | | | | | | | | | Power supplies to ESF equipment control | 3.6 | 1 |
| 013 Engineered Safety Features Act. | | | | | | | | | 3.02 | | | Monitor auto operation | 4.1 | 1 |
| 013 Engineered Safety Features Actuation | | | 3.01 | | | | | | | | | Effect on fuel of a loss of ESFAS | 4.4 | 1 |
| 015 Nuclear Instrumentation | | | | | | | | 2.02 | | | | Erratic IR compensation | 3.1 | 1 |
| 015 Nuclear Instrumentation | | | | 4.01 | | | | | | | | Design Feature; SR shutoff | 3.1 | 1 |
| 015 Nuclear Instrumentation | | | | | | | | | 3.03 | | | N-31 Bypass Implementation | 3.9 | 1 |
| 017 In-core Temperature Monitor | | | | 4.01 | | | | | | | | ITM input to subcooling | 3.4 | 1 |
| 022 Containment Cooling | | | | | | X | | | 3.01 | | | Trip of CAR Fans | 4.1 | 1 |
| 059 Main Feedwater | | X | | | X | X | 1.03 | | | | | Power level restrictions | 2.7 | 1 |
| 059 Main Feedwater | | X | 3.02 | | X | X | | | | | | Effect of loss of MFW on AFW | 3.6 | 1 |
| 061 Auxiliary/Emergency Feedwater | 1.01 | | | | | | | | | | | Relation of AFW to SG | 4.1 | 1 |
| 061 Auxiliary/Emergency Feedwater | | | | | | | 1.05 | | | | | Changes in Flow/motor amps | 3.6 | 1 |
| 068 Liquid Radwaste | | X | X | | | | X | | | | 2.3.11 | Setpoint change location for release | 2.7 | 1 |
| 071 Waste Gas Disposal | | X | | | | X | | | | 4.29 | | O ₂ limits in waste gas tank | 3.0 | 1 |
| 072 Area Radiation Monitoring | 1.04 | X | | | | X | | | | | | ARM impact on CR Vents. | 3.3 | 1 |
| K/A Category Point Totals: | 4 | 2 | 2 | 3 | 2 | 3 | 2 | 3 | 1 | 1 | 1 | Group Point Total: | | 23 |

| PWR RO Examination Outline Plant Systems - Tier 2 /Group 2 | | | | | | | | | | | | (Follows Form ES-401-4) | | |
|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---|-----|--------|
| System # / Name | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | K/A Topic(s) | Imp | Points |
| 002 Reactor Coolant | | | | | | | 1.02 | | | | | RCS Heat Up Rates | 3.7 | 1 |
| 006 Emergency Core Cooling | | | | | | | 1.16 | | | | | Determine subcooling | 4.1 | 1 |
| 010 Pressurizer Pressure Control | 1.03 | | | | | | | | | | | Impact of RCP loss on Spray Valve Ops | 3.6 | 1 |
| 011 Pressurizer Level Control | | | | 4.01 | | | | | | | | Operation of PZR heater cutout | 3.3 | 1 |
| 012 Reactor Protection | | | | | | 6.11 | | | | | | Operational impact on OTAT | 2.9 | 1 |
| 014 Rod Position Indication | | | | | | | 1.02 | | X | | | Impact of DRPI switches on indication | 3.2 | 1 |
| 016 Non-Nuclear Instrumentation | 1.03 | | | | | | X | | | | | Effect of NNIS on SDS | 3.2 | 1 |
| 026 Containment Spray | | | 3.02 | | | | | | | | | Effect of loss of CCS on RSS | 4.2 | 1 |
| 029 Containment Purge | | | | 4.02 | X | | | | | | | Design features for negative pressure | 2.9 | 1 |
| 033 Spent Fuel Pool Cooling | | X | | | X | X | | | | X | 2.2.30 | New fuel movement | 2.6 | 1 |
| 035 Steam Generator | | | | | | 6.02 | | | | | | Effect of PORV failure | 3.1 | 1 |
| 039 Main and Reheat Steam | | | | | | | 1.05 | | | | | Effect of MS controls on RCS Tave | 3.2 | 1 |
| 055 Condenser Air Removal | 1.06 | X | | | | | | | | | | SGTL Rad Impact on Filters | 2.6 | 1 |
| 062 AC Electrical Distribution | | 2.01 | | | | | | | | | | Bus power supplies to major loads | 3.3 | 1 |
| 063 DC Electrical Distribution | | | | | X | | | 2.01 | | | | Impact of grounds | 2.5 | 1 |
| 064 Emergency Diesel Generator | | | | | | | | 2.16 | | | | Impact of loss of offsite power in TEST | 3.3 | 1 |
| 073 Process Radiation Monitoring | | X | | 4.01 | | X | | | X | | | Termination of release on high activity | 4.0 | 1 |
| 076 Circulating Water | | | | | | X | X | | X | 4.02 | | Service Water Interlocks | 2.9 | 1 |
| 079 Station Air | | X | X | 4.01 | X | X | X | | X | | | Cross-connect with instrument air | 2.9 | 1 |
| 086 Fire Protection | | | | 4.02 | | | | | | | | Maintenance of NSA | 3.0 | 1 |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| K/A Category Point Totals: | 3 | 1 | 1 | 5 | 0 | 2 | 4 | 2 | 0 | 1 | 1 | Group Point Total: | | 20 |

| Facility: | | Date of Exam: | | Exam Level: | |
|--------------------------------|--------|--|------|-------------|--|
| Category | K/A | Topic | Imp. | Points | |
| Conduct of Operations | 2.1.1 | Conduct of operations requirements | 3.7 | 1 | |
| | 2.1.7 | Evaluate plant performance | 3.7 | 1 | |
| | 2.1.11 | Technical Specification Action Requirements < 1 hour | 3.0 | 1 | |
| | 2.1.22 | Determine mode of operation | 2.8 | 1 | |
| | | | | | |
| | | | | | |
| Total | | | | 4 | |
| Equipment Control | 2.2.4 | Explain variations in systems between units | 2.8 | 1 | |
| | 2.2.13 | Tagging and Clearance Procedures | 3.6 | 1 | |
| | 2.2.13 | ESF Checklist | 3.6 | 1 | |
| | 2.2.25 | Tech Spec Basis - Activity | 2.5 | 1 | |
| | | | | | |
| | | | | | |
| Total | | | | 4 | |
| Radiation Control | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Total | | | | | |
| Emergency Procedures and Plan | 2.4.2 | EOP entry setpoints | 3.9 | 1 | |
| | 2.4.4 | Ability to recognize AOP entry requirements | 4.0 | 1 | |
| | 2.4.6 | Symptom based EOP mitigation strategy | 3.1 | 1 | |
| | 2.4.9 | Low power/shutdown mitigation strategy | 3.3 | 1 | |
| | 2.4.25 | Knowledge of Fire Protection Procedures | 2.9 | 1 | |
| | | | | | |
| Total | | | | 5 | |
| Tier 3 Target Point Total (RO) | | | | 13 | |

2LOT 2B NRC RO -As Given

1. The NCO is recovering a rod misaligned from its group in accordance with 2OM-1.4.P "RCCA or RCCA Group Misalignment." Reactor Engineering has specified that the rod should be withdrawn at no greater than 20 steps per hour. If the NCO were to withdraw rods at a higher rate than specified which of the following is a consequence of that action?
- A. Low Xenon concentration causes neutron flux peaks in the affected quadrant.
 - B. Low Xenon concentration causes axial flux peaks in the bottom half of the core.
 - C. Intermediate Range Start Up Rate will exceed 0.5 dpm in the affected quadrant.
 - D. Heat Up Rate will exceed 100°F per hour across the affected quadrant.

Answer: A

K/A 00005 K1.03:

Importance:3.2

Cognitive Level: Knowledge

Reference: Basis for Tech Specs 3/4.1.3, page B3/4 1-5, 2OM-52.2.A, Issue 4, Rev. 2, P&L 24 and 25.

LP # : 2LP-SQS-1.3

Obj: 18

Objective: Discuss the Technical Specification LCO's and their bases of all limits involving the Rod Control System. Recognize when a limit has been violated.

History: N/A

Source: NEW

Type: CLOSED BOOK

JTA: 0000080401

MASTER

2LOT 2B NRC RO -As Given

2. Unit 2 is operating at 100% power with all systems NSA. Reactor Coolant Pump 21C Upper Motor Bearing High Temperature computer alarm is received. The Alarm Response Procedure requires that the RCP be tripped. Choose from the list below the correct sequence of actions and the reason for those actions?
- A. Trip the Reactor Coolant pump and allow Doppler Power Coefficient to lower reactor power before tripping the reactor.
 - B. Trip the reactor to prevent violation of DNB parameters before tripping the reactor coolant pump.
 - C. Trip the Reactor Coolant Pump to minimize flow oscillations in the core region from a pump coast down before tripping the Rx.
 - D. Trip the reactor to limit backflow into the affected loop before tripping the Reactor Coolant Pump.

ANSWER: B

K/A: 000015/17 K3.03:

Importance:3.7

Cognitive Level: Knowledge

Reference: Tech Spec. Basis/ 3/4.1.1, 2 and 3 page 4-1 First sentence

Lesson Plan #: 2LP-SQS-6.3

Obj. #: 10

Objective: Given a set of conditions determine Tech Spec action required and the basis for these requirements. a. 3.4.1 Reactor Coolant Loops and Circulation 1) normal operation.

History: NEW

Source:

Type: CLOSED BOOK

JTA: 003AAA0401

| | |
|---|-------------------|
| <p>3. A natural circulation cooldown has been in progress using ES-0.2 " Natural Circulation Cooldown."</p> <ul style="list-style-type: none"> • RCP's are off • The RHS system is in service. • Letdown and RCP seal leakoff flow are matched by charging flow. • Loop Thot temperatures are 320 degrees. • Both pressurizer spray valves are full open. • RCS pressure has been dropped to 55 psig using auxiliary spray. • The operator stops auxiliary Spray. • Pressurizer level is rising rapidly <p>Why is pressurizer level rising?</p> <ul style="list-style-type: none"> A. Normal spray is injecting water into the pressurizer. B. Seal Injection flow is injecting water into the RCS. C. RHS flow is forcing coolant into the loops. D. Voiding is occurring in the Reactor Coolant System. | |
| ANSWER:D | |
| K/A: W/E09/E10 K2.2: | Importance:3.6 |
| Cognitive Level: Comprehension | |
| References: 2OM-53B.4.ES-0.2 Background for Natural Circulation, Issue 1B, Rev. 4, Step 23 | |
| Lesson Plan #:2LP-SQS-53.3 | Obj. #:3 |
| Objective: State from memory the basis and sequence for the major action steps of each EOP procedure, IAW the BVPS-EOP Executive Volume. | |
| History: NEW | |
| Source: | Type: CLOSED BOOK |
| JTA: | |

2LOT 2B NRC RO -As Given

| | |
|---|--------------------------|
| <p>4. The unit is conducting a natural circulation cooldown in accordance with ES-0.2 "Natural Circulation Cooldown." Cooldown rates are limited, by procedure, to less than 25°F per hour for which of the following reasons?</p> <p>A. Limit steam generator pressure drops to less than 25psig/min.</p> <p>B. Limit subcooling rate of rise to less than 25°F/hr.</p> <p>C. Maintain RCS subcooling greater than 200 degrees during reactor coolant system depressurization.</p> <p>D. Prevent formation of a void in the reactor vessel head region during reactor coolant system depressurization.</p> | |
| <p>ANSWER:D</p> | |
| <p>K/A:W/E09/10 K3.1</p> | <p>Importance:3.3</p> |
| <p>Cognitive Level: Knowledge</p> | |
| <p>References: 2OM-53B.1.ES-0.2 Background for Natural Circulation Cooldown, Issue 1B, Rev. 4, Steps 6, 13 and 15</p> | |
| <p>Lesson Plan #:2LP-SQS-53.3</p> | <p>Obj. #:3</p> |
| <p>Objective: State from memory the basis and sequence for the major action steps of each EOP procedure, IAW the BVPS-EOP Executive Volume.</p> | |
| <p>History: NEW</p> | |
| <p>Source:</p> | <p>Type: CLOSED BOOK</p> |
| <p>JTA:301AAA0601</p> | |

2LOT 2B NRC RO -As Given

5. The unit is at 100% with all systems NSA. RCS boron concentration is 600 ppm. The core age is MOL at 8000 MWD/MTU burnup. A malfunction requires turbine load to be lowered to 70%. What is the final RCS boron concentration that will maintain control rods at their current position? (Exclude the effects of Xenon)
- A. 510 to 520 ppm
 - B. 550 to 560 ppm.
 - C. 630 to 640 ppm.
 - D. 680 to 690 ppm.

ANSWER: D

K/A: 000024 K1.02

Importance: 3.6

Cognitive Level: Application

References: Curve CB-21 will give total of +645 pcm inserted. Curve gives boron worth 8000MWD/MTU as -7.35 pcm/ppm divide 645 pcm/-7.35 pcm/ppm = + 88 ppm. Alternate reading from 100 to 70% on Curve CB-28 will give 620 pcm. Alternate average on Curve CB-5C will give 618 pcm. Range should cover 680 to 690 ppm

Lesson Plan #: 2LP-SQS-7.1

Obj. #: 8

Objective: Given a set of conditions, be able to locate and apply the proper procedure and applicable P&L's for the following procedures: Q: EMERGENCY BORATION

History: NEW

Source:

Type: OPEN BOOK

JTA: 004EEE0101

Give curves CB-21 and CB-28

2LOT 2B NRC RO -As Given

| | |
|---|-------------------------|
| <p>6. Which of the following Primary Component Cooling system loads in the letdown path is isolated by automatic valve closure on a Low Level in Primary Component Cooling Surge Tanks [2CCP*TK21A, 21B]?</p> <p>A. Non Regenerative Heat [2CHS*E23]</p> <p>B. Excess Letdown Heat Exchanger [2CHS*E24]</p> <p>C. Degasifier Vent Chillers [2BRS*E23A,23B]</p> <p>D. Seal Water Heat Exchanger [2CHS*E21]</p> | |
| <p>ANSWER: C</p> | |
| <p>K/A:000026 AK2.03</p> | <p>Importance:3.6</p> |
| <p>Cognitive Level: Knowledge</p> | |
| <p>References 2OM-15.5, Figure 15-1, Figure 15-6, 2OM -15.3.B, Iss. 4, Rev. 10</p> | |
| <p>Lesson Plan #:: 2LP-SQS-15.1</p> | <p>Obj. #: 6</p> |
| <p>Objective: Explain the effects the following malfunctions will have on this system and the components cooled by this system: a. Loss of Primary Component Cooling Water</p> | |
| <p>Flow/Inventory</p> | |
| <p>History: NEW</p> | |
| <p>Source:</p> | <p>Type: OPEN Book</p> |
| <p>JTA:: 0000060121</p> | <p>Give Figure 15-6</p> |

2LOT 2B NRC RO -As Given

7. The unit is at 75% power and preparing to escalate power to 100%. The Pressurizer Pressure Control Station [2RCS*PK444A] is in Automatic and the output is at 50%. All systems are NSA with PZR Control Heater Control Group [2RCS*H2C] and [2RCS*H2D] selected to "ON."
Which of the following is the expected status of PZR pressure control equipment at this point?

- A. Heater Groups B, D and E ON, Pressurizer Spray [2RCS*PCV455A] OPEN.
- B. Heater Groups B, D and E OFF, Pressurizer Spray [2RCS*PCV455A] CLOSED.
- C. Heater Groups C and D ON, Pressurizer Spray [2RCS*PCV455A] OPEN.
- D. All Heater Groups OFF, Pressurizer Spray [2RCS*PCV455A] OPEN.

ANSWER: C

K/A: 000027 A2.03

Importance:2.6

Cognitive Level: Application

References: Curve Book CB-18, Rev. 0

Lesson Plan #: 2LP-SQS-6.4

Obj. #: 11

Objective: From memory discuss the operation of the pressurizer master controller. Include as a minimum, the following: b. All automatic functions of the pressure control system including setpoints.

History: NEW

Source:

Type: CLOSED BOOK

JTA: 0020090101

2LOT 2B NRC RO -As Given

8. The crew is responding to a Secondary Side Steam Break Accident using ECA-2.1, "Uncontrolled Depressurization of All Steam Generators." All steam generators are depressurized to containment pressure and all steam generator levels are OFF-SCALE low on the narrow range. The ANSS orders the NCO to throttle AFW flow to all three steam generators to a minimum 50 gpm to each steam generator.
- Maintaining AFW flow is designed to accomplish which of the following functions?
- A. Provide minimum flow through the operating Auxiliary Feedwater pumps.
 - B. Prevent exceeding pump runout on the operating Auxiliary Feedwater pumps.
 - C. Provide thermal stress relief by maintaining wetted surfaces on the interior of the steam generators.
 - D. Prevent overflow of the steam generators during restoration of narrow range level.

ANSWER: C

K/A:000040 (W/E12) K3.2

Importance:3.3

Cognitive Level: Knowledge

References: 2OM-53.B.4.ECA-2.1, Iss. 1B, Rev. 6, Background for CAUTION before step 6

Lesson Plan #: 2LP-SQS-53.3

Obj. #: 3

Objective: State from memory the basis and sequence for the major action steps of each EOP procedure, IAW the BVPS-EOP Executive Volume.

History: NEW

Source:

Type: CLOSED BOOK

JTA: 3010030601

2LOT 2B NRC RO -As Given

9. Following an overcooling transient, the crew is responding to an Integrity Red Path using FR-P.1, "Response to Imminent Pressurized Thermal Shock Condition." The RCS is saturated at 400 psig. SI can NOT be terminated.
- Why should a Reactor Coolant Pump be started even if support conditions are missing?
- A. To establish loop flow, to stabilize Tav_g, and stop the cooldown.
 - B. To mix heated loop water and SI flow to limit temperature stresses.
 - C. To use forced flow to collapse voids in the reactor vessel head.
 - D. To equalize RCS pressures, allowing uniform SI flow to the vessel.

ANSWER:B

K/A:W/EO8 K3.2

Importance:3.6

Cognitive Level: Knowledge

References: 2OM-53B.4.FR-P.1, Background for Step 6, Issue 1B, Rev. 1, page 21

Lesson Plan #:2LP-SQS-53.3

Obj. #: 3

Objective: State from memory the basis and sequence for the major action steps of each EOP procedure, IAW the BVPS-EOP Executive Volume

History: NEW

Source:

Type: CLOSED BOOK

JTA: 3110140601

2LOT 2B NRC RO -As Given

10. The unit is operating at 100% power with all systems NSA when the Section A1 Main Condenser Water Box Outlet Valve [2CWS*MOV100A] malfunctions and closes. Unit power remains constant.
- As a result, the temperatures of CWS to the cooling tower will (1) and condenser vacuum will (2).
- A. (1) rise, (2) improve
 - B. (1) fall, (2) degrade
 - C. (1) rise, (2) degrade
 - D. (1) fall, (2) improve

ANSWER:C

K/A:000051 K1.01

Importance:2.4

Cognitive Level: Comprehension

References: Component Fundamentals, Topic 1, Section B, Heat Exchangers and Condensers, Page 16 (See Westinghouse HTFF Book page 9-33 & 34

Value of K/A below 2.5. Use based on recent Unit 1 trip on loss of vacuum and circwater flow.

Lesson Plan #: 2LP-SQS-26.2

Obj. #: 6

Objective: Explain the effects of the following malfunctions: condenser vacuum loss

History: NEW

Source:

Type: CLOSED BOOK

JTA: 0550110101

2LOT 2B NRC RO -As Given

11. The unit has tripped from 100% power coincident with a complete loss of the switchyard.

- All RCP pumps are off.
- RVLIS is available.
- RCS temperature and pressure are trending toward no-load values.
- 4Kv Emergency Bus 2AE and 2DF failed to load on the EDG's.

Based on these symptoms, which of the following procedures could be entered directly without entering E-0 "Reactor Trip and Safety Injection"?

- A. FR-C.1 "Response to Inadequate Core Cooling."
- B. ECA-0.1 "Loss of All AC Power Recovery Without SI Required."
- C. ES-0.2 "Natural Circulation Cooldown"
- D. ECA-0.0 "Loss of All AC Power"

ANSWER:D

K/A: 000055 G 2.4.1

Importance:4.3

Cognitive Level: Comprehension

References: 2OM-53B.2 Section IV, Issue 1B, Rev 4, Page 13

Lesson Plan #: 2LP-SQS-53.1

Obj. #: 1

Objective: State from memory and apply "ALL" of the Emergency Operating Procedures User's Guide rules of usage as defined in OM53B.2

History: NEW

Source:

Type: CLOSED BOOK

JTA: 3010060601

2LOT 2B NRC RO -As Given

12. The unit is at 75% power with all systems NSA for this power. Due to performing a maintenance work order, the 21B Steam Generator level control inputs are selected as follows:

- S/G B Feedwater Flow [2FWS-FI486] is on Channel IV
- S/G B Steam Flow [2MSS-FI485] is on Channel IV
- Turbine First Stage Pressure is selected to Position PT446 (Channel III)

What will be the initial response of SG Main Feedwater Control Valve [2FWS*FCV488] on Steam Generator 21B to the loss of 120 Vital Bus 3?

- A. The valve opens as S/G B Feedwater Flow 2FWS*FT486 fails low.
- B. The valve closes as S/G B Steam Flow 2MSS*FT485 fails low.
- C. The valve closes as Turbine First Stage Pressure 2MSS*PT446 fails low.
- D. The valve opens as S/G B Steam Flow 2MSS*PT485 fails low.

ANSWER:C

K/A: 000057 A2.19

Importance:4.0/4.3

Cognitive Level: Application

References: 2OM-38.4.V, Issue 1, Rev. 6, 2OM-24.4,IF, Issue 4,Rev. 5, USFSAR Fig. 7-3.18

Lesson Plan #: 2SQS-24.1

Obj. #: 5

Objective: Be able to discuss component, function, controls, capacities, cooling and seal water supplies, normal operating flows and pressures, for all components in ELO-2: All remote operated or automatic valves.

History: NEW

Source:

Type: OPEN Book

JTA: 059BBB0401

Give UFSAR Figure 7-3.18

2LOT 2B NRC RO -As Given

13. A fire has started in the Cable Spreading Room [CB-2]. The fire is now out of control and the fire brigade has not been able to enter the area. Smoke is entering the control room and the NSS has implemented 2OM-56C "Alternate Safe Shutdown From Outside Control Room."

Which of the following methods is to be used to bring the unit to Cold Shutdown?

- A. Conduct a natural circulation cooldown using only the Train B (Purple) equipment from the control room.
- B. Conduct a forced circulation cooldown using only Train A (Orange) equipment from the Alternate Shutdown Panel.
- C. Transfer all Train B (Purple) equipment to the Emergency Shutdown Panel and conduct a natural circulation cooldown.
- D. Transfer all Train A (Orange) equipment to the Alternate Shutdown Panel and conduct a natural circulation cooldown.

ANSWER: D

K/A: 000067 K3.02

Importance: 2.5

Cognitive Level: Knowledge

References: 2OM-53B.4. 2OM-56C.4.B, Issue 1, Rev. 14

Lesson Plan #: 2LP-SQS-56C.1

Obj. #:

Objective: Describe from memory, the overall purpose of each Abnormal Operating Procedure

History: NEW

Source:

Type: CLOSED BOOK

JTA: 0000020401

2LOT 2B NRC RO -As Given

14. The control room was evacuated due to a fire. Procedure 2OM-56C.4.A" Alternate Safe Shutdown from Outside the Control Room" is in progress. Control has been established at the Alternate Shutdown Panel.

Which of the following steam release paths is available to cooldown the unit from the ASP?

- A. Atmospheric Dump Valve [2SVS*PCV101A] and Residual Heat Release [2SVS*HCV104].
- B. Atmospheric Dump Valve [2SVS*PCV101B] and the Residual Heat Release valve [2SVS*HCV104].
- C. Atmospheric Dump Valves [2SVS*PCV101A, 101C].
- D. Atmospheric Dump Valves [2SVS*PCV101A, 101B].

ANSWER: D

K/A: ,000068 K3.06

Importance: 3.9

Cognitive Level: Knowledge

References: 2OM-56C.4.A, Issue 1, Rev. 8, Page A 3

Lesson Plan #: 2LP-SQS-56C.1

Obj. #: 6

Objective: State what equipment/flowpaths are to be used for: c. RCS Temperature Control.

History: NEW

Source:

Type: CLOSED BOOK

JTA: 0000020401

2LOT 2B NRC RO -As Given

15. A channel II Containment High-1 pressure signal is in test with a trip signal when a second channel Containment High-1 is generated by electrical noise. Which of the following will be the status of containment isolation?
- A. All inside and outside containment penetrations will go to their Phase A configuration.
 - B. All inside and outside containment penetrations will remain in their current configuration.
 - C. Only the outside containment penetrations will go to their Phase A configuration.
 - D. Only the inside containment penetrations will go to their Phase A configuration.

ANSWER: A

K/A: 069(W/E 14) A1.01

Importance: 3.5/3.7

Cognitive Level: Comprehension

Ref.: 2OM-1.1.D "Reactor Control and Protection" Issue 4, Rev. 0

FSAR Table 6.2-60

LP#: 2LP-SQS-1.2

OBJ: 9

History: Used in 2LOT 2A SRO exam.

Source: 2LOT 2A SRO Exam

JTA: 0060150101

Type: CLOSED BOOK

2LOT 2B NRC RO -As Given

| | |
|--|-------------------|
| 16. Unit 2 is at 100% power with all systems NSA. Which of the following detectors will indicate a fuel clad leak into the RCS? | |
| A. Aerated Vent Transfer Line Monitor [2GWS-RQ103] | |
| B. Elevated Release Monitor [2HVS-RQ109A, 109B] | |
| C. Reactor Containment Area Low Range [2RMR-RQ201] | |
| D. Reactor Coolant Letdown Monitor [2CHS-RQ101A,B] | |
| ANSWER: D | |
| K/A: 000076 K2.01 | Importance:2.6 |
| Cognitive Level: Knowledge | |
| References: 2OM-43.1.C, Issue 4, Rev. 3, Page 8 | |
| Lesson Plan #: 2LP-SQS-43.1 | Obj. #: 2 |
| Objective: Explain where each of the following process monitors takes a sample in the associated system: c. 2CHS-RQ101A,B RCS Letdown. | |
| History: NEW | |
| Source: | Type: CLOSED BOOK |
| JTA: 072BBB0221 | |

2LOT 2B NRC RO -As Given

17. The unit is operating at 100% Rated Thermal Power when control rods H2 and H4 simultaneously drop into the core. In order to meet power distribution limits specified in the UFSAR, which of the following actions is required from 2OM-53C.4.2.1.8 "Rod Inoperability"?

- A. Lower turbine load to less than 75% power at 5% per minute.
- B. Trip the reactor and go to E-0 "Reactor Trip and Safety Injection" Step 1.
- C. Restore the individual rods to group position using 2OM-2.4.P "RCCA or RCCA Group Misalignment."
- D. Perform 2OST-49.1 "Shutdown Margin Calculation (Plant Critical)" within 1 hour.

ANSWER:B

K/A:000003 K3.04

Importance:3.8

Cognitive Level: Knowledge

References: 2OM-53C.4.2.1.8, Issue 1A, Rev. 0

Lesson Plan #: 2LP-SQS-53C.1

Obj. #: 1

Objective: State from memory all Immediate Manual Actions associated with the Abnormal Operating Procedure.

History: NEW

Source:

Type CLOSED BOOK

JTA: 0000070401

18. The unit has tripped but a Safety Injection was NOT required. The crew has transitioned to ES-0.1" Reactor Trip Response." The following conditions exist:

- All steam generators are below the narrow range
- All reactor coolant pumps are operating
- Steam Dumps are open to the condenser and Tave is trending to 547°F
- Auxiliary Feedwater is 200 gpm to each steam generator

Is the requirement for a secondary heat sink met?

- A. Yes, the steam dumps are open and the condenser is available.
- B. Yes, auxiliary feedwater flow is greater than 365 gpm.
- C. No, all steam generator levels are less than 5% in the narrow range.
- D. No, auxiliary feedwater must be greater than 365 gpm to each steam generator.

ANSWER: B

K/A: 000007 G.2.4.8

Importance: 3.0

Cognitive Level: Comprehension

References: 2OM-53B.4.ES-0.1' Reactor Trip Response Background" Issue 1B, Rev. 5, Step 12

Lesson Plan #: 2LP-SQS-53.3

Obj. #: 3

Objective: State from memory the basis and sequence for the major action steps of each EOP procedure, IAW the BVPS-EOP Executive Volume.

History: NEW

Source:

Type: CLOSED BOOK

JTA: 3010010601

2LOT 2B NRC RO -As Given

19. The unit has tripped from 100% power due to a PZR Power Operated Relief Valve that has failed full open. What conditions will develop in the RCS if the Motor Operated Isolation Valve fails to close?
- A. Breakflow will be within capacity of normal charging line flow, so RCS pressure will stabilize at or near 2235 psig.
 - B. HHSI flow will be initiated via the cold leg SI injection and RCS pressure will stabilize at or near 1800 psig.
 - C. Breakflow will be within capacity of normal charging flow, so RCS pressure stabilizes at or near 1200 psig.
 - D. HHSI flow will be initiated via the cold leg SI injection and RCS pressure stabilizes at or near 1200 psig.

ANSWER: D

K/A: 000008 AA2.25

Importance:2.8

Cognitive Level: Comprehension

References: 2OM-53B.4.FR-H1, Background, Issue 1B, Rev. 6, page 11 and 20

Lesson Plan #: 2LP-SQS-11.1

Obj. #: 5

Objective: State the operating levels, pressures, temperatures, and flows associated with the system during the following alignments: Injection Phase

History: NEW

Source:

Type: CLOSED BOOK

JTA: 3110060601

| | |
|--|-------------------|
| <p>20. A large LOCA has occurred on Unit 2. Containment is at maximum design pressure. The RCS is at saturation with system pressure matching containment pressure. All equipment has responded as required by the SSPS. The RWST is 600 inches and dropping.</p> <p>What is the expected configuration for the Low Head Safety Injection Pumps [2SIS*P21A, 21B] under these conditions?</p> <p>A. Operating at maximum rated flow of both pumps.</p> <p>B. Operating at shutoff head with recirculation flow to the RWST.</p> <p>C. Shutdown on Refueling Water Storage Tank Low Low level.</p> <p>D. Flow limited by the throttled settings for RCS Cold Leg SI Throttle valves.</p> | |
| ANSWER: A | |
| K/A: 000011 K2.02 | Importance: 2.6 |
| Cognitive Level: Comprehension | |
| References 2OM-11.1.C, Issue 4, Rev. 0 page 3, 2OM-11.1.D, Iss. 4, Rev. 0, page 3, 2OM-11.2.B, Issue 4, Rev. 2 Page 3. | |
| Lesson Plan #: 2LP-SQS-11.1 | Obj. #: 5 |
| Objective: State the operating levels, pressures, temperatures, and flows associated with the system during following alignments: Injection Phase | |
| History: NEW | |
| Source: | Type: CLOSED BOOK |
| JTA: 3010020601 | |

2LOT 2B NRC RO -As Given

21. A Low Pressurizer Pressure Safety Injection signal tripped the reactor. All ESFAS equipment responded as required with the following exception, Letdown Orifice Isolation [2CHS-AOV200B] failed to close. Pressurizer level is at 35% and rising. If the letdown line were to subsequently break just outside of the containment penetration, which of the following results could be expected if the operators failed to respond?

- A. Thermal shock to the charging line penetration.
- B. Rapid core uncover and fuel damage.
- C. Loss of recirculation capability from the Containment Sump.
- D. Loss of injection flow to the RCS loop 21A.

ANSWER: C

K/A: W/E04 EK2.2

Importance: 3.8

Cognitive Level: Comprehension

References: 2OM-7.5, Issue 4, Rev. 0, Figure 7-1A, Rev. 7

Lesson Plan #: 2LP-SQS-7,1

Obj. #: 1

Objective: Be able to explain the main and auxiliary functions and the design basis of the system. (Design of system is to isolate to contain fluids in the containment for rupture)

History: NEW

Source:

Type: CLOSED BOOK

JTA: 0040150101

2LOT 2B NRC RO -As Given

| | |
|---|-------------------|
| <p>22. The actions of E-1" Loss of Primary or Secondary Coolant" are in progress. Annunciator A1-2E " RECIRCULATION MODE INITIATION is lit. All systems associated with this alarm perform as required.</p> <p>If the Containment Emergency Sump is empty, which of the following pump combinations may be damaged?</p> <p>A. Quench Spray Pumps [2QSS*P21A, 21B]</p> <p>B. Low Head Safety Injection Pumps [2SIS*P21A, P21B]</p> <p>C. Residual Heat Removal Pumps [2RHS*P21A, 21B]</p> <p>D. High Head Safety Injection Pumps [2CHS*P21A and B]</p> | |
| ANSWER: D | |
| K/A: W/E11 K1.3 | Importance: 3.6 |
| Cognitive Level: Knowledge | |
| References: 2OM-11.1.D. Issue 4, Rev. 0, page 2 | |
| Lesson Plan #: 2LP-SQS-11.1 | Obj. #: 5 |
| Objective: State the operating levels, pressures, temperatures, and flows associated with the system during the following alignments: Transfer to Recirculation. | |
| History: NEW | |
| Source: | Type: CLOSED BOOK |
| JTA:0060160102 | |

23. The unit operators are recovering from an Inadvertent SI. The following annunciators are verified:

- A12-1C, "AUTO SAFETY INJECTION BLOCKED" is lit
- A12-1D, "SAFETY INJECTION SIGNAL" is off.
- CIA and CIB (Both Trains) reset pushbuttons have been actuated.

While attempting to restore charging flow, Charging Isolation Valve [2CHS*MOV310] opens and remains open, Charging Isolation Valve [2CHS*MOV289] recloses when the control switch is released.

Which operator action is required to open 2CHS*MOV289?

- A. Open and verify P-4 signal from Reactor Trip Breaker A on PSMS, Data Page 1.
- B. Reset Train A CIA signal using "Containment Isolation Phase A Reset" pushbutton on BB-A.
- C. Push and verify "Manual Action System Bypass Status Train A - HHSI" light lit on panel 1069.
- D. Reset Train A SI slave relays using switch S821 at Safeguards Test Cabinet.

ANSWER: D

K/A: W/E02 K2.1

Importance: 3.4

Cognitive Level: Application

References: 2OM-53B.4.ES-1.1, Issue 1B Rev 6 Background for step 2 Note 1

Lesson Plan #: 2LP-SQS-53.3

Obj. #: 6

Objective: Given a set of conditions, be able to locate and apply the proper Emergency Operating Procedures, IAW the BVPS-EOP Executive Volume User's Guide.

History: NEW

Source:

Type: OPEN BOOK

JTA: 3010010601

Copy of ES 1.1

2LOT 2B NRC RO -As Given

24. Unit 2 is cooling down and has reached Mode 4. RHS is valved in for service and 2A RHS Pump [2RHS*P21A] is running.

- RCS temperature is being maintained at 325°F
- RCS pressure is at 335 psig
- All RHS system components are NSA
- B RHS train is in standby

According to the VOND, if RCS Pressure Transmitter [2RCS*PT440] fails high, which of the following describes what will happen to the RHS system?

- A. 2RHS*MOV701A and 2RHS*701B close and A RHS pump trips.
- B. 2RHS*MOV701A and 2RHS*702A close and A RHS pump trips.
- C. 2RHS*MOV701B and 2RHS*702B close and B RHS pump is inoperable.
- D. 2RHS*MOV702A and 2RHS*702B close and B RHS pump is inoperable.

ANSWER: A

K/A: 000025 K3.02

Importance: 3.3

Cognitive Level: Application

References: 2OM-10.5, Issue 4, Rev. 0 Figure 10-1, 2OM-10.1.D, Issue 4, Rev. 0, page 3 to 6

Lesson Plan #: 2LP-SQS-10.1

Obj. #: 9

Objective: Explain the effects of the following malfunctions will have on the system: 1.

2RCS*PT440(441) Failures High and Low

History: NEW

Source:

Type: OPEN BOOK

JTA:0050080101

Open- Give figure 10-1

| | |
|--|--------------------------|
| <p>25. The NCO manually actuates a reactor trip, but the trip breakers remain closed. The plant operator must manually trip the turbine because of the failure of which of the following actuations?</p> <p>A. Both First Stage Impulse Pressure Transmitters [2MSS*PT446, 2MSS*PT447] still indicate greater than 40% power.</p> <p>B. Both P-4 signals are missing due to both Reactor Trip Breakers [RTA and RTB] being closed.</p> <p>C. SSPS Train A and B signals for Turbine Trip on Reactor Trip above P-9 were not generated.</p> <p>D. AMSAC Timer B-3 is blocked because both Main Feedwater Pumps are still running.</p> | |
| <p>ANSWER: B</p> | |
| <p>K/A: 000029 A2.09</p> | <p>Importance:4.4</p> |
| <p>Cognitive Level: Comprehension</p> | |
| <p>References: FSAR Figure 7.3-20</p> | |
| <p>Lesson Plan #: 2LP-SQS-26.3</p> | <p>Obj. #: 4</p> |
| <p>Objective: Describe all control functions, protective functions, interlocks. State the inputs, setpoints, blocks, permissives, control stations, logics, outputs, and power supplies for the system components.</p> | |
| <p>History: NEW</p> | |
| <p>Source:</p> | <p>Type: CLOSED BOOK</p> |
| <p>JTA: 0450070101</p> | |

2LOT 2B NRC RO -As Given

26. The unit is operating with a steam generator tube leak in Steam Generator 21C. Air Ejector Discharge [2ARC-RQ100] radiation monitor is in "ALERT." Over the next 60 minutes 2ARC-RQ100 rises to "HIGH" alarm setpoint. What action should be taken?

- A. Perform an emergency shutdown in accordance with AOP 2.51.1 and be in MODE 3 as quickly as possible.
- B. Shutdown plant and be in MODE 3 within 6 hours.
- C. Trip the Reactor and Turbine go to E-0 "Reactor Trip and Safety Injection" Step 1.
- D. Continue to monitor the affected Steam Generator and prepare for a normal plant shutdown.

ANSWER: A

K/A: 000037 K3.02

Importance: 3.2

Cognitive Level: Application

References: 2OM-53C.4.2.6.4, Issue 1A, Rev. 9, Step 3

Lesson Plan #: 2LP-SQS-53C.1

Obj. #: 8

Objective: Given a set of conditions, be able to apply the proper Abnormal Operating Procedure.

History: NEW

Source:

Type OPEN BOOK.

JTA: 0000110401

AOP-4.2.6.4

27. A steam generator tube has ruptured in the 21C Steam Generator. The crew is performing the actions required by E-3" Steam Generator Tube Rupture." The cooldown of the RCS has been completed and the RCS has been depressurized to match steam generator pressure. To prevent the restart of leakage into the affected steam generator the operators must complete which of the following tasks?
- A. Isolate the 21C steam generator and depressurize 21A and 21B steam generators by at least 100 psig.
 - B. Isolate the 21C steam generator and raise level in 21C steam generator to a minimum of 5% level in the narrow range.
 - C. Spray the pressurizer as needed to minimize subcooling and hold the RCS pressure equal to steam pressure in the affected steam generator.
 - D. Restore normal charging and letdown and balance RCS pressure to match 21C steam generator pressure.

ANSWER: D

K/A: 000038 K1.02

Importance: 3.2

Cognitive Level: Knowledge

References: 2OM-53B.E-3 Background Issue 1B, Rev. 7, page

Lesson Plan #: 2LP-SQS-53.3

Obj. #: 3

Objective: State from memory the basis and sequence for the major action steps of each EOP procedure, IAW the BVPS-EOP Executive Volume

History: NEW

Source:

Type: CLOSED BOOK

JTA: 3010040601

2LOT 2B NRC RO -As Given

28. Unit 2 has tripped from 100% power due to a small break LOCA. All reactor coolant pump operations were terminated when the pump trip criteria were met. Which of the following is an indication that circulation has stopped and a loop has become stagnant?
- A. Tcold follows steam pressure in the affected steam generators.
 - B. Tcold falls rapidly as SI flows fills the cold leg and RCP casing.
 - C. That remains at saturation temperature for the affected steam generator.
 - D. Tcold falls as the affected loop stagnates during cooldown.

ANSWER: B

K/A: 000038 K1.01

Importance: 4.1

Cognitive Level: Knowledge

References: 2OM-53B.5.GI-12, Issue 1b, Rev. 1, Pages 1 and 4

Lesson Plan #: 2LP-SQS-53.2

Obj. #: 9

Objective: State from memory four (4) conditions, which could lead to loop stagnation, IAW BVPS EOP Executive Volume.

History: NEW

Source:

Type: CLOSED BOOK

JTA: 3010040601

| | |
|--|--------------------------------------|
| <p>29. Unit 2 is operating at 30% Rated Thermal Power with all systems in NSA. Which one of the following events will actuate the Motor Driven Auxiliary Feedwater Pump [2FWE*P23A]?</p> <p>A. 4Kv Emergency Bus 2AE drops to 75% of rated voltage on 1 of 3 phases.</p> <p>B. 2RCS*SG21A Narrow Range Level Transmitter [2FWS*LT474] indicates less than 5%.</p> <p>C. Low Pressurizer Pressure signal at 1845 psig occurs on 2RCS*PT455 and 456.</p> <p>D. 2RCS*SG21A Feed Flow - Steam Flow mismatch indicated on 2FWS*FT476.</p> | |
| <p>ANSWER: C</p> | |
| <p>K/A: 000054 A2.03</p> | <p>Importance: 4.1</p> |
| <p>Cognitive Level: Knowledge</p> | |
| <p>References: 2OM-24.1.D, Issue 4, Rev. 2 and 2OM-24.1.E, Issue 4, Rev. 1</p> | |
| <p>Lesson Plan #: 2LP-SQS-24.1</p> | <p>Obj. #: 10</p> |
| <p>Objective: From memory list and explain all control and protective functions of the AFW system including logics, setpoints, permissives, and blocks.</p> | |
| <p>History: NEW</p> | |
| <p>Source:</p> | <p>Type: CLOSED BOOK</p> |
| <p>JTA:0130010101</p> | <p>Low pressure SI signal active</p> |

Low pressurizer pressure on 455 and 456 give SI signal at 1845 and SI starts AFW all pumps. Low voltage blocks start, Need 2 of 3 SG low level. Feedflow is N/A

2LOT 2B NRC RO -As Given

30. The unit is on Natural Circulation. The operator rapidly opens the main steam dump valves. A Low Pressure Steam Line Safety Injection is actuated due to which of the following reasons?

- A. Reactor Coolant System heat transfer rate is less than steam demand.
- B. Auxiliary Feedwater Flow is less than steam demand.
- C. Steam generator level swell quenches steam generator steam space.
- D. Pressurizer pressures drop at a higher rate.

ANSWER: A

K/A: W/E05 K1.2

Importance:3.9

Cognitive Level: Knowledge

References: 2OM-53B.4.FR-H.1, Issue 1B, Rev 6, Step 5

Lesson Plan #:2LP-SQS-53.3

Obj. #: 3

Objective: State from memory the basis and sequence for the major action steps of each EOP procedure, IAW the BVPS-EOP Executive Volume

History: NEW

Source:

Type: CLOSED BOOK

JTA: 3110060601

2LOT 2B NRC RO -As Given

| | |
|---|---------------------------|
| 31. Steam Generator Blowdown Test Tank [2SGC-TK23A] discharge is planned. Tank level is 125 inches on 2SGC-LI112A. How long must the tank recirculate before sampling? | |
| A. 65 minutes | |
| B. 155 minutes | |
| C. 210 minutes | |
| D. 281 minutes | |
| ANSWER: D | |
| K/A: 00059 AA2.02 K/A Change | Importance: 2.9 |
| Cognitive Level: Application | |
| References: 2OM-25.4.L, Issue 4, Rev. 9, Step 2d. Reference Table A for 17082 gals. Divide by 60.7 from note before step. Total should be 281 minutes. Two reference points. | |
| Lesson Plan #: 2LP-SQS-25.1 | Obj. #: 5 |
| Objective: Given a set of plant conditions apply the proper procedure(s) and applicable P&Ls to the following: H Discharging The Steam Generator Blowdown Hold Tank [2SGC-TK21A, (B)] to Unit 2 or Unit 1 Cooling Tower Blowdown. | |
| History: NEW | |
| Source: | Type: OPEN Book |
| JTA: 072BBB0221 | Copy of Release Procedure |

2LOT 2B NRC RO -As Given

32. A fuel assembly had been in the spent fuel pool for a year. While being moved to a new location, the assembly is snagged and damaged. Bubbles are observed rising from the fuel assembly. Which monitor would warn the operators of the rising radiation levels due to the gas release in the spent fuel pool?

- A. Auxiliary Building - 755B Airborne Monitor [2RMP-RQI312]
- B. Fuel Handling Building Vent Airborne Monitor [2RMF-RQI301B]
- C. Ventilation Vent Off-line Gas and Particulate Monitor [2HVS-RQI101]
- D. Fuel Pit Bridge Area Radiation Monitor [2RMF-RQ202]

ANSWER: B

K/A: 000061 AK1.01

Importance: 2.5

Cognitive Level: Knowledge

References: 2OM-43.1.C, Issue 4, Rev. 3, page 22 and 23

Lesson Plan #: 2LP-SQS-43.1

Obj. #: 1

Objective: Explain where each of the following process monitors takes a sample in the associated system. q. 2RMF-RQ301A,(B)

History: NEW

Source:

Type: CLOSED BOOK

JTA: 072BBB0221

2LOT 2B NRC RO -As Given

33. A LOCA has occurred that resulted in damage to fuel. Radiation levels in the containment reached 200,000 Rem/hr and now, 24 hours later, are 50,000 Rem/hr. Containment pressure peaked at 15 psig and has now returned to 0.5 psig.

Which of the following describes the correct use of "adverse containment" values?

- A. Discontinue use of "adverse containment" values due to containment pressure dropping below 1.5 psig.
- B. Discontinue use of "adverse containment" values due to containment radiation levels below 10^5 Rads/hr.
- C. Continue use of "adverse containment" values until integrated radiation dose is confirmed to be below 10^6 Rads.
- D. Continue use of "adverse containment values until containment pressure is restored to subatmospheric pressure.

ANSWER: C

K/A: W/E16 A1.2

Importance: 2.9

Cognitive Level: Application

References: 2OM53B.5.GI-2, Issue 1B, Revision 1, page 13

Lesson Plan #: 2LP-SQS-53.3

Obj. #:6

Objective: Given a set of conditions, be able to locate and apply the proper Emergency Operating Procedures, IAW the BVPS-EOP Executive Volume User's Guide.

History: NEW

Source:

Type: CLOSED BOOK

JTA: 301AAA0601

2LOT 2B NRC RO -As Given

| | |
|---|-------------------|
| 34. Pressurizer Level Control Selector Switch is in Position I & II. Pressurizer Level Transmitter [2RCS*LT461] fails high. Which of the following control actions should be confirmed as having occurred? | |
| A. PZR High Level RX Trip Channel III Bistable light lit. | |
| B. Charging Flow Control Valve [2CHS*FCV122] closed to minimum flow. | |
| C. Pressurizer Back up Heater Groups A, B, D and E come on. | |
| D. Letdown Orifice Isolation Valves [2CHS*AOV200A, B, C] open. | |
| ANSWER: A | |
| K/A:: 000028 G 2.4.4 | Importance: 4.0 |
| Cognitive Level: Knowledge | |
| References: 2OM-6.4.IF, Issue 4, Revision 5, page 13 | |
| Lesson Plan #: 2LP-SQS-6.4 | Obj. #: 13 |
| Objective: From memory discuss the operation of the pressurizer level control system. Include as a minimum the following: c. All of the automatic functions of the level control system including setpoints, inputs, and outputs. | |
| History: NEW | |
| Source: | Type: CLOSED BOOK |
| JTA:0110030101 | |

2LOT 2B NRC RO -As Given

35. Technical Specification 3.9.11 "Refueling Operation - Storage Pool Water Level" requires a minimum of 23 feet of water over irradiated fuel assemblies in the Spent Fuel Storage Pool. This level is required to limit what hazard during fuel handling?
- A. Potential for criticality involving two spent fuel assemblies.
 - B. Exposure to iodine release from a damaged fuel assembly.
 - C. Overheating damage to a fuel assembly from a loss of cooling.
 - D. Damage to fuel handling equipment from radiation exposure.

ANSWER: B

K/A: 00036 AK1.01

Importance: 3.5

Cognitive Level: Knowledge

References: Bases for Tech Spec. 3/4.9.11 page B 3/4 9-3

Lesson Plan #: 2LP-SQS-20.1

Obj. #:10

Objective: Given a set of conditions, recognize when a L.C.O. has been exceeded. Identify any actions and explain the bases for the following Tech Specs. b. Technical Specification 3.9.11 Storage Pool Water Level.

History: NEW

Source:

Type: CLOSED BOOK

JTA: 0330150101

2LOT 2B NRC RO -As Given

36. The crew is performing step 25 of ECA-0.0 " Loss of All AC Power" and depressurizing all three steam generators to 300 psig. The cooldown is stopped at 300 psig in order to accomplish which one of the following functions?
- A. Block of Steam Line Isolation signal and Low Steam Line Pressure SI.
 - B. Allow Auxiliary Feedwater Flow to fill all steam generators to above 5% Narrow Range Level.
 - C. Maintain RCS subcooling greater than 50°F and PRZR level on scale.
 - D. Maximize injection of SI accumulator water and limit nitrogen injection into RCS.

ANSWER: D

K/A: 000056 K3.02

Importance: 4.4

Cognitive Level: Knowledge

References: 2OM-53B.4.ECA-0.0 Issue 1B, Rev. 4, page 114

Lesson Plan #: 2LP-SQS-53.3

Obj. #: 3

Objective: State from memory the basis and sequence for the major action steps of each EOP procedure, IAW the BVPS-EOP Executive Volume.

History: 2LOT 2A Question 17 NRC

Source: Modified from Q17 on 2LOT2A

Type: CLOSED BOOK

JTA: 3010060601

2LOT 2B NRC RO -As Given

37. The unit is at 100% power with all systems NSA. "A" Train SSPS testing is in progress. The "A" Train Reactor Trip Bypass breaker [BYA] is racked in and closed. The Train "A" SSPS Input Error Inhibit Switch is in "INHIBIT." A 2 out of 3 Reactor Trip signal is generated on low pressurizer pressure.

Which of the following actions will produce the actual reactor trip?

- A. Train A Reactor Trip Breaker [RTA] opens on loss of voltage to the UV coil.
- B. Train A Reactor Trip Bypass Breaker [BYA] opens when the shunt trip coil energizes.
- C. Train B Reactor Trip Breaker [RTB] opens on loss of voltage to the UV coil.
- D. Train B Reactor Trip Bypass Breaker [BYB] opens when the shunt trip coil energizes.

ANSWER: C

K/A: 001 K1.05

Importance: 4.5

Cognitive Level: Application

References: 2OM-1.1.D, Issue 4, Rev. 0, page 5, page 8,

Lesson Plan #: 2LP-SQS-1.2

Obj. #: 8

Objective: Using components listed in objective 2 as applicable from memory explain how a signal is automatically generated to cause the reactor trip breakers to open.

History: NEW

Source:

Type: CLOSED BOOK

JTA: 0120080101

2LOT 2B NRC RO -As Given

38. The unit is in Mode 5 in preparation for heating up. A dilution is in progress when annunciator A2-5D "NIS SOURCE RANGE HIGH FLUX AT SHUTDOWN" comes into alarm. This is to alert the operator to perform which of the following actions?
- A. Block the source range high flux trips in preparation for reactor startup.
 - B. Emergency borate the RCS to restore core shutdown margin.
 - C. Turn off the source range high voltages for protection of the instrumentation.
 - D. Verify all control rods fully inserted and the reactor trip breakers open.

ANSWER: B

K/A: 001 K6.08

Importance: 2.9

Cognitive Level: Comprehension

References: 2OM-2.4.AAQ, Issue 1, Rev. 4

Lesson Plan #:: 2LP-SQS-2.1

Obj. #: 10

Objective: Explain how the following can effect Excore Nuclear Instrumentation indication: b. reactor coolant system boron concentration.

History: NEW

Source:

Type: CLOSED BOOK

JTA:0150050101

39. The Unit is critical and stabilized at 1E-8 amps in the Intermediate Range. The operator records the following data in the Daily Journal:

- Control Bank C is at 100 steps
- Control Bank D is at 0 steps.
- Reactor Coolant system boron is 575 ppm
- Reactor Coolant system temperature is 547°F.

Exhibiting a questioning attitude the Plant Operator states that the rod configuration seems improper and consults Plant Curve CB-15. Which of the following actions is required?

- A. Manually trip the reactor and commence emergency boration.
- B. Insert Control Banks A, B, C and D and re-calculate the Estimated Critical Position.
- C. Request permission from General Manager Operations to enter Mode 1.
- D. Request Nuclear Engineering validation of the current rod configuration.

ANSWER: A

K/A: 001 K5.04 K/A CHANGE

Importance: 4.3

Cognitive Level: Application

References: CB-15 Issue 7, Rev. 0, 2OM-50.4.D, Issue 1, Rev. 31, Step 19

Lesson Plan #: 2LP-SQS-50.1

Obj. #: 7

Objective: Given a set of conditions, be able to locate and apply the proper procedure(s) and applicable P&Ls for all the procedures contained in OM Chapter 50.

History: NEW

Source:

Type: OPEN BOOK

JTA: 0010100101

Give CB-15

2LOT 2B NRC RO -As Given

| | |
|--|-------------------|
| 40. At low RCS pressure and with procedural restrictions the RCP Seal Water Bypass Isolation Valve [2CHS*MOV307] may be opened. Opening this valve will produce which of the following? | |
| A. Number 2 Seal leakoff flow will rise above 1 gpm. | |
| B. Number 1 Seal leakoff flow will rise above 0.2 gpm. | |
| C. Elevated cooling flow through RCP Lower Radial Bearing. | |
| D. Elevated cooling flow through RCP Thermal Barrier. | |
| ANSWER: C | |
| K/A: 003 K1.03 | Importance: 3.3 |
| Cognitive Level: Comprehension | |
| References: 2OM-6.4.AAB, Issue 4, Rev. 2, Page 7, 2OM-6.1.C, Issue 4, Rev.0, page 20 | |
| Lesson Plan #: 2LP-SQS-6.3 | Obj. #: 4.c |
| Objective: Describe the function and design features of the RCP seal system. Include in your discussion the following for each seal: c. Purpose of number 1 seal leakoff isolation and bypass. | |
| History: NEW | |
| Source: | Type: CLOSED BOOK |
| JTA: 0030020101 | |

2LOT 2B NRC RO -As Given

41. Given the following conditions:

- Make-up to the RCS has increased and the following alarms are received:
 - Reactor Coolant Pump Seal Leak-off Temp High.
 - Reactor Coolant Pump Seal Leak-off Flow High.
 - Reactor Coolant Pump 21A Seal Vent Pot Level High.
 - Reactor Coolant Pump No. 1 Seal Differential Pressure Low.

Which of the following has occurred to the 21A RCP?

- A. #1 seal has failed.
- B. #1 and #2 seals have failed.
- C. All the seals have failed.
- D. Seal injection has failed.

ANSWER: A

K/A: 003A2.01

Importance: 3.5/3.9

Cognitive Level: Analysis

Ref.: 2OM-6.4.AAB Iss 4 Rev 1; 2OM-7.4.AAH Iss 1 Rev 16.

LP#: 2LP-SQS-6.3

OBJ: 4e

History: Similar question used in 2LOT1 NRC exam (Q-2-97-53), 1LOT 3B exam

Source: NRC Bank

JTA: 0030020101

CLOSED BOOK

2LOT 2B NRC RO -As Given

42. The unit is at 100% power with all systems NSA. Core burnup is 4000 MWD/MTU. RCS boron concentration is 1150 ppm. Control Rods are in MANUAL. Due to an erroneous chemistry sample, the mixed bed demineralizer DEMIN 21B is placed in service with a fresh resin charge. Reactor Coolant System boron changes by 50 ppm as the resin saturates.

With no operator or SSPS actions, what would be the approximate change in Tavg to compensate for the boron change?

- A. 72 degrees.
- B. 26 degrees.
- C. 12 degrees.
- D. 5 degrees.

ANSWER: B

K/A: 004 A2.32

Importance: 3.4

Cognitive Level: Application

References: Generic Fundamentals: Reactor Theory Fundamentals, Topic 3: Control Reactivity Effects. A: Soluble Boron 192004, K1.11, page 9, 2OM-7.2.A, Issue 4, Rev. 7 page 2, precaution 6. Curve CB-28 indicates

Lesson Plan #: 2LP-SQS-7.1

Obj. #: 8

Objective: Given a set of conditions, be able to locate and apply the proper procedures and applicable P&Ls for the following procedures: AL Mixed Bed/Deborating Demineralizer Operation.

History: NEW

Source:

Type: OPEN BOOK

JTA: 0040100101

CB-4C , CB-13 and CB-28

CB-11 says critical boron is 1150 ppm. Down 50 ppm Curve CB-28 indicates boron worth as -7.1 pcm/ppm. Change is 355 pcm. CB-4C indicates MTC Coefficient as -13.5 pcm/F therefore need approx. 26 degree temperature change.

2LOT 2B NRC RO -As Given

43. The unit is at 75% power with all systems NSA. Control Bank D is at 125 steps withdrawn. Which of the following actions is the correct response to this rod configuration?

- A. 2CHS*MOV350 Emergency Boration Isol. Valve open and greater than 30 gpm boron flow indicated on 2CHS*FI110.
- B. 2CHS*113A Boric Acid to Boric Acid Blender open and greater than 120 gpm flow indicated on 2CHS-FR113.
- C. 2CHS*MOV115B and D Charging Pump Suction from RWST open and greater than 30 gpm indicated on 2CHS*FI122.
- D. 2CHS*FCV122 full open in manual and greater than 120 gpm indicated on 2CHS*FI122.

ANSWER: A

K/A: 004 A2.14 K/A CHANGE

Importance: 3.8

Cognitive Level: Comprehension

References: 2OM-1.4.AAM, Issue 4, Rev. 0, 2OM-7.4.Q, , Issue 4, Rev. 3, Page 1, Curve Book CB-15

Lesson Plan #: 2LP-SQS-6.5

Obj. #: 4

Objective: Given a set of conditions, be able to locate and apply the proper procedure(s) and applicable P&L's for the following procedures Q. Emergency Boration.

History: NEW

Source:

Type: OPEN BOOK

JTA: 0040080101

Copy of CB-15

2LOT 2B NRC RO -As Given

| | |
|--|-------------------|
| <p>44. The unit is operating in Mode 3 at normal temperature and pressure with Charging Flow Control Valve [2CHS*FCV122] controlling at 60 gpm. Letdown Orifice 23 Isolation Valve [2CHS*AOV200B] is open and letdown flow is at 60 gpm. The ANSS wants to close Charging Flow Control Valve [2CHS*FCV122] for troubleshooting. Failure to close 2CHS*AOV200B before closing 2CHS*FCV122 will result in which of the following?</p> <p>A. Overcooling of the Regenerative Heat Exchanger [2CHS*E23].</p> <p>B. Thermal shock to the reactor vessel in loop 21A.</p> <p>C. Flashing of letdown flow downstream of the letdown orifice.</p> <p>D. Thermal shock to the Mixed Bed Demineralizers.</p> | |
| ANSWER: C | |
| K/A: 004 K5.09 | Importance: 3.7 |
| Cognitive Level: Comprehension | |
| References: 2OM-7.2A, Issue 4, Rev. 5, Page 2 of 7 | |
| Lesson Plan #: 2LP-SQS-7.1 | Obj. #: 3 |
| Objective: Be able to explain the normal system arrangement of the system and all components within the system. | |
| History: NEW | |
| Source: | Type: CLOSED BOOK |
| JTA: 0040150101 | |

| | |
|---|--------------------------|
| <p>45. 120 VAC Vital AC Bus II [UPS*VITBS2-2] is completely lost and all attached AC panels are deenergized. Which of the following describes how the "A" and "B" Trains of SSPS will react to a signal requiring Safety Injection to be actuated?</p> <p>A. "A" Train Equipment actuates; "B" Train slave relays are deenergized.</p> <p>B. "A" and "B" Train require manual actuation, slave relays are deenergized.</p> <p>C. "A" and "B" Train equipment will actuate as required.</p> <p>D. "A" Train equipment actuates; "B" Train slave relays remain energized.</p> | |
| <p>ANSWER: A</p> | |
| <p>K/A: 013 K2.01</p> | <p>Importance:3.6</p> |
| <p>Cognitive Level: Comprehension</p> | |
| <p>References: 2OM-1.5 Issue 4, Rev. 3, Figure 1-41</p> | |
| <p>Lesson Plan #: 2LP-SQS-1.2</p> | <p>Obj. #: 7</p> |
| <p>Objective: From memory, explain the effect of a loss of power to the components listed in objective 6. (6.b.slave relays)</p> | |
| <p>History: NEW</p> | |
| <p>Source:</p> | <p>Type: CLOSED BOOK</p> |
| <p>JTA: 0130010101</p> | |

2LOT 2B NRC RO -As Given

46. The unit has experienced a Design Basis Accident. The ANSS desires to stop the Recirc Spray Pumps [2RSS*P21A, P21B]. Which of the following must be true for the pumps to stop?
- A. The SI (Safety Injection) signal must be reset.
 - B. The Reactor Trip Breakers (RTA and RTB) must be closed.
 - C. The CIA (Phase A) signal must be reset.
 - D. The CIB (Phase B) signal must be reset.

ANSWER: D

K/A: 013 A 3.02

Importance: 4.1

Cognitive Level: Comprehension

References: FSAR Figure 7.3-13,

Lesson Plan #: 2LP-SQS-1.2

Obj. #: 10

Objective: Given a particular process parameter, from memory explain how the generation of a reactor trip and/or ESF signal is automatically or manually enabled/disabled.

History: NEW

Source:

Type CLOSED BOOK

JTA: 0130010101

2LOT 2B NRC RO -As Given

47. The RCS pressure drops below 1800 psig and a reactor trip and safety injection signal are generated. All ESF equipment responds as required. RCS pressure stabilizes at 1500 psig with flow indicated on High Head Safety Injection Flow [2SIS*FI943].
- With the Safety Injection system in this condition, which of the following failures is most likely to result in fuel damage in this condition?
- A. Reactor Coolant pumps trip on loss of power.
 - B. HHSI Pumps [2CHS*P21A and 21B] trip after starting.
 - C. Motor Driven Auxiliary Feedwater Pumps [2FWE*P23A and 23B] trip after starting.
 - D. Recirculation Spray Pumps [2RSS*P21C and 21D] fail to start.

ANSWER: B

K/A: 013 K3.01

Importance: 4.4

Cognitive Level: Comprehension

References: 2OM-53B.E-1, Issue 1B, Rev 6, pages 1 to 25

Lesson Plan #: 2LP-SQS-11.1

Obj. #: 2

Objective: Explain functions and describe the operation of the system components listed in Objective 2 - HHSI pumps.

History: NEW

Source:

Type: CLOSED BOOK

JTA:3010020601

| | |
|---|--------------------------|
| <p>48. The unit is critical at 1E-8 amps. The Plant Operator informs the Reactor Operator that N-35 "LOSS OF COMP VOLT" light is lit on the NI cabinet. Which of the following describes the impact of the loss of voltage?</p> <p>A. N-35 will indicate higher amps than N-36.</p> <p>B. N-36 will indicate higher amps than N-35.</p> <p>C. P-10 would actuate at a higher indicated power level.</p> <p>D. P-6 would actuate at a lower indicated power level.</p> | |
| <p>ANSWER: A</p> | |
| <p>K/A: 015 A 2.02</p> | <p>Importance: 3.1</p> |
| <p>Cognitive Level: Comprehension</p> | |
| <p>References:</p> <p>2OM-2.4.AAC "NIS DETECTOR/COMPENSATOR TROUBLE", Issue 1, Rev. 3 Page 3</p> <p>2OM-53C.4.2.2.18 "Intermediate Range Channel Malfunction" Issue 1A, Rev. 1, Step 4</p> | |
| <p>LP#: 2LP-SQS-2.1</p> | <p>OBJ: 2</p> |
| <p>Objective: Explain the principles of operation of the source range, intermediate range and power range detectors. Include detector types and effects of voltage changes on detector performance.</p> | |
| <p>History: NEW</p> | |
| <p>Source:</p> | <p>Type :CLOSED BOOK</p> |
| <p>JTA: 0000100401</p> | |

2LOT 2B NRC RO -As Given

| | |
|---|-------------------|
| 49. The unit is operating at 100% power with all systems NSA. Which of the following interlocks prevents energizing the Source Range High Voltage [N31, N32] while operating in the power range? | |
| A. P-6 | |
| B. P-8 | |
| C. P-9 | |
| D. P-10 | |
| ANSWER: D | |
| K/A:: 015 K4.01 | Importance: 3.1 |
| Cognitive Level: Knowledge | |
| References: 2OM-2.1.C, Issue 4, Revision 1, Page 13, 14, and 15 | |
| Lesson Plan #: 2SQS-LP-2.1 | Obj. #: 6 |
| Objective: State the reactor protection signals generated by the Excore Nuclear Instrumentation System. Include trip setpoints, coincidences, permissives, blocks, rod motion inhibit signals and bases for each protection action. | |
| History: NEW | |
| Source: | Type: CLOSED BOOK |
| JTA: 0150050101 | |

2LOT 2B NRC RO -As Given

50. The highest reading Core Exit Thermocouple tri-sector average temperature provides which one of the following temperature inputs?

- A. Subcooled RVLIS level correction calculations.
- B. RCS Wide Range Temperature Indicator [2RCS*TI413].
- C. Saturated RCS temperature RVLIS level correction calculations.
- D. Vertical board Subcooling Monitor [2RCS*YI001].

ANSWER: D

K/A: 017 K4.01

Importance: 3.4

Cognitive Level: Knowledge

References: 2OM-5D.1.C, Issue 4, Revision 0, page 18 and 19

Lesson Plan #: 2LP-SQS-5.2

Obj. #: 4

Objective: List all interfaces PSMS has with the Main Control Board and the Alternate Shutdown Panel.

History: NEW

Source:

Type: CLOSED BOOK

JTA: 0830040101

2LOT 2B NRC RO -As Given

| | |
|--|-------------------|
| 51. Containment Recirculation Fan 2HVR*FN201C is aligned to 480V Emergency Bus 2-9 and is running. Under this alignment, which of the following signals will STOP the fan? | |
| A. Safety Injection Signal. | |
| B. Containment Isolation Signal (CIA). | |
| C. Containment Spray Actuation Signal (CIB). | |
| D. High Containment Pressure Reactor Trip. | |
| ANSWER: A | |
| K/A: 022 A3.01 <u>K/A CHANGE</u> | Importance: 4.1 |
| Cognitive Level: Knowledge | |
| References: 2OM-44C.1.D, Issue 4, Rev. 0, Pages 2 and 3 | |
| Lesson Plan #: 2LP-SQS-44C.1 | Obj. #: 7 |
| Objective: Describe all control functions of the system including inputs, setpoints, blocks, permissives, control stations, logic and outputs. a. Effects of SIS, CIA and CIB. | |
| History: NEW | |
| Source: | Type: CLOSED BOOK |
| JTA: 0880040101 | |

52. The plant is preparing for a start-up. The Shutdown Bank rods are fully withdrawn and all Control Banks are fully inserted. In preparation for the start-up, the Control Room operators are performing an Operations Surveillance Test (OST) on Source Range detector N31. Which of the following is correct regarding the performance of this test?
- A. The Shutdown Banks must be inserted and the Reactor trip breakers opened. The OST will generate a Reactor trip signal.
 - B. The Shutdown Banks must be inserted and the Reactor trip breakers opened. This will provide a lower baseline Source Range count to allow all setpoints to be tested.
 - C. The Shutdown Banks can be left withdrawn. No Reactor trip signal is generated during the performance of the OST.
 - D. The Shutdown Banks can be left withdrawn. Placing the Level Trip switch to Bypass will prevent the OST from causing a Reactor trip.

ANSWER: D

K/A: 015A3.03

Importance: 3.9

Cognitive Level: Comprehension/Application

Ref: 2OST-2.3 Iss1 Rev 12, Page 10 step 6

LP#:2 LP-SQS-2.2

OBJ: 9

Explain the interrelationships between the Excore Nuclear Instrumentation System and the following systems/components. Include the effects a loss either one will have on the other. b. Rod Control

History: Modified from 1LOT 3B Question 17

Source: Exam Bank

JTA: 0150090201

Type: CLOSED BOOK

2LOT 2B NRC RO -As Given

53. Total steam flow out of all steam generators at current reactor power is 2 million pounds-mass per hour. Which of the following is the minimum required main feed/condensate pump combination required by 2OM-24.2.A "Main Feedwater Precautions and Limitations" for maintaining steam generator levels on program?

- A. One Main Feedwater Pump and One condensate Pump.
- B. One Main Feedwater Pump and Two Condensate Pumps.
- C. Two Main Feedwater Pumps and One Condensate Pump.
- D. Two Main Feedwater Pumps and Two Condensate Pumps.

ANSWER: B

K/A: 059 A1.03

Importance: 2.7

Cognitive Level: Application

References: 2OM-24.2.A, Issue 4, Rev. 4 Precautions 2, 10, 16 and 17

Lesson Plan #: 2LP-SQS-SC

Obj. #: 7

Objective: Given a set of conditions, be able to locate and apply the proper procedures(s) and applicable P&Ls for the following: OM-24.4.D and F.

History: NEW

Source:

Type: OPEN BOOK

JTA: 0590030101

Give 2OM-24.2.A

2LOT 2B NRC RO -As Given

54. The unit is operating at 25% power with all systems NSA for this power level. The operating Main Feedwater Pump trips.

Which of the following would be the first automatic action?

- A. All three auxiliary feedwater pumps start after 150 seconds on the AMSAC timer.
- B. Both Motor Driven Auxiliary Feedwater Pumps [2FWE*P23A, 23B] start on low S/G level.
- C. Turbine Driven Auxiliary Feedwater Pump [2FWE*P22] starts on low S/G levels.
- D. Both Motor Driven Auxiliary Feedwater Pumps [2FWE*P23A, 23B] start on trip of the Main Feedwater Pump.

ANSWER: D

K/A: 059 K3.02

Importance: 3.6

Cognitive Level: Knowledge

References: 2OM-24.1.D, Issue 4, Rev. 2

Lesson Plan #:: 2LP-SQS-24.1

Obj. #: 10

Objective: From memory list and explain all control and protective functions of the AFW system including logics, setpoints, permissives and blocks.

History: NEW

Source:

Type: CLOSED BOOK

JTA: 0610030101

2LOT 2B NRC RO -As Given

55. The unit is holding at HOT SHUTDOWN following a unit trip. Over the next hour, which of the following adjustments should the operator expect to make to maintain steam generator levels at no load values?
- A. Raise feedwater flow to match decay heat load steam flow.
 - B. Drop feedwater flow to match decay heat load steam flow.
 - C. Reset and restart one Main Feedwater pump to match steam flow.
 - D. Maintain 365 gpm minimum feedwater flow to each steam generator.

ANSWER: B

K/A: 061 K1.01

Importance: 4.1

Cognitive Level: Comprehension

References: 2OM-53B.5.GI-4, issue 1B, Rev. 1, page 4 and 5

Lesson Plan #:2LP-SQS-24.1

Obj. #:8

Objective: Be able to discuss component type, function, controls, capacities, cooling supplies, normal operating flows and pressures for all components in ELO-7. 7. b. 2FWS-22 and c. 2FWS-P23A and P23B.

History: NEW

Source:

Type: CLOSED BOOK

JTA: 0610040101

56. Both Motor Driven Auxiliary Feedwater Pumps [2FWE*P23A,23B] are in service and taking suction from the Primary Plant Demineralized Water Storage Tank [2FWE*TK210].

Which of the following Motor Driven Auxiliary Feedwater Pump indications would alert the operator to the loss of suction to the operating pumps?

| | Pump Amps | Discharge Pressure | Flow |
|----|-----------|--------------------|------|
| A. | LOW | HIGH | LOW |
| B. | HIGH | LOW | HIGH |
| C. | ZERO | Equal to Suction | ZERO |
| D. | LOW | LOW | LOW |

ANSWER: D

K/A: 061 A1.05

Importance: 3.6

Cognitive Level: Application

References: Generic Fundamentals. Pump Performance with loss of suction

Lesson Plan #: 2LP-SQS-24.1

Obj. #: 8

Objective: Be able to discuss component type, function, controls, capacities, cooling supplies, normal operating flows and pressures for all components in ELO-7 (ELO-7 b. 2FWS-P23A and P23B)

History: NEW

Source:

Type: CLOSED BOOK

JTA:0610050101

| | |
|--|--|
| <p>57. A change in setpoint for Process Effluent Radiation Monitor [2SGC-RQ1100] is needed to release a Steam Generator Blowdown Evaporator Test Tank [2SGC-TK23A(B). This setpoint change can only be implemented under which of the following conditions?</p> <p>A. In "Normal Mode" at the Health Physics RM-23A console.</p> <p>B. In "Primary Mode" at the Control Room RM-23A console.</p> <p>C. At 2SGC-DAU100 (RM-80) on the monitor skid.</p> <p>D. In "Supervisor Mode" at the RM-11 Control Room console.</p> | |
| <p>ANSWER: D</p> | |
| <p>K/A: 068 2.3.11K/A CHANGE</p> | <p>Importance: 2.7</p> |
| <p>Cognitive Level: Knowledge</p> | |
| <p>References: 2OM-43.1.C, Issue 4, Rev. 3, page 2</p> | |
| <p>Lesson Plan #: 2LP-SQS-43.1</p> | <p>Obj. #: 7</p> |
| <p>Objective: Explain the function and purpose of the following components: e RM-23A.</p> | |
| <p>History: NEW</p> | |
| <p>Source:</p> | <p>Type: CLOSED BOOK</p> |
| <p>JTA: 0720030101</p> | <p>NOTE the rules require that all setpoint changes occur in the control room. Changes are not done at HP console.</p> |

2LOT 2B NRC RO -As Given

| | |
|---|------------------|
| 58. Annunciator A1-5A " GASEOUS WASTE SYSTEM TROUBLE" is in alarm. Computer points Y6557D and Y6558D " GWS OXY ANALYZER GWS-OA100A (B) WARN" are in alarm. Failure to respond to this alarm could result in which of the following? | |
| A. Increased corrosion to the inner surface of Waste Gas Tanks. | |
| B. Loss of water seal to the operating Waste Gas Compressors. | |
| C. Buildup to flammable concentrations of gasses in the Waste Gas Surge Tanks. | |
| D. Corrosion damage to the Waste Gas System Charcoal Delay Beds. | |
| ANSWER: C | |
| K/A: 071.A4.29 | Importance: 3.0 |
| Cognitive Level: Knowledge | |
| References: 2OM-19.1.B, Issue 4, Rev 5, Page 2, 2OM-19.2, Issue 4, Rev. 1, Precaution 9 | |
| Lesson Plan #:2LP-SQS-19.1 | Obj. #: 3 |
| Objective: State the purpose of the components listed in Objective 2 above. (2.i Oxygen Analyzers) | |
| History: NEW | |
| Source: | Type CLOSED BOOK |
| JTA: 0710070101 | |

2LOT 2B NRC RO -As Given

| | |
|--|-------------------|
| 59. If Control Room Area Radiation Monitors [2RMC*RQ201, 202] go into ALERT what impact can be expected on Control Building Ventilation? | |
| A. Control Building Ventilation remains in the current configuration. | |
| B. CREBAPS is actuated. | |
| C. Control Building Normal Exhaust and Supply Fans trip. | |
| D. One Emergency Supply Fan starts. | |
| ANSWER: A | |
| K/A: 072 K2.04 | Importance: 3.3 |
| Cognitive Level: Comprehension | |
| References: 2OM-43.1.B, Issue 4, Rev. 1, page 4 | |
| Lesson Plan #: 2LP-SQS-43.1 | Obj. #: 3 |
| Objective: State the automatic functions associated with the detectors listed in Objective 2 and 3 2a. 2RMC*RQ201 b. 2RMC*RQ202 | |
| History: NEW | |
| Source: | Type: CLOSED BOOK |
| JTA: 0720030101 | |

2LOT 2B NRC RO -As Given

60. The Unit is heating up with the following parameter noted:

- 1000 Tavg = 362 degrees
- 1030 Tavg = 383 degrees
- 1100 Tavg = 413 degrees
- 1130 Tavg = 440 degrees
- 1200 Tavg = 459 degrees.

Under this condition, which of the following is true concerning heatup limits?

- A. No administrative or Technical Specifications limit has been exceeded.
- B. The Administrative limit was exceeded but the Tech Spec limit was not.
- C. Both the Administrative and the Tech Spec limits were exceeded.
- D. Not enough data has been gathered to determine if any limits were exceeded.

ANSWER: B

K/A: 002 A1.02

Importance: 3.7

Cognitive Level: Comprehension

References: 2OM-50.2A, P&L 6, page 1, Issue 4, Rev. 3

Lesson Plan #: 2LP-SQS-6.6

Obj. #: 6

Objective: From memory state the T.S. maximum allowable heat up rate for the RCS and PRZR.

History: 1LOT3B NRC Exam

Source: NRC Exam Bank

Type: CLOSED BOOK

JTA: 002AAA0101

61. A natural circulation cooldown is in progress in accordance with ES-0.2 "Natural Circulation Cooldown." The following information is available to the operator from PSMS.

- Core Exit Thermocouples (PSMS)
 - Trisector 1 = 495
 - Trisector 2 = 490
 - Trisector 3 = 488
- RCS Wide Range Pressure Indicator [2RCS*PT440] = 1135 psig
- RCS Wide Range Pressure Indicator [2RCS*PT441] = 1185 psig.
- RCS Wide Range Pressure Indicator [2RCS*PT442] = 1235 psig

Using the listed information, which of the following would be the expected indication that should appear on the Subcooling Monitor [2RCS*YI001] on VB-B subcooling?

- A. 84 degrees
- B. 77 degrees
- C. 72 degrees
- D. 66 degrees

ANSWER: C

K/A: 006 A1.16

Importance: 4.1

Cognitive Level: Application

References: Steam Tables 2OM-53.3B ES-0.2, Foldout page.

Lesson Plan #: 2LP-SQS-6.7

Obj. #: 7

Objective: Given a set of conditions, be able to use the PSMS to determine Reactor Vessel Water Level and RCS Subcooling.

History: NEW

Source:

Type: OPEN REFERENCE

JTA: 3010060601

Give steam tables

2LOT 2B NRC RO -As Given

| | |
|---|-------------------|
| <p>62. The unit is in mode 3 with the RCS at no load operating temperature and pressure. Which of the following configurations would provide the operator with the <u>most effective</u> pressurizer spray?</p> <p>A. Reactor Coolant Pump 2A [2RCS*P21A] ON and Pressurizer Spray Valves [2RCS*PCV455A] OPEN, [2RCS*PCV455B] CLOSED.</p> <p>B. Reactor Coolant Pump 2C [2RCS*P21C] ON and Pressurizer Spray Valves [2RCS*PCV455B] OPEN, [2RCS*PCV455A] CLOSED.</p> <p>C. Reactor Coolant Pump 2A [2RCS*P21A] ON and Pressurizer Spray Valves [2RCS*PCV455B] OPEN, [2RCS*PCV455A] CLOSED.</p> <p>D. Reactor Coolant Pump 2B [2RCS*P21B] ON and Pressurizer Spray Valves [2RCS*PCV455A] OPEN, [2RCS*PCV455B] CLOSED.</p> | |
| ANSWER: B | |
| K/A: 010 K1.03 | Importance: 3.6 |
| Cognitive Level: Comprehension | |
| References: 2OM-6.1.C, Issue 4, Rev. 0, Page 28 | |
| Lesson Plan #: 2LP-SQS-6.4 | Obj. #: 8 |
| Objective: Discuss the effect on pressurizer spray when running various combinations of RCP's | |
| History: NEW | |
| Source: | Type: CLOSED BOOK |
| JTA: 0020090101 | |

2LOT 2B NRC RO -As Given

63. Pressurizer Control Level Switch is selected to position I & III. Which of the following instruments will turn off all of the operating heater groups on low level?

- A. 2RCS*LT459 OR 2RCS*LT461.
- B. 2RCS* LT460 OR 2RCS*LT462.
- C. 2RCS*LT459 OR 2RCS*LT460.
- D. 2RCS*LT461 OR 2RCS*LT462.

ANSWER: A

K/A: 011 K4.01

Importance: 3.3

Cognitive Level: Knowledge

References: 2OM-6.4.IF, Issue 4, Revision 5, Page 13

Lesson Plan #: 2LP-SQS-6.4

Obj. #: 13

Objective: From memory discuss the operation of the pressurizer level control system. Include as a minimum the following: b. All automatic functions of the level control system including setpoints inputs and outputs.

History: NEW

Source:

Type: CLOSED BOOK

JTA: 0020090101

2LOT 2B NRC RO -As Given

64. The unit is at 100% with all systems NSA. The following readings are observed:

- Pressurizer Pressure is 2235 psig
- Delta I is + 4 percent
- Loop Delta Temperatures are 60 degrees.
- Tavg is 576 degrees.

Which of the following will cause the setpoint for OTΔT to LOWER?

- A. Delta I drops to -2 percent
- B. Pressurizer pressure rises to 2260 psig
- C. Tavg rises to 578 degrees.
- D. Loop Delta Temperatures drop to 58 degrees.

ANSWER: C

K/A: 012 K6.11

Importance: 2.9

Cognitive Level: Comprehension

References: T.S. 2.2.1 Note 3

Lesson Plan #: 2LP-SQS-1.1

Obj. #: 6

Objective: Explain how a change in each of the input parameters to the OPDT and OTDT setpoint calculation will affect the Reactor Trip Setpoint.

History: 1LOT 3B NRC Exam

Source: NRC Exam Bank

Type: CLOSED BOOK

JTA: 0120050101

65. The annunciator A4-8G " ROD POSITION DEVIATION ALARM" informs the operator of which of the following deviations in the Rod Position Indication System?

- A. At least one DRPI signal deviates 12 steps from the Group Demand for that group.
- B. At least one Group Demand signal deviates 12 steps from the Bank Demand signal.
- C. There is a one bit difference between Data Cabinet A and Data Cabinet B.
- D. Group demand signal is within 10 step of the calculated Rod Insertion Limit.

ANSWER: A

K/A: 014 A1.02

Importance: 3.2

Cognitive Level: Knowledge

References: 2OM-1.1.B, Issue 4, Rev. 1 page 20, 2OM-1.4.ACF, Issue 4, Rev. 1

Lesson Plan #:2LP-SQS-1.1

Obj. #: 8

Objective: From memory, state the possible cause(s) and explain the effect(s) on system operation of the following alarm conditions: c. Rod Deviation Alarm

History: NEW

Source:

Type: CLOSED BOOK

JTA: 0140030101

2LOT 2B NRC RO -As Given

| | |
|--|-------------------|
| <p>66. The unit is at 100% power with all systems NSA. Main Condenser Vacuum [2CNM-CND21A] Section A Condenser Vacuum Transmitter [2CNM-PT103A] is damaged and reads 0" vacuum. Section B Condenser Vacuum Transmitter [2CNM-PT103B] is intact and reading 29 inches vacuum. The unit suffers a 50% load rejection. Which of the following steam release pathways would open first?</p> <p>A. 1st and 2nd Bank Steam Bypass Valves.</p> <p>B. 3rd and 4th Bank Steam Bypass Valves.</p> <p>C. Residual Heat Release Valve [2SVS*HCV104].</p> <p>D. Atmospheric Steam Dumps [2SVS*PCV101A, 101B, 101C].</p> | |
| ANSWER: D | |
| K/A: 016 K1.03 | Importance: 3.2 |
| Cognitive Level: Comprehension | |
| References: 2OM-22A.5, Issue 4, Rev. 0, Figure 22A-1, 2OM-21.5, Issue 4, Rev. 2, Figure 21-9B (12241-LSK-11-14B) | |
| Lesson Plan #: 2LP-SQS-21.1 | Obj. #: 3 |
| Objective: Explain the control and protective functions of the system including permissives setpoints, blocks, logics and control stations for the various system components, including the steam dump system. | |
| History: NEW | |
| Source: | Type: CLOSED BOOK |
| JTA: 0410030101 | |

2LOT 2B NRC RO -As Given

| | |
|---|--|
| <p>67. Which of the following describes the impact from a failure of Quench Spray Pumps [2QSS*P21A,21B] to start as required by a CIB signal during a Design Basis LOCA?</p> <p>A. Immediate implementation of ECA-1.1 "Loss of Emergency Coolant Recirculation" will be required.</p> <p>B. Recirculation Mode Initiation Signal is delayed by the slower RWST depletion rate.</p> <p>C. Containment pressure would exceed the shutoff head of Recirculation Spray Pumps A and B [2RSS*P21A, 21B].</p> <p>D. Start up of Recirculation Spray Pumps C and D [2RSS*P21C, 21D] is delayed by slower RWST depletion.</p> | |
| ANSWER: B | |
| K/A: 026 K3.02 | Importance: 4.2 |
| Cognitive Level: Comprehension | |
| References: 2OM-13.1.D, Issue 4, Rev. 0 | |
| Lesson Plan #:: 2LP-SQS-13.1 | Obj. #: 4 |
| Objective: Explain the function and purpose of the components listed in Objective 2 Refueling Water Storage Tank [2QSS-TK21] and Quench Spray Pumps [2QSS*P21A, 21B]. | |
| History: NEW | |
| Source: | Type: CLOSED BOOK |
| JTA:0060150101 | <p>By inspection. QSS flow is approx. 6000 gpm loss of QSS start will slow rate of depletion of RWST.</p> <p>DBA so sump level will be present.</p> <p>RSS pump capability is above design basis pressure.</p> <p>CIB starts all RSS pumps after time delay.</p> |

2LOT 2B NRC RO -As Given

68. Prior to heating the RCS above 350°F, which of the following must be completed to comply with Technical Specifications concerning Containment Vacuum?

- A. Containment Vacuum Air Ejector [2CVS-J22] must be manually isolated.
- B. Containment Vacuum Pumps [2CVS-P21A,P21B] must be OPERABLE.
- C. A Containment Vacuum Pump [2CVS-P21A or P21B] must be in operation.
- D. A Containment Air Compressor [2IAC-C21A or C21B] must be aligned to take suction on Containment.

ANSWER: A

K/A: 029 K. 4.02

Importance: 2.9

Cognitive Level: Knowledge

References: Technical Specification 3.6.5.1. 1 HOUR Tech Spec.

Lesson Plan #: 2LP-SQS-12.1

Obj. #: 10

Objective: Given a set of conditions, recognize when an LCO has been exceeded --.

History: NEW

Source:

Type: CLOSED BOOK

JTA: 0260060101

2LOT 2B NRC RO -As Given

69. New fuel with an enrichment of 4.2% is being placed in the spent fuel pool. Which of the following actions is correct?
- A. Storage is allowed in Region 2 of the Spent Fuel Pool with no restrictions.
 - B. Storage is allowed in Region 1 of the Spent Fuel Pool with no restrictions.
 - C. Fuel with this enrichment must be stored in a 3 out of 4 Checkerboard pattern in Region 1.
 - D. Fuel with this enrichment may be stored in a 3 out of 4 Checkerboard pattern in Region 2.

ANSWER: C

K/A: 033 G 2.2.30

Importance: 2.6

Cognitive Level: Comprehension

References: BVPS Technical Specifications 3/4.9.14

Lesson Plan #: 2LP-SQS-20.1

Obj. #: 10

Objective: Given a set of conditions, recognize when a LCO has been exceeded. Identify any required actions and explain the bases for the following Tech. Specs. c. Technical Specification 3.9.14 Fuel Storage - Spent Fuel Storage Pool.

History: NEW

Source:

Type: OPEN BOOK

JTA: 033--A0101

Tech Spec Reference for Student

2LOT 2B NRC RO -As Given

| | |
|---|--|
| <p>70. The unit is stable at 8% power with the Main Turbine off-line. The Main Feedwater Regulating Bypass Valves are in automatic and controlling at program level. Inadvertently, loop 21A Main Steam Atmospheric Vent Valve [2SVS*PCV101A] fails full open. Which of the following would be the result of the valve opening?</p> <p>A. Intermediate Range High Reactor Power Trip is generated.</p> <p>B. Reactor Trip due to Steam Generator 21A Low-Low level.</p> <p>C. Steam Generator 21A level swells on increased steam demand.</p> <p>D. Steam Generator 21 A level swells to new program level.</p> | |
| <p>ANSWER: C</p> | |
| <p>K/A: 035 K6.02</p> | <p>Importance: 3.1</p> |
| <p>Cognitive Level: Comprehension</p> | |
| <p>References: Generic Fundamentals, 2OM-21.1.D, Issue 4, Rev. 2, page 1</p> | |
| <p>Lesson Plan #: 2LP-SQS-24.1</p> | <p>Obj. #: 8</p> |
| <p>Objective: Be able to discuss component type, function, controls, capacities, cooling supplies, normal operating flows, and pressures for all components in ELO-7 (ELO-7.g. S/G</p> | |
| <p>History: NEW</p> | |
| <p>Source:</p> | <p>Type: CLOSED BOOK</p> |
| <p>JTA: 0350060101</p> | <p>Relief valve is below 10% load. Well within feedflow and below 25%.</p> |

2LOT 2B NRC RO -As Given

| | |
|---|-------------------|
| <p>71. The unit is in Mode 3 after shutdown from extended full power operations. Stm Dump Control Mode Selector is in STM PRESSURE mode. The operator adjusts the setpoint on the Main Stm Manifold Press Control [2MSS*PK464] from 8.8 turns to 8.5 turns. When steam pressure and RCS temperatures return to steady state, the operator should observe _____Tavg and _____ Loop Delta T.</p> <p>A. Lower and lower. B. Lower and identical. C. Higher and higher. D. Higher and lower.</p> | |
| ANSWER: B | |
| K/A: 039 A1.05 | Importance: 3.2 |
| Cognitive Level: Comprehension | |
| References: See heat exchanger behavior GF. 2OM-21.1.C | |
| Lesson Plan #: 2LP-SQS-21 | Obj. #: 3. |
| Objective: Explain the control protective functions of the system including permissives, setpoints, blocks, logics and control stations for the various system components including the steam dump system. | |
| History: NEW | |
| Source: | Type: CLOSED BOOK |
| JTA: 0410050101 | |

2LOT 2B NRC RO -As Given

72. With the unit at 100% power and a 400 gpd tube leak, a HIGH alarm is received on Condenser Air Ejector Discharge Radiation Monitor [2ARC-RQ100]. Based on this alarm which of the following actions occur?
- A. Discharge continues to the Air Ejector Discharge Delay Beds.
 - B. Discharge is routed to the Gaseous Waste Charcoal Delay Beds.
 - C. Air ejector flow is diverted to Containment.
 - D. Air ejector flow is diverted to the Gaseous Waste Surge Tank.

ANSWER: A

K/A: 055 K1.06

Importance: 2.6

Cognitive Level: Knowledge

References: 2OM-43.1, Issue 4, Rev. 3, page 6, 2OM-43.4.ACN, Issue 4, Rev. 0

Lesson Plan #: 2LP-SQS-26.2

Obj. #: 4

Objective: Describe all control functions, protective functions and interlocks. State the inputs, setpoints, blocks, permissives, control stations, logics, outputs and power for the system components.

History: Based on 1LOT3B question number 36

Source:

Type: CLOSED BOOK

JTA: 0550040101

2LOT 2B NRC RO -As Given

| | |
|--|-----------------------|
| 73. The unit is in Mode 4 and heating up. All reactor coolant pumps are running. The 4KV Normal Electrical System is in NSA for Mode 4. Which of the following is the source of power to Reactor Coolant Pump 21A [2RCS*P21A]? | |
| A. 138 kV Bus # 2 via System Station Service Transformer 2A. | |
| B. 138 kV Bus # 1 via System Station Service Transformer 2B. | |
| C. 345 kV Bus 3 via Unit Station Service Transformer 2C. | |
| D. Unit 1 4KV Bus 2A via Unit 1 to 2A Cross-Tie [ACB-2A2]. | |
| ANSWER: A | |
| K/A:: 062 K2.01 | Importance: 3.3 |
| Cognitive Level: Comprehension | |
| References: 2OM-36.1.B, Issue 4, Rev. 0, Page 1 | |
| Lesson Plan #: 2LP-SQS-36.1 | Obj. #: 4 |
| Objective: Explain the system arrangement when the plant is below 20% power and when the plant is above 20% power. | |
| History: NEW | |
| Source: | Type: OPEN BOOK |
| JTA: 0620040101 | 2OM-36.5 Figure 36-19 |

2LOT 2B NRC RO -As Given

74. Annunciator A8-10A "125 VDC BUS 2-1 GROUND" is lit. NO. 2-1 DC Bus Ground Detector indicates a (-75) VDC ground. Under these conditions, which of the following is a concern?
- A. The 2-1 Battery may be inoperable due to low voltage.
 - B. The 2-1 Battery Charger Output Breaker may trip on overcurrent.
 - C. A 125 VDC Bus 2-1 load could actuate inadvertently if a positive ground occurs.
 - D. 125 VDC Bus 2-1 Distribution Switchboard may trip on voltage differential.

ANSWER: C

K/A: 063 A2.01

Importance: 2.5

Cognitive Level: Comprehension

References: 2OM--39.1.C, Issue 4, Rev. 0, 2OM-39.4.F, Issue 4, Rev. 1 Section II.

Lesson Plan #: 2LP-SQS-39.1

Obj. #: 7. b

Objective: Explain the effect the following malfunctions will have on loss of system.

History: NEW

Source:

Type CLOSED BOOK

JTA: 063AAA0101

| | |
|---|--------------------------|
| <p>75. Unit 2 is at 100% power with all systems NSA. 2OST-36.1 "Emergency Diesel Generator [2EGS*EG2-1] Monthly Test" is in progress with the diesel paralleled to 2AE and at 4450 kW for the last 30 minutes. Without warning the unit trips and a Safety Injection signal is actuated. A "Fast Transfer" from USST to SSST occurs with no problems. What is the status of Emergency Diesel Generator [2EGS*EG2-1] at the completion of the transfer?</p> <p>A. Paralleled with Emergency Bus 2AE with Emergency Diesel Generator Breaker [ACB2E10] closed.</p> <p>B. At rated speed and voltage with Emergency Diesel Generator Breaker [ACB2E10] open.</p> <p>C. In "Cooldown" cycle with Emergency Diesel Generator Breaker [ACB2E10] open.</p> <p>D. Tripped with Emergency Diesel Generator Breaker [ACB2E10] locked out.</p> | |
| <p>ANSWER: B</p> | |
| <p>K/A: 064 A2.16</p> | <p>Importance: 3.3</p> |
| <p>Cognitive Level: Comprehension</p> | |
| <p>References: 2OST-36.1, Issue 4, Rev. 24 page 7, 2OM-36.1.D, Issue 4, Rev. 3, page 31</p> | |
| <p>Lesson Plan #: 2LP-SQS-36.2</p> | <p>Obj. #: 5</p> |
| <p>Objective: List and explain all emergency starts and test start for the diesel and explain generator output breaker action and interlocks.</p> | |
| <p>History: NEW</p> | |
| <p>Source:</p> | <p>Type: CLOSED BOOK</p> |
| <p>JTA: 0640040101</p> | |

2LOT 2B NRC RO -As Given

76. The Unit is in MODE 5. Containment Purge to the Auxiliary Building Ventilation Vent is in progress when Containment Purge Monitor [2HVR*RQ104A, 104B] HIGH Alarm is activated. Which of the following fans does the closing of the Containment Isolation Valve [2HVR-MOD23A] trip?

- A. Containment Air Recirculation Fan [2HVR-FN201B].
- B. Containment Iodine Filtration Fan [2HVR-FN203B].
- C. Leak Collection Filter Exhaust Fan [2HVS-FN204B].
- D. Leak Collection Normal Exhaust Fan [2HVS-FN263B].

ANSWER: D

K/A: 073 K4.01

Importance: 4.0

Cognitive Level: Comprehension

References: 2OM-43.1.C, Issue 4, Rev. 3, page 43, 2OM-16.5 Figure 16-7

Lesson Plan #: 2LP-SQS-43.1

Obj. #: 7

Objective: Explain the effects a loss of the area/process monitors will have on the following evolutions: c Containment Purge.

History: NEW

Source:

Type: CLOSED BOOK

JTA: 072BBB0221

2LOT 2B NRC RO -As Given

77. The Unit is at 100% power. The operator is preparing to start Service Water pump [2SWS-P21A]. Which of the following conditions will prevent a pump start from the control board?

- A. Service Water Pump [2SWS-P21C] in AFTER START.
- B. Standby Service Water Pump [2SWE-P21A] in AFTER START.
- C. Secondary Component Cooling Water Heat Exchanger Service Water Supply Isolation Valve [2SWS*MOV107A] OPEN.
- D. Service Water Pump Discharge Valve [2SWS*MOV102A] OPEN.

ANSWER: D

K/A: 076 A4.02

Importance:2.9

Cognitive Level: Knowledge

References: 2OM-30.1.D, Issue 4, Rev. 4, pages 4,5 and 14

Lesson Plan #: 2LP-SQS-30.1

Obj. #: 5.b

Objective: Describe all control functions protective functions and interlocks associated with the system and its component including inputs, setpoints, blocks, permissive, control stations, logics and outputs.

History: NEW

Source:

Type: CLOSED BOOK

JTA: 076CCC0121

2LOT 2B NRC RO -As Given

78. Containment Instrument Air Compressors [2IAC-C21A, 21B] are out of service. Station Air Compressor [2SAS-C21A] is supplying containment instrument air with Containment Instrument Air Isolation Valve [2IAC-MOV130] and Containment Instrument Air Backup Supply Valve open [2IAC*MOV131]. A CIA signal was actuated. Which of the following configurations is expected?

- A. 2IAC*MOV130 open, 2IAC-MOV131 open.
- B. 2IAC*MOV130 closed 2IAC-MOV131 open.
- C. 2IAC*MOV130 closed, 2IAC-MOV131 closed.
- D. 2IAC*MOV130 open, 2IAC-MOV131 closed.

ANSWER: B

K/A: 079 K4.01

Importance: 2.9

Cognitive Level: Knowledge

References: 2OM-34.1.D, Issue 4, Rev. 1, page 6

Lesson Plan #: 2LP-SQS-34.1

Obj. #: 5.a

Objective: Describe all control functions, protective functions and interlocks associated with the system and its components including inputs, setpoints, blocks, permissives, control stations, logics and outputs. a. crossover to other air systems, 2IAC-MOV131

History: NEW

Source:

Type: OPEN BOOK

JTA: 078AAA0101

Figure 34-3

2LOT 2B NRC RO -As Given

79 Unit 2 is at 100% with all systems NSA. With no actuations in progress, which of the following operations pressurizes the Unit 2 Fire Main to 125 psig?

- A. Intermittent operation of Motor Driven Fire Pump on low-pressure setpoint.
- B. Continuous operation of Pressure Maintenance Pump [FP-P-3] on the Hydropneumatic Tank.
- C. Continuous Injection from Service Water System Train A (B) via Secondary Component Cooling Water Heat Exchange Service Water Supply Valve [2SWS*MOV107A(B)]
- D. Intermittent operation of Service Water Booster Pump 2FPW-36.

ANSWER: B

K/A: 086 K4.02

Importance: 3.0

Cognitive Level: Knowledge

Ref.: 2OM-33.1.B , Issue 4, Rev. 2, Page 3

LP#: 2LP-SQS-33.1

OBJ: 4

Objective: Be able to explain the normal system arrangement for the components listed in Objective 2. Unit 2 Yard Loop

History: NEW

Type: CLOSED BOOK

Source:

JTA: 0860070101

2LOT 2B NRC RO -As Given

80. Unit 2 has been shutdown for 5 days. The following conditions exist:

Reactor coolant temperature is 125 degrees °F

Pressurizer level is 40%

RCS pressure is 95 psig using nitrogen in the PRZR

The operating RHS pump has become gas bound and is shutdown by the crew. How long would the crew have to vent the pump before reaching saturation in the RCS?

A. 270 minutes

B. 175 minutes

C. 166 minutes

D. 125 minutes

ANSWER: B

| | |
|----------------|------------------|
| K/A: 005 K3.01 | Importance: 3.9/ |
|----------------|------------------|

| | |
|---------------------------|-----------|
| Cognitive Level: Analysis | OPEN BOOK |
|---------------------------|-----------|

Ref.: 2OM53.C.4.2.10.1 "Residual Heat Removal Loss", Issue 1A, Rev. 4, Attachments 1,2,3 and 4

| | |
|-------------------|---------|
| LP#: 2LP-SQS-10.1 | OBJ: 10 |
|-------------------|---------|

History Used in 2LOT 2A

| | |
|--------------------------|-----------|
| Source: 2LOT 2A SRO Exam | OPEN BOOK |
|--------------------------|-----------|

| | |
|-----------------|---|
| JTA: 0000180401 | Assumptions: Saturation for 110 psia is 335 degrees Current RCS Temp is 125 degree Heat rate at 120 hours after shutdown is 1.2°F/hr Student gets Attachments and steam tables |
|-----------------|---|

2LOT 2B NRC RO -As Given

81. The plant is in Mode 4 on RHR with a cooldown to Mode 5 in progress. The "A" Train of RHR is in service. During the construction of scaffolding on the RHR platform, the instrument air line to [2RHS*HCV758A] is broken, resulting in the loss of air to the valve. Which of the following describes the impact on RHR Heat Exchanger Outlet Flow Control Valve 2RHS*HCV758A and RHS system flow?

- A. The valve fails open. [2RHS*FCV605A] automatically closes to control flow.
- B. The valve fails open. The RHR pump will run out at maximum system flow.
- C. The valve fails closed. [2RHS*FCV605A] automatically opens to maintain flow.
- D. The valve fails closed. [2RHS*FCV605A] must be manually opened to maintain flow.

ANSWER: A

K/A: 005A2.04

Importance: 2.9/2.9

Cognitive Level: Comprehension

Ref.: 2OM10.5"Residual Heat Removal Systems Figures and Tables" Figure10.1

LP#: 2LP-SQS-10.1

OBJ: 8

History: From memory describe the operation of 2RHS*FCV605A/B 2RHS*HCV758A/B

Source: New

JTA: 0050080101

Type: CLOSED BOOK

2LOT 2B NRC RO -As Given

82. Which of the following describes the function of the sparger installed in the Pressurizer Relief Tank [2RCS*TK22]?

- A. Allows drainage of the Pressurizer Relief Tank via Primary Drains Transfer Pumps [2DGS*P21A, 21B].
- B. Reduces pressure by spray from Pressurizer Relief Tank Spray Valve [2RCS-MOV516].
- C. Directs steam discharge from Pressurizer PORV's [2RCS*455C,D, 2RCS*456] to bottom of tank.
- D. Mixes nitrogen cover gas into tank volume via Nitrogen Supply Valve [2RCS*AOV101].

ANSWER: C

K/A: 007 K4.01 K/A CHANGE

Importance: 2.6

Cognitive Level: Knowledge

References: 2OM-6.1.C, Issue 4, Rev. 0, page 33

Lesson Plan #: 2LP-SQS-6.4

Obj. #: 7

Objective: Explain the operation of the PRT. Include as a minimum, its function, control room indications, capacity, and all controls available on the control board.

History: NEW

Source:

Type: CLOSED BOOK

JTA: 0070030101

2LOT 2B NRC RO -As Given

83. The Containment Iodine Filtration Charcoal adsorbers [2HVR-FLTA211A(B)] are designed for iodine removal from containment during which of the following scenarios?
- A. Normal subatmospheric and shutdown plant operations for normal containment access.
 - B. Post Design Basis LOCA atmospheric clean up of containment prior to any release to the Uncontrolled Area.
 - C. Scrubbing of Containment Purge Exhaust during Containment RWDA-G releases.
 - D. Filtering exhaust during the initial lift of the vessel head prior to refueling canal flooding.

ANSWER: A

K/A: 027 K5.01

Importance: 3.1

Cognitive Level: Knowledge

References: 2OM-44C.1.B

Lesson Plan #: 2LP-SQS-44C.1

Obj. #: 1

Objective: Write the function of the Containment Ventilation System.

History: NEW

Source:

Type: CLOSED BOOK

JTA: 0270010101

2LOT 2B NRC RO -As Given

84. Step 29 of E-1 " Loss of Reactor or Secondary Coolant" checks H2 concentration in preparation for startup of the Hydrogen Recombiners. If H2 concentration is 4.5%, why must the TSC be consulted prior to startup of the Hydrogen Recombiners?
- A. The hydrogen recombiner could ignite a hydrogen burn.
 - B. Hydrogen concentration is above the design capacity of the hydrogen recombiner.
 - C. Core damage is indicated and dose rates will be higher than projected while aligning containment penetrations.
 - D. Containment depressurization to subatmospheric conditions must be completed prior to recombiner startup.

ANSWER: A

K/A: 028 A2.02

Importance: 3.5

Cognitive Level: Knowledge

References: 2OM-53B.4.E-1 Background, Issue 1B, Rev. 6, step 29

Lesson Plan #: 2LP-SQS-53.3

Obj. #: 3

Objective: State from memory the basis and sequence for the major action steps of each EOP procedure, IAW the BVPS-EOP Executive Volume

History: NEW

Source:

Type: CLOSED BOOK

JTA: 3010020601

2LOT 2B NRC RO -As Given

85. Unit 2 is at 100% with all systems NSA with control rods in MANUAL. Without warning, a large load rejection occurs and A4-8A " ROD CONTROL SYSTEM URGENT ALARM" annunciates. Which of the following actions occur due to this alarm?
- A. Rods step in at the fixed speed rate of 48 steps per minute.
 - B. Control Rod Bank Selector Switch must be placed in AUTO to restore Tavg - Tref mismatch.
 - C. Operator must insert rods in MANUAL to restore Tavg-Tref.
 - D. Steam Dumps are forced to control a higher Tave-Tref mismatch.

ANSWER:D

K/A: 041 K6.03

Importance: 2.7

Cognitive Level: Comprehension

References: 2OM-1.1.C, Issue 4, Rev. 0

Lesson Plan #: 2LP-SQS-21.1

Obj. #: 5.c

Objective: Explain the effects of the following malfunction on the steam dump operations: c.

Tavg - Hi & Low

History: NEW

Source:

Type: CLOSED BOOK

JTA: 0410030101

2LOT 2B NRC RO -As Given

86. The Unit is at 100 % with all systems NSA. The unit experiences an Overtemperature Delta T runback. At 70% turbine load, the runback signal clears. Which one of the following indicates the expected response of the main turbine?

- A. Main Turbine Governor valves will hold at the runback position.
- B. Main Turbine Throttle valves shift to Operator Manual.
- C. Turbine Load Control drops output to zero load at the selected loading rate.
- D. Main Turbine Throttle Valves shift to full arc admission.

ANSWER: A

K/A: 045 K4.12

Importance: 3.3

Cognitive Level: Knowledge

References: 2OM-26.1.D, Issue 4, Rev. 2, page 31 and 32

Lesson Plan #: 2LP-SQS-26.3

Obj. #: 4

Objective: Describe all control functions, protective functions and interlocks. State the inputs, setpoints, blocks, permissives, control stations, logics outputs and power supplies for the system components.

History: NEW

Source:

Type: CLOSED BOOK

JTA: 0450070101

2LOT 2B NRC RO -As Given

| | |
|---|--|
| 87. The unit is at 100% power with all systems NSA. Service Water is 75°F. Average Containment Dewpoint Temperature is 90°F. Average Containment Air Pressure is 9.9 psia. Is this pressure in compliance with the L-5 log? | |
| A. Yes, containment pressure is greater than 10.6 psia | |
| B. No, containment pressure is lower than 10.25 psia. | |
| C. Yes, containment pressure is lower than 9.65 psia | |
| D. No containment pressure is lower than 9.0 psia. | |
| ANSWER: C | |
| K/A: 103 A1.01 | Importance: 3.7 |
| Cognitive Level: Application | |
| References 2OM-12.5 Figure 12-1, Technical Specification 3.6.1.4 2OM-53.4 - L-5, page 25. | |
| Lesson Plan #: 2LP-SQS-12.1 | Obj. #: 9.d |
| Objective: Given a set of conditions, be able to locate and apply the proper procedure and applicable P& Ls for the following: d. Determination of the Maximum Allowable Operation Air Pressure. | |
| History: NEW | |
| Source: | Type: OPEN BOOK |
| JTA: 103DDD0101 | Steam Tables, Log L-5, page 25 Curve CB-19 |

88. Unit 2 is in Mode 1 with all systems NSA. You are assigned as the on-duty Reactor Operator "at the controls." Which of the following actions is authorized?

- A. Pick up a procedure from the Unit 1 NCO at the Unit 1/Unit 2 Control Room separation doors.
- B. Obtain a key from the key locker inside the Unit 2 Nuclear Shift Supervisor's Office.
- C. Acknowledge an alarm at the Unit 2 Digital Radiation Monitor Console (RM-11A).
- D. Open a Rod Lift Coil Disconnect Switch inside the Unit 2 Vertical Board [VB-B].

ANSWER: C

K/A: 2.1.1

Importance: 3.7

Cognitive Level: Comprehension

References: 1/2OM-48.1.A, Issue 3, Rev. 15, page 5 and 8

Lesson Plan #: 1/2LP-SQS-48.1

Obj. #: 4

Objective: From memory, explain the Control Room Area Rules

History: NEW

Source:

Type: CLOSED BOOK

JTA:119CCC0301

A. Transfer of Waste Gas Release??

B. Pick up keys or documents???

C. Operate lift coil disconnect switches??

2LOT 2B NRC RO -As Given

89. The unit has operated at 100% power for 100 days and all systems are NSA. The power range Nuclear Instruments read as follows

- N-41 - 99%
- N-42 - 99.7%
- N-43 - 99.6%*
- N-44 - 98.8%

At the completion of 2OM-54.4.C1 " Daily Heat Balance", calculated Net Reactor Power is 2644 MWT. Which of the power range nuclear instrument gains must be adjusted?

- A. N-41 and N-44
- B. N-42 and N-43
- C. N-41, N-43 and N-44
- D. N-41, N-42, N-43 and N-44

ANSWER: C

K/A: 2.1.7

Importance: 3.7

Cognitive Level: Application

References: 2OM-54.4.C1, Issue 4, Revision 0, page 2

Lesson Plan #:2LP-SQS-RI

Obj. #: 5

Objective: Demonstrate a familiarity with the use and location of all controls and indications associated with this block of systems.

History: NEW

Source:

Type: OPEN BOOK

JTA: 0150050201

Give procedure to candidates.

2LOT 2B NRC RO -As Given

90. The unit is at 1% power with all systems NSA for the current power level. The 21A Steam Generator is overfed and Tav_g drops from 548°F to 543°F. The operator has stabilized the temperatures and feed flow with the steam generator level above program. Which of the following actions is an authorized response to restore Tav_g in this situation?
- A. Lower feedwater flow to restore level.
 - B. Lower the RCS boron concentration.
 - C. Raise control rods in 5 step increments or less.
 - D. Raise turbine load to restore level.

ANSWER: A

K/A: 2.1.11

Importance: 3.0

Cognitive Level: Knowledge

References: Ops Standards Page 3

Lesson Plan #: 2LP-SQS-50.1

Obj. #: 9

Objective: Using incident reports/SOERs be able to discuss causes, consequences and proper response. (March 16, 1996, Unit 1 Reactor Trip)

History: NEW

Source:

Type: CLOSED BOOK

JTA:

2LOT 2B NRC RO -As Given

| | |
|--|----------------------------|
| <p>91. The unit is at 100% power with all systems NSA. At 0100, SI Accumulator 21A [2SIS*TK21A] low-pressure alarm annunciated. Pressure continues to decline. Which of the following will meet the Technical Specification required actions for this situation at 0800 hours?</p> <p>A. Reactor power must be less than 5% Rated Thermal Power and at 1400 hrs Tav_g must be less than 350°F.</p> <p>B. K_{eff} must be less than 0.99 and at 1400 hrs Tav_g must be less than 350°F.</p> <p>C. K_{eff} must be less than 0.99 and at 1400 hrs Tav_g must be less than 200°F.</p> <p>D. K_{eff} must be less than or equal to 0.95 and at 1400 hrs Tav_g must be less than 350°F.</p> | |
| ANSWER: B | |
| K/A: 2.1.22 | Importance: 2.8 |
| Cognitive Level: Application | |
| References: Unit 2 Technical Specifications, Table 1.1, page 1-8 and 3.5.1 | |
| Lesson Plan #: 2LP-SQS-TS | Obj. #: 4 |
| Objective: Using a copy of Technical Specifications, evaluate given conditions for their compliance with Technical Specification LCO's and state what actions if any are required. | |
| History: NEW | |
| Source: | Type: OPEN BOOK |
| JTA: | Give a copy of T.S. 3.5.1. |

2LOT 2B NRC RO -As Given

92. A RWDA-G is in progress from Unit 2 Gaseous Waste Tanks in accordance with 1/2OM-19.4A.B "Unit 2 GW Storage Tk Disch to Unit 1 Atmos. Vent." The release starts at 60 psig with seven tanks discharging. Two hours after the release has begun, the operator has observed tank pressures at 53 psig. Which of the following actions must be completed?

- A. Contact the shift chemist and verify tritium samples are complete for each tank contained in the RWDA-G.
- B. Hand carry the procedure to Unit 1 and have Unit 1 NCO throttle Decay Tank Bleed Control Valve [FCV-1GW-105] to reduce flow rate.
- C. Notify the ANSS to review the RWDA-G and confirm data entered is complete and all steps taken in procedure are correct.
- D. Hand carry the procedure to Unit 1 and have Unit 1 NCO close Decay Tank Bleed Control Valve [FCV-1GW-105].

ANSWER: D

K/A: 2.2.4

Importance: 2.8

Cognitive Level: Application

References: 1/2OM-19.4A.B, Issue 3, Rev. 6, page 1 and page B.7.a and 8.

Lesson Plan #: 2LP-SQS-19.1

Obj. #: 9 h

Objective: Given a set of conditions, locate and apply the proper procedure and P and Ls for the following: h. Unit 2 Gaseous Waste Storage Tank Discharge to the Unit 1 Atmospheric Vent 1/2OM-19.4A.B.

History: NEW

Source:

Type: OPEN BOOK

JTA: 0710060101

Give copy of procedure

2LOT 2B NRC RO -As Given

93. The Low Head SI Pump [2SIS*P21A] must be put on clearance to repair the pump casing vent [2SIS-899].

Which of the following is required to properly place the pump on clearance?

- A. [2SIS*MOV8809A] must be declutched and closed manually.
- B. [2SIS*MOV8809A] must be closed first to prevent pressure buildup in the suction line.
- C. [2SIS*3] must be closed prior to seating the suction valve.
- D. [2SIS*899] must be tagged shut to prevent pressure buildup in the suction line.

ANSWER: C

K/A: 2.2.13

Importance: 3.6

Cognitive Level: Comprehension

References: NPDAP 3.4, Revision 10, page 22, VOND 11.5 Figure 11-1

Lesson Plan #: 1/2LP-SQS-AP.2

Obj. #: 6.

Objective: For given conditions, determine and apply the appropriate Clearance Procedure practices and precautions.

History: NEW

Source:

Type: OPEN BOOK

JTA: 119--A0301

Give NPDAP 3.4 and VOND 11.5 Figure 11-1

2LOT 2B NRC RO -As Given

| | |
|--|---------------------|
| 94. A clearance is needed involving an ESF system. Which of the following is the responsibility of the NCO in preparation of the ESF Checklist? A. Authorize the performance of a checklist. B. Determine the requirements of the checklist. C. Authorize the entry into the Limiting Condition for Operation. D. Determine the OPERABILITY of the standby equipment. | |
| ANSWER: D | |
| K/A: 2.2.13 | Importance: 3.6/3.8 |
| Cognitive Level: Knowledge | |
| Ref.: NPDAP 3.4 Rev 10 Attachment 4, Pg. 43, Section IV I page 33 and 34 | |
| LP#: 1/2LP-SQS-AP.2 | OBJ: 24 |
| Describe the use of the Emergency Safety Features (ESF) Checklist | |
| History: Used 1/31/97 1LOT3B NRC Exam MODIFIED | |
| Source: SQS Bank Q. # 0102 | Type: CLOSED BOOK |
| JTA: 3420050302 | |

2LOT 2B NRC RO -As Given

95. The Technical Specification limit for RCS activity ensures that the dose at the site boundary will not exceed a small fraction of the Part 100 limits in the event that a _____ occurs.

- A. Steam Generator Tube Rupture.
- B. Small Break LOCA with a stuck open Atmospheric Steam Dump Valve.
- C. Rod Ejection accident.
- D. Locked RCP rotor accident.

ANSWER: A

K/A:2.2.25

Importance: 2.5

Cognitive Level: Knowledge

References: Technical Specification Basis 3.4.8

Lesson Plan #: 2LP-SQS-TS

Obj. #5

Objective: Explain the bases for any given Technical Specification.

History: Modified from 1LOT 3B.

Source:

Type: CLOSED BOOK

JTA:3410040302

2LOT 2B NRC RO -As Given

96. Unit 2 is in Mode 3 with the following conditions:

Tavg is at 450°F and stable

RCS Pressure is at 1500 psig and rising

Steam Generator Pressures are at 430 psig and stable

Pressurizer Heater Banks C and A are ON. The operator places the Pressurizer Master Pressure Controller in MANUAL. As RCS pressure rises, which of the following actuations should occur first?

- A. Safety Injection Signal on low steam line pressure.
- B. Power Operated Relief Valve [2RCS*PCV455C] opens.
- C. AMSAC actuation on low steam generator pressure.
- D. Reactor Trip signal generated on High RCS pressure.

ANSWER: A

K/A: 2.4.2 K/A CHANGE

Importance: 3.9

Cognitive Level: A: Comprehension

Ref.: 2OM-1.2.B "Reactor Protection Setpoints", Issue 4, Rev. 3, pages 4 and 5

LP#: 2LP-SQS-1.1

OBJ: 5. b

Objective: State from memory the setpoints, coincidences, permissives and protection afforded by/bases of each of the following: b. safety injection signals.

History LRT 1997 Module IV Written exam, Modified from Question 49, 2LOT 2A

Source:

JTA: 0120050101

CLOSED BOOK

2LOT 2B NRC RO -As Given

97. The unit is critical at 5E-8 amps. Intermediate Range Channel N-35 Instrument Power is lost. Which of the following is an appropriate response?
- A. Restore the channel prior to raising thermal power above P-6.
 - B. Restore the channel prior to raising thermal power above 5%.
 - C. Place the unit in Mode 3 with the Reactor Trip Breaker Open until the channel is restored.
 - D. Perform the immediate actions of E-0 "Reactor Trip and Safety Injection."

ANSWER: D

K/A: 2.4.4

Importance: 4.0

Cognitive Level: Application

References: 2OM-53C.4.2.2.1B, Issue 1A, Rev. 1

Lesson Plan #: 2LP-SQS-2.1

Obj. #: 16

Objective: Given a set of conditions, recognize when an L.C.O has been exceeded. Identify any required actions and explain the bases for the following Tech Specs. c. Reactor Trip System Instrumentation T.S. 3/4.3.1

History: NEW

Source:

Type: OPEN BOOK

JTA: 0000100401

Give AOP in references.

2LOT 2B NRC RO -As Given

98. The unit has undergone a Loss of Coolant Accident. Both trains of Safety Injection are in service and High Head SI Flow [2SIS*FI943] indicates 500 gpm. Coolant system pressure is 50 psig above the highest steam generator pressure.

Tripping the Reactor Coolant Pumps is required at this time to accomplish which of the following strategies?

- A. Prevent damage to Reactor Coolant Pumps operating in a highly voided system.
- B. Prevent Reactor Coolant Pump overspeed and generation of missile fragments.
- C. Limit heat input to the RCS during an inadequate core-cooling situation.
- D. Limit the loss of reactor coolant after system drainage to the break location.

ANSWER: D

K/A: 2.4.6

Importance: 3.1

Cognitive Level: Knowledge

References: 2OM-53B.5.GI-6, Issue 1B, Rev. 1, page 9

Lesson Plan #:2LP-SQS-53.2

Obj. #: 11

Objective: State from memory the basis for RCP trip criteria, IAW BVPS EOP Executive Volume

History: NEW

Source:

Type: CLOSED BOOK

JTA:301AAA0601

| | |
|--|--------------------------|
| <p>99. The unit is in Mode 4 at 325 psig and 322 degrees. All systems are NSA for the current plant condition. Pressurizer level suddenly drops rapidly and subcooling in the RCS falls to 0 degrees. The operator has entered AOP 2.6.5 "Shutdown LOCA." Under these conditions, which of the following mitigation strategies is designed to restore subcooling, but limit overpressure conditions in the RCS?</p> <p>A. Manually initiate both trains of High Head Safety Injection.</p> <p>B. Stop all but one operating Reactor Coolant Pump.</p> <p>C. Isolate all letdown pathways and open Charging Flow Control Valve [2CHS*FCV122].</p> <p>D. Depressurize the RCS to refill the Pressurizer.</p> | |
| <p>ANSWER: C</p> | |
| <p>K/A: 2.4.9</p> | <p>Importance: 3.3</p> |
| <p>Cognitive Level: Knowledge</p> | |
| <p>References: 2OM-53C.4.2.6.5, Issue 1A, Rev. 9, Caution before step 1, Steps 2 and 3</p> | |
| <p>Lesson Plan #:2LP-SQS-53C.1</p> | <p>Obj. #:4</p> |
| <p>Objective: Explain from memory, the basis for CAUTIONS, NOTES and major actions in accordance with 2OM-53C</p> | |
| <p>History: NEW</p> | |
| <p>Source:</p> | <p>Type: CLOSED BOOK</p> |
| <p>JTA: 0000560401</p> | |

2LOT 2B NRC RO -As Given

| | |
|---|-------------------|
| <p>100. A fire is in progress in the Cable Tunnel and a CO₂ discharge has occurred. Which of the following actions limits dispersal of CO₂?</p> <p>A. Actuation of Control Room Emergency Bottled Air Pressurization System [CREBAPS].</p> <p>B. Trip of Control Building Supply Fans [2HVC*FN265A, B] and Exhaust Fans [2HVC*FN263A, B].</p> <p>C. Closure of Control Room Air Intake [2HVC*MOD201A, B] and Exhaust [2HVC*MOD201C, D] Dampers.</p> <p>D. Startup of Control Room Emergency Supply Fans [2HVC*FN241A, 241B].</p> | |
| ANSWER: B | |
| K/A:2.4.25 | Importance: 2.9 |
| Cognitive Level: Knowledge | |
| References: 2OM53.3.B.1, Issue 1, Rev. 8 Tab 1, page 44.B | |
| Lesson Plan #: 1/2LP-SQS-44A1 | Obj. #:8 |
| Objective: Explain all the control functions of the Control Area Ventilation and the CL2 detectors including inputs, blocks, permissives, control stations, outputs, control stations. | |
| History: NEW | |
| Source: | Type: CLOSED BOOK |
| JTA:0860040101 | |

2LOT 2B NRC RO -As Given

NAME: KEY
DLC EMP. # _____
DATE: _____

| | | | | | | | |
|-----|---|-----|-----------------|-----|---|------|---|
| 1. | A | 26. | A | 51. | A | 76. | D |
| 2. | B | 27. | D | 52. | D | 77. | D |
| 3. | D | 28. | B | 53. | B | 78. | B |
| 4. | D | 29. | C | 54. | D | 79. | B |
| 5. | D | 30. | A | 55. | B | 80. | B |
| 6. | C | 31. | D | 56. | D | 81. | A |
| 7. | C | 32. | B | 57. | D | 82. | C |
| 8. | C | 33. | C | 58. | C | 83. | A |
| 9. | B | 34. | A | 59. | A | 84. | A |
| 10. | C | 35. | B | 60. | B | 85. | D |
| 11. | D | 36. | D | 61. | C | 86. | A |
| 12. | C | 37. | C | 62. | B | 87. | C |
| 13. | D | 38. | B | 63. | A | 88. | C |
| 14. | D | 39. | A | 64. | C | 89. | C |
| 15. | A | 40. | C | 65. | A | 90. | A |
| 16. | D | 41. | A | 66. | D | 91. | B |
| 17. | B | 42. | B | 67. | B | 92. | D |
| 18. | B | 43. | A | 68. | A | 93. | C |
| 19. | D | 44. | C | 69. | C | 94. | D |
| 20. | A | 45. | A ⁴³ | 70. | C | 95. | A |
| 21. | C | 46. | A D | 71. | B | 96. | A |
| 22. | D | 47. | B | 72. | A | 97. | D |
| 23. | D | 48. | A | 73. | A | 98. | D |
| 24. | A | 49. | D | 74. | C | 99. | C |
| 25. | B | 50. | D | 75. | B | 100. | B |

#46 Key error. Correct ans. was D. J. E. Brigg