

Waterford 3

2014 NRC Exam

JOB PERFORMANCE MEASURE

A1

Determine Time to Shutdown Cooling

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Determine time to place plant on Shutdown cooling

Task Standard: Applicant calculates time to place plant on Shutdown Cooling in accordance with key.

References: OP-902-009, Standard Appendices, Rev 309, Appendix 2
OP-902-006, Loss of Main Feedwater Recovery, Rev 15

Alternate Path: No Time Critical: No Validation Time: 9 mins.

| | | | |
|-----|---|-------------------|-------|
| K/A | 2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc. | Importance Rating | 3.9 |
| | <hr/> | | <hr/> |

Level RO/SRO
:

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____
Signature

Date: _____

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

Standard Appendices, Rev 309, Appendix 2-G through 2-J (Handout 1)
Straight Edge or Ruler
Calculator

Description:

The applicant will be required to perform a calculation and use graphs to determine available Feedwater for cooldown to Shutdown Cooling (SDC) conditions, required Feedwater for cooldown to SDC conditions, and the time required to place SDC in service in accordance with OP-902-009, Standard Appendices, Appendix 2. The Applicant should determine the time to place SDC in service at no later than 14.75 to 15.5 hours.

READ TO APPLICANT

DIRECTION TO APPLICANT:

Each administrative JPM has a cue sheet with the instructions for that JPM. Each administrative JPM stands alone, and conditions from 1 JPM do not carry over to any other JPM. If you have any questions, raise your hand and I will come to your desk.

Provide all answers on the sheets provided.

(Read the Initial Condition and Cues from the Applicant Cue sheet, and then give the cue sheet and student handout to the applicant.)

| TASK ELEMENT 1 | STANDARD |
|--|--|
| Directions for calculating available feed water, apply to Graphs 2-G thru 2 -J : DWST Volume = 5,000 gal/% x _____ % - 58,000 gal. = _____ gal. | Calculated 212,000 gal |
| Comment: EXAMINER NOTE: Applicant should use 54% from initial conditions | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 2 | STANDARD |
|---|--|
| CSP Volume = 2,106 gal/% x _____ % - 53,000 gal. = _____ gal. | Calculated 85,996 gal |
| Comment: EXAMINER NOTE: Applicant should use 66% from initial conditions | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 3 | STANDARD |
|---|--|
| Total Feedwater = DWST Volume + CSP Volume = _____ gal. | Calculated 297,996 gal |
| Comment: | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 4 | STANDARD |
|---|--|
| Determine required Feedwater from Attachment 2-G | Determined 36,500 gal – 37,500 gal |
| Comment: EXAMINER NOTE: Refer to A1 key. Acceptable range based on graph interpolation | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 5 | STANDARD |
|---|---|
| Total Feedwater – Feedwater Required from Att. 2 -G = Available Feed water Total _____ – Required _____ = Available _____ | Calculated 260,496 gal – 261,496 gal for Available. |
| Comment: EXAMINER NOTE: Refer to A1 key. Acceptable range of answer depends on acceptable range of Required Feedwater from Task Element 4. | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

| TASK ELEMENT 6 | STANDARD |
|---|---|
| Calculate the maximum time remaining to place Shutdown Cooling in service. | Determined 14.75 – 15.5 hours |
| Comment: EXAMINER NOTE: Applicant should use Figure 2-I, 2 hour curve. Refer to A1 key. Acceptable range of answer depends on acceptable range of Available Feedwater from Task Element 5 based on graph interpolation | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

END OF TASK

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- Plant tripped 2 hours ago due to a loss of Main Feedwater
- Plant Conditions as follows:
 - RCS $T_{HOT} = 550^{\circ}F$
 - DWST level = 54%
 - CSP level = 66%
 - 2 RCPs have been stopped
- OP-902-006, Loss of Main Feedwater has been completed up to the step to commence a plant cooldown.

INITIATING CUES:

The CRS directs you to calculate the maximum time remaining to place Shutdown Cooling in service at $350^{\circ}F$ based upon Condensate inventory in accordance with OP-902-009, Appendix 2. Complete all work on attachment provided and write your answer on this sheet.

Maximum time remaining to place SDC in service _____

Waterford 3

2014 NRC Exam

JOB PERFORMANCE MEASURE

A2

**Calculation for Determining the Amount of Pure
Water That May Be Added to the Refuel Cavity**

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Calculation for determining the amount of pure water that may be added to the Refuel Cavity

Task Standard: Applicant calculates the amount of pure water that can be added to the refueling cavity in accordance with OP-010-006, Outage operations. The results must conform to the answer key.

References: OP-010-006, Outage Operations Rev 322
TS 3.9.1
COLR

Alternate Path: No Time Critical: No Validation Time: 11 mins.

| | | | |
|-----|--|-------------------|----------------|
| K/A | 2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation. | Importance Rating | <u> 4.3 </u> |
|-----|--|-------------------|----------------|

Level RO/SRO

: _____

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments:

Examiner: _____
Signature

Date: _____

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-010-006, Outage Operations (Handout 1)
COLR (Handout 2)
TS 3.9.1 (Handout 3)
Calculator

Description:

The applicant will be required to calculate the amount of pure water that can be added to the refueling cavity in accordance with OP-010-006, Outage Operations. To perform this calculation the applicant will need to determine what the Refueling Minimum Boron concentration is from Tech Specs. The results will indicate that 1413 gallons of CMU may be added to the refuel cavity.

READ TO APPLICANT

DIRECTION TO APPLICANT:

Each administrative JPM has a cue sheet with the instructions for that JPM. Each administrative JPM stands alone, and conditions from 1 JPM do not carry over to any other JPM. If you have any questions, raise your hand and I will come to your desk.

Provide all answers on the sheets provided.

(Read the Initial Condition and Cues from the Applicant Cue Sheet, and then give the cue sheet to the applicant.)

| TASK ELEMENT 1 | STANDARD |
|--|---------------------------|
| <p>Note:</p> <p>(1) This attachment provides guidance for calculating the amount of pure water that may be added to the Refuel Cavity without dilution to below shutdown margin requirements. This is typically used while Radiation Protection is using CMU to wash down the Refuel Cavity walls to mitigate airborne radioactivity while performing Refuel Cavity drain down.</p> <p>(2) This calculation is only valid for water additions while the Refuel Cavity Water Level is $\geq 20'$ MSL.</p> <p>(3) This calculation includes a 50% margin.</p> | <p>Note reviewed.</p> |
| | <p>SAT / UNSAT</p> |

9.24.1 Record the following:

| TASK ELEMENT 2 | STANDARD |
|---|---------------------------|
| <ul style="list-style-type: none"> ▪ Final Refuel Cavity Water Level (Lf): | <p>22 ft</p> |
| <p>Comment: Refer to A2 Key.</p> | <p>SAT / UNSAT</p> |

| TASK ELEMENT 3 | STANDARD |
|--|---------------------------|
| <ul style="list-style-type: none"> ▪ Initial Refuel Cavity Boron Concentration (Ci) | <p>2090 ppm</p> |
| <p>Comment: Refer to A2 Key.</p> | <p>SAT / UNSAT</p> |

| TASK ELEMENT 4 | STANDARD |
|--|---|
| <ul style="list-style-type: none"> ▪ Refueling Minimum Boron Concentration (Cf) | <p>2050 ppm</p> |
| <p>Comment: Refer to A2 Key.</p> <p>The applicant will determine that 2050 ppm is the most restrictive requirement per TS 3.9.1.</p> | <p><u>Critical</u></p> <p>SAT / UNSAT</p> |

| TASK ELEMENT 5 | STANDARD |
|---|---|
| <p>9.24.2 Calculate the amount of pure water that may be added to the Refuel Cavity (Vw) using the following formula:</p> $Vw = (6954 \text{ gal/ft} \times Lf - 79,161 \text{ gal}) \times (1 - Cf/Ci)$ $Vw = [(6954 \times \text{ft}) - 79,161] \times [1 - (\text{ppm} / \text{ppm})]$ <p>Vw = _____ gallons</p> | 1402 to 1476 gallons |
| <p>Comment: EXAMINER NOTE: (Cf/Ci) 2050ppm/2090ppm = .98086124 Rounding up to .981 would yield Vw = 1402.7 gal. Rounding down to .98 would yield Vw = 1476.5 gal. 73,827 x .01913876 = <u>1413 gallons</u></p> | <p align="center"><u>Critical</u> SAT / UNSAT</p> |

| TASK ELEMENT 6 | STANDARD |
|--|---|
| 9.24.3 Select the lower of Vw calculated in Step 9.24.2 or 1500 gallons: | 1402 to 1476 gallons |
| <p>Comment: Refer to A2 Key.</p> | <p align="center"><u>Critical</u> SAT / UNSAT</p> |

| TASK ELEMENT 7 | STANDARD |
|--|---|
| <p>9.24.4 SM/CRS designate the allowable amount of pure water to add to the Refuel Cavity by specifying an amount that is \leq amount specified in Step 9.24.3.</p> <p>SM/CRS designated allowable pure water limit to add to cavity:</p> | less than or equal to value calculated in step 9.24.3 |
| <p>Comment: Refer to A2 Key.</p> <p>If asked by the applicant if the CRS desires to limit the amount specified in step 9.24.3 the answer will be that it is not desired to limit the amount designated in step 9.24.3.</p> | <p align="center">SAT / UNSAT</p> |

END OF TASK

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- Waterford 3 is in a refueling outage.
- Reactor engineering has determined that a boron concentration of 1985 ppm is required to maintain the refuel cavity at a Keff of $\leq .95$.
- Refueling Cavity Water Level is 24 ft. and will be drained to 22 ft.
- Refueling Cavity boron concentration is 2090 ppm.

INITIATING CUES:

RP has requested that the refuel cavity walls be washed down with CMU as level in the refueling cavity is lowered to 22 ft.

The CRS directs you to determine refueling minimum boron concentration per TS 3.9.1 and perform OP-010-006, Attachment 9.24 Refueling Cavity Boron concentration, through step 9.24.3.

Waterford 3

2014 NRC Exam

JOB PERFORMANCE MEASURE

A3

Calculate Leak Rate for SI-510B

Applicant: _____

Examiner: _____

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-903-008, Reactor Coolant System Isolation Leakage Test (Handout 1)
Calculator with capability to raise to the $\frac{1}{2}$ power (y^x)

Description:

The applicant will be required to calculate the leak rate based on data provided on Attachment 10.9. The Applicant will first calculate gross leak rate, the extrapolation ratio coefficient, and the corrected leak rate for valve SI-510B. The leakage will exceed acceptance criteria of 1 GPM and will be 1.18 GPM.

READ TO APPLICANT

DIRECTION TO APPLICANT:

Each administrative JPM has a cue sheet with the instructions for that JPM. Each administrative JPM stands alone, and conditions from 1 JPM do not carry over to any other JPM. If you have any questions, raise your hand and I will come to your desk.

Provide all answers on the sheets provided.

(Read the Initial Condition and Cues from the Applicant Cue Sheet, and then give the cue sheet to the applicant.)

| TASK ELEMENT 1 | STANDARD |
|--|--|
| <p>7.9.5.16 / 7.9.6.13 Corrected Leak Rate Calculation for SI-510B: GROSS LEAK RATE (RG): RG = 2.64E-4 X VC / TE RG = 2.64E-4 X _____ ml / _____ min RG = _____ GPM</p> | <p>.95 to .951 GPM</p> |
| <p>Comment: EXAMINER NOTE: RG = 2.64E-4 X 7200 ml / 2 min Rounding down [(2.64E-4 X 7200) / 2] to 1.9/2 would yield RG = .95 GPM. Rounding up [(2.64E-4 X 7200) / 2] to 1.901/2 would yield RG = .9505 (Then rounded up to .951) GPM. Refer to A3 Key</p> | <p><u>Critical</u> SAT / UNSAT</p> |

| TASK ELEMENT 2 | STANDARD |
|--|--|
| <p>EXTRAPOLATION RATIO COEFFICIENT (CE): (N/A if RG = 0) CE = [2235 PSIG / P2]^{0.5} CE = [2235 PSIG / _____ PSIG]^{0.5} CE = [_____]^{0.5} CE = _____</p> | <p>1.24 to 1.242</p> |
| <p>Comment: EXAMINER NOTE: CE = [2235 PSIG / _____ PSIG]^{0.5} Rounding down (2235/1450) to 1.54 would yield CE = (1.54)^{0.5} = 1.2409 (Then rounded down to 1.24). Rounding up (2235/1450) to 1.5414 would yield CE = (1.5414)^{0.5} = 1.2415 (Then rounded up to 1.242) GPM. Refer to A3 Key</p> | <p><u>Critical</u> SAT / UNSAT</p> |

| TASK ELEMENT 3 | STANDARD |
|---|--|
| <p>CORRECTED LEAK RATE (RC): RC = RG X CE RC = _____ GPM X _____ RC = _____ GPM</p> | <p>1.17 to 1.2 GPM</p> |
| <p>Comment: EXAMINER NOTE: RC = _____ GPM X _____ Rounding down including min ranges of previous task elements (1.24 X .95) would yield RC = 1.178 GPM (Then stopped at 2 decimal places = 1.17 GPM). Rounding up including max ranges of previous task elements (1.242 X .951) would yield RC = 1.181 GPM (Then rounded up = 1.2 GPM) Refer to A3 Key</p> | <p><u>Critical</u> SAT / UNSAT</p> |

| TASK ELEMENT 4 | STANDARD |
|--|------------------------------|
| Note: Refer to attachment 10.16, Acceptance Criteria and Test Acceptance, for acceptance criteria. | Referred to Attachment 10.16 |
| Comment: Refer to A3 Key. | SAT / UNSAT |

| TASK ELEMENT 5 | STANDARD |
|---|------------------------|
| 10.16.1 SI-4052A(B) leakage limit is less than or equal to 0.375 gpm. | Determined step is N/A |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 6 | STANDARD |
|--|--|
| 10.16.2 For all check valves tested, test is acceptable if leakage is less than or equal to 1 GPM. | Determined leakage is not acceptable |
| Comment: EXAMINER NOTE: This may be satisfied by either annotating on Attachment 10.12, Attachment 10.9, Attachment 10.16, or on Cue sheet. | <u>Critical</u> SAT / UNSAT |

END OF TASK

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- OP-903-008, Reactor Coolant Leakage System Isolation Test is in progress.
- RC Loop 2 Hot Leg Injection inside Containment Check SI-510B Leak rate using HPSI Train A is in progress
- Data has been collected for valve SI-510B (RC LOOP 2 HOT LEG INJECTION INSIDE CONTAINMENT) and recorded on Attachment 10.9
- Step 7.9.5.16 has been reached for calculating corrected leak rate on Attachment 10.9

INITIATING CUES:

The CRS directs you to resume with step 7.9.5.16 of OP-903-008 to Calculate Corrected Leak Rate for RC Loop 2 Hot Leg Injection Inside Containment Check, SI-510B, on Attachment 10.9, record test results for SI-510B, and evaluate against acceptance criteria on Attachment 10.12, Results Summary Table.

Waterford 3

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JOB PERFORMANCE MEASURE

A4

Calculate Stay Times Based on Dose Rates

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Calculate Stay Times Based on Dose Rates

Task Standard: Applicant correctly calculates the allowed stay time (0.3846 hour or 23.0 – 23.1 minutes) to complete the described tagout without exceeding his yearly Waterford 3 administrative radiation dose limits.

References: N/A

Alternate Path: No Time Critical: No Validation Time: 7 mins.

| | | | |
|-----|--|-------------------|------------|
| K/A | 2.3.4 Knowledge of radiation exposure limits under normal or emergency conditions. | Importance Rating | <u>3.2</u> |
|-----|--|-------------------|------------|

Level RO/SRO

: _____

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments:

Examiner: _____
Signature

Date: _____

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

None

READ TO APPLICANT

Each administrative JPM has a cue sheet with the instructions for that JPM. Each administrative JPM stands alone, and conditions from 1 JPM do not carry over to any other JPM. If you have any questions, raise your hand and I will come to your desk.

Provide all answers on the sheets provided.

(Read the Initial Condition and Cues from the Applicant Cue sheet, and then give the cue sheet and student handout to the applicant.)

| TASK ELEMENT 1 | STANDARD |
|--|---|
| Calculate stay time based on dose rate and Waterford 3 yearly TEDE limits. | Applicant calculated the stay time as 22.8 - 23.1 minutes (.38 - .385 hour). |
| <p>Comment:</p> <p>Waterford 3 administrative TEDE limit: 2000 mrem Dose for the year: 1750 mrem Remaining dose for the year: 250 mrem</p> <p>Time allowed in room: 250 mrem / 650 mrem/hour</p> <p>0.3846 hour or 22.8 – 23.1 minutes</p> | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

END OF TASK

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER TO UPON COMPLETION OF TASK)

You have been assigned to verify a tagout in the Regenerative Heat Exchanger Room.

- Your yearly dose to date is 1750 mrem TEDE for the year.
- The dose rate in the room is 650 mrem/hour.

Based on Waterford 3 yearly administrative limits, what is your stay time in the room?

Do all of your calculations on this sheet.

Waterford 3

2014 NRC Exam

JOB PERFORMANCE MEASURE

A5

Verify Time to Shutdown Cooling

Applicant: _____

Examiner: _____

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

Standard Appendices, Rev 309, Appendix 2-G through 2-J (Handout 1)
Straight Edge or Ruler
Calculator

Description:

The applicant will be required to verify a calculation and use graphs to determine available Feedwater for cooldown to Shutdown Cooling (SDC) conditions, required Feedwater for cooldown to SDC conditions, and the time required to place SDC in service in accordance with OP-902-009, Standard Appendices, Appendix 2. The Applicant should identify an error in determining Condensate Storage Pool volume and Required Feedwater and use the correct curves to determine the time to place SDC in service at no later than 14.75 to 15.5 hours.

READ TO APPLICANT

DIRECTION TO APPLICANT:

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Provide all answers on the sheets provided.

(Read the Initial Condition and Cues from the Applicant Cue sheet, and then give the cue sheet and student handout to the applicant.)

| TASK ELEMENT 1 | STANDARD |
|---|---|
| Directions for calculating available feed water, apply to Graphs 2-G thru 2 -J : DWST Volume = 5,000 gal/% x _____ % - 58,000 gal. = _____ gal. | Verified 212,000 gal |
| Comment: EXAMINER NOTE: Only Critical if the applicant changes the answer from the correct value which is given to an incorrect value and this value changes the Final time to place SDC in service outside of the band given in Task element 6. | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

| TASK ELEMENT 2 | STANDARD |
|---|---|
| CSP Volume = 2,106 gal/% x _____ % - 53,000 gal. = _____ gal. | Identified error and calculated 85,996 gal |
| Comment: EXAMINER NOTE: Error is that the RO supplying the information did not subtract 53,000 gal from the amount that is indicated | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

| TASK ELEMENT 3 | STANDARD |
|---|---|
| Total Feedwater = DWST Volume + CSP Volume = _____ gal. | Recalculated 297,996 gal |
| Comment: EXAMINER NOTE: If previous value was used this would be reflected as an error carried forward from incorrect calculation of CSP volume. | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

| TASK ELEMENT 4 | STANDARD |
|---|---|
| Determine required Feedwater from Attachment 2-G | Identified error and determined 36,500 gal – 37,500 gal |
| Comment: EXAMINER NOTE: Error is that the RO supplying the information used a curve to reduce temperature to 400°F and not the required 350°F. Refer to A5 key. Acceptable range based on graph interpolation | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

| TASK ELEMENT 5 | STANDARD |
|---|--|
| <p>Total Feedwater – Feedwater Required from Att. 2 -G = Available Feed water</p> <p>Total _____ – Required _____ = Available _____</p> | <p>Identified error and Inserted 297,996 gal for Total, 36,500 gal – 37,500 gal for Required and Calculated 260,496 gal – 261,496 gal for Available.</p> |
| <p>Comment:</p> <p>EXAMINER NOTE: Total Feedwater and Required Feedwater values given on handout are incorrect and should be corrected based on Task Elements 2-4. Refer to A5 key. Acceptable range of answer depends on acceptable range of Required Feedwater from Task Element 4.</p> <p>If previous value was used this would be reflected as an error carried forward from incorrect calculation of CSP volume and/or Required Feedwater calculation.</p> | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

| TASK ELEMENT 6 | STANDARD |
|---|---|
| <p>Calculate the maximum time remaining to place Shutdown Cooling in service.</p> | <p>Rejected recommendation of RO and used Figure 2-1, 2 hour curve, determined 14.75 – 15.5 hours</p> |
| <p>Comment:</p> <p>EXAMINER NOTE: Refer to A5 key. Acceptable range of answer depends on acceptable range of Available Feedwater from Task Element 5 based on graph interpolation</p> | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

END OF TASK

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- Plant tripped 2 hours ago due to a loss of Main Feedwater
- Plant Conditions as follows:
 - RCS $T_{HOT} = 550^{\circ}F$
 - DWST level = 54%
 - CSP level = 66%
 - 2 RCPs have been stopped
- OP-902-006, Loss of Main Feedwater has been completed up to the step to commence a plant cooldown.
- A calculation was performed by the BOP operator to determine the maximum time remaining to place Shutdown Cooling in service at 350 °F based upon Condensate inventory in accordance with OP-902-009, Appendix 2. The BOP operator reports to you, the CRS, that SDC must be placed in service no later than 19.5 hours from now.

INITIATING CUES:

- You are directed to verify the BOP operator's calculations and if necessary make any corrections to ensure the calculated time is correct based upon available Condensate Inventory in accordance with OP-902-009.

Waterford 3

2014 NRC Exam

JOB PERFORMANCE MEASURE

A6

**Review and Approve a Calculation for
Determining the Amount of Pure Water That May
Be Added to the Refuel Cavity**

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Review and approve a calculation for determining the amount of pure water that may be added to the Refuel Cavity.

Task Standard: Applicant reviews a calculation for determining the amount of pure water that can be added to the refueling cavity in accordance with OP-010-006, Outage operations. The results must conform to the answer key.

References: OP-010-006, Outage Operations Rev 322
TS 3.9.1
COLR

Alternate Path: No Time Critical: No Validation Time: 16 mins.

K/A 2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation. Importance Rating 4.4

Level SRO
:

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-010-006, Outage Operations Rev 322 (Handout 1)

TS 3.9.1 (Handout 2)

COLR (Handout 3)

Description:

The applicant will be directed to review and approve a calculation for the amount of pure water that can be added to the refueling cavity in accordance with OP-010-006, Outage Operations. To perform this calculation the applicant will need to determine what the Refueling Minimum Boron concentration is from Tech Specs. The results will indicate that 1413 gallons of CMU may be added to the refuel cavity instead of the 1500 gallons indicated on the reviewed attachment.

READ TO APPLICANT

DIRECTION TO APPLICANT:

Each administrative JPM has a cue sheet with the instructions for that JPM. Each administrative JPM stands alone, and conditions from 1 JPM do not carry over to any other JPM. If you have any questions, raise your hand and I will come to your desk.

Provide all answers on the sheets provided.

(Read the Initial Condition and Cues from the Applicant Cue sheet, and then give the cue sheet and student handout to the applicant.)

| TASK ELEMENT 1 | STANDARD |
|--|---------------------------|
| <p>Note:</p> <p>(1) This attachment provides guidance for calculating the amount of pure water that may be added to the Refuel Cavity without dilution to below shutdown margin requirements. This is typically used while Radiation Protection is using CMU to wash down the Refuel Cavity walls to mitigate airborne radioactivity while performing Refuel Cavity drain down.</p> <p>(2) This calculation is only valid for water additions while the Refuel Cavity Water Level is $\geq 20'$ MSL.</p> <p>(3) This calculation includes a 50% margin.</p> | <p>Note reviewed.</p> |
| | <p>SAT / UNSAT</p> |

9.24.1 Record the following:

| TASK ELEMENT 2 | STANDARD |
|---|-----------------------------|
| <ul style="list-style-type: none"> ▪ Final Refuel Cavity Water Level (Lf): | <p>value input verified</p> |
| <p>Comment: Refer to A6 Key.</p> | <p>SAT / UNSAT</p> |

| TASK ELEMENT 3 | STANDARD |
|--|-----------------------------|
| <ul style="list-style-type: none"> ▪ Initial Refuel Cavity Boron Concentration (Ci) | <p>value input verified</p> |
| <p>Comment: Refer to A6 Key.</p> | <p>SAT / UNSAT</p> |

| TASK ELEMENT 4 | STANDARD |
|---|---|
| <ul style="list-style-type: none"> Refueling Minimum Boron Concentration (Cf) | 2050 ppm |
| <p>Comment: Refer to A6 Key.</p> <p>The applicant will determine that 2050 ppm is the most restrictive requirement per TS 3.9.1.</p> <p>The attachment being reviewed has 1985 ppm entered as the refueling minimum boron concentration. 1985 ppm is the reactor engineering boron concentration to maintain $K_{eff} \leq .95$. TS 3.9.1 requires the most restrictive of 2050 ppm or the boron concentration to maintain $K_{eff} \leq .95$ as the refueling minimum boron concentration. In this case, the most restrictive boron concentration is 2050 ppm.</p> | <p><u>Critical</u></p> <p>SAT / UNSAT</p> |

| TASK ELEMENT 5 | STANDARD |
|---|---|
| <p>9.24.2 Calculate the amount of pure water that may be added to the Refuel Cavity (Vw) using the following formula:</p> $Vw = (6954 \text{ gal/ft} \times Lf - 79,161 \text{ gal}) \times (1 - Cf/Ci)$ $Vw = [(6954 \times \text{ft}) - 79,161] \times [1 - (\text{ppm} / \text{ppm})]$ <p>Vw= ___ gallons</p> | 1402 to 1476 gallons |
| <p>Comment:</p> <p>EXAMINER NOTE: $(Cf/Ci) 2050\text{ppm}/2090\text{ppm} = .98086124$</p> <p>Rounding up to .981 would yield Vw = 1402.7 gal. Rounding down to .98 would yield Vw = 1476.5 gal.</p> <p>$73,827 \times .01913876 = 1413 \text{ gallons}$</p> <p>The attachment being reviewed would have an error carried forward if 1985 ppm is used as the minimum required boron concentration.</p> | <p><u>Critical</u></p> <p>SAT / UNSAT</p> |

| TASK ELEMENT 6 | STANDARD |
|---|---|
| 9.24.3 Select the lower of Vw calculated in Step 9.24.2 or 1500 gallons: | 1402 to 1476 gallons |
| <p>Comment:</p> <p>Refer to A6 Key.</p> <p>The attachment being reviewed would have an error carried forward if 1985 ppm is used as the minimum required boron concentration.</p> | <p><u>Critical</u></p> <p>SAT / UNSAT</p> |

| TASK ELEMENT 7 | STANDARD |
|--|---|
| <p>9.24.4 SM/CRS designate the allowable amount of pure water to add to the Refuel Cavity by specifying an amount that is \leq amount specified in Step 9.24.3.</p> <p>SM/CRS designated allowable pure water limit to add to cavity:</p> | <p>Less than or equal to the number calculated in step 9.24.3</p> |
| <p>Comment: Refer to A6 Key.</p> <p>The CRS may desire to limit the amount specified in step 9.24.3.</p> | <p><u>Critical</u></p> <p>SAT / UNSAT</p> |

END OF TASK

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- Waterford 3 is in a refueling outage.
- Reactor engineering has determined that a boron concentration of 1985 ppm is required to maintain the refuel cavity at a K_{eff} of $\leq .95$.
- Refueling Cavity Water Level is 24 ft. and will be drained to 22 ft.
- Refueling Cavity boron concentration is 2090 ppm.

INITIATING CUES:

RP has requested that the refuel cavity walls be washed down with CMU as level in the refueling cavity is lowered to 22 ft.

The CRS is to review the calculation for determining refueling minimum boron concentration per TS 3.9.1 and the performance OP-010-006, Attachment 9.24 Refueling Cavity Boron concentration. IF necessary, correct any problems found on Attachment 9.24.

Waterford 3

2014 NRC Exam

JOB PERFORMANCE MEASURE

A7

Review Calculation of Leak Rate for SI-510B

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Review and approval of a calculation for determining the leak rate of RC Loop 2 Hot Leg Injection Inside Containment Check SI-510B.

Task Standard: Applicant identifies error in gross leak rate calculation and then recalculates the gross leak rate, recalculates the corrected leak rate of SI-510B and determines leakage is not acceptable in accordance with OP-903-008, Reactor Coolant System Isolation Leakage Test. Applicant determines Technical Specification 3.4.5.2 condition e is applicable.

References: OP-903-008, Reactor Coolant System Isolation Leakage Test Rev 13
Technical Specification 3.4.5.2

Alternate Path: No Time Critical: No Validation Time: 16 mins.

K/A 2.2.40 Ability to apply Technical Specifications for a System. Importance Rating 4.7

Level SRO
:

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____

Date: _____

Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-903-008, Reactor Coolant System Isolation Leakage Test (Handout 1)

Technical Specification 3.4.5.2 (Handout 2)

Calculator with capability to raise to the $\frac{1}{2}$ power (y^x)

Description:

The applicant will be directed to review and accept the calculation of the leak rate of SI-510B based on data provided on Attachment 10.9. The Applicant should first notice an error was made calculating the gross leak rate, the extrapolation ratio coefficient is correct, and the corrected leak rate for valve SI-510B must be re-performed. The corrected leakage will exceed acceptance criteria of 1 GPM and will be 1.18 GPM. This will exceed Technical Specification leakage of 1 GPM and Technical Specification 3.4.5.2 for Reactor Coolant System Operational Leakage will be applicable.

READ TO APPLICANT

DIRECTION TO APPLICANT:

Each administrative JPM has a cue sheet with the instructions for that JPM. Each administrative JPM stands alone, and conditions from 1 JPM do not carry over to any other JPM. If you have any questions, raise your hand and I will come to your desk.

Provide all answers on the sheets provided.

(Read the Initial Condition and Cues from the Applicant Cue Sheet, and then give the cue sheet to the applicant.)

| TASK ELEMENT 1 | STANDARD |
|---|---|
| <p>7.9.5.16 / 7.9.6.13 Corrected Leak Rate Calculation for SI-510B: GROSS LEAK RATE (RG): RG = 2.64E-4 X VC / TE RG = 2.64E-4 X _____ ml / _____ min RG = _____ GPM</p> | <p>Calculation corrected to .95 to .951 GPM</p> |
| <p>Comment: EXAMINER NOTE: Instead of 2.64E-4 the calculation was performed using 2.64E-5 RG = 2.64E-4 X 7200 ml / 2 min Rounding down [(2.64E-4 X 7200) / 2] to 1.9/2 would yield RG = .95 GPM. Rounding up [(2.64E-4 X 7200) / 2] to 1.901/2 would yield RG = .9505 (Then rounded up to .951) GPM. Refer to A7 Key</p> | <p><u>Critical</u> SAT / UNSAT</p> |

| TASK ELEMENT 2 | STANDARD |
|--|---|
| <p>EXTRAPOLATION RATIO COEFFICIENT (CE): (N/A if RG = 0) CE = [2235 PSIG / P2]^{0.5} CE = [2235 PSIG / _____ PSIG]^{0.5} CE = [_____]^{0.5} CE = _____</p> | <p>1.24 to 1.242</p> |
| <p>Comment: EXAMINER NOTE: CE = [2235 PSIG / _____ PSIG]^{0.5} Rounding down (2235/1450) to 1.54 would yield CE = (1.54)^{0.5} = 1.2409 (Then rounded down to 1.24). Rounding up (2235/1450) to 1.5414 would yield CE = (1.5414)^{0.5} = 1.2415 (Then rounded up to 1.242) GPM. Only Critical if the applicant changes the answer from the correct value which is given to an incorrect value outside of the given range Refer to A7 Key</p> | <p><u>Critical</u> SAT / UNSAT</p> |

| TASK ELEMENT 3 | STANDARD |
|---|---|
| <p>CORRECTED LEAK RATE (RC): RC = RG X CE RC = _____ GPM X _____ RC = _____ GPM</p> | <p>Calculation corrected to 1.17 to 1.2 GPM</p> |
| <p>Comment: EXAMINER NOTE: Error carried forward from Gross Leakage Error RC = _____ GPM X _____ Rounding down including min ranges of previous task elements (1.24 X .95) would yield RC = 1.178 GPM (Then stopped at 2 decimal places = 1.17 GPM). Rounding up including max ranges of previous task elements (1.242 X .951) would yield RC = 1.181 GPM (Then rounded up = 1.2 GPM) Refer to A7 Key</p> | <p><u>Critical</u> SAT / UNSAT</p> |

| TASK ELEMENT 4 | STANDARD |
|--|------------------------------|
| Note: Refer to attachment 10.16, Acceptance Criteria and Test Acceptance, for acceptance criteria. | Referred to Attachment 10.16 |
| Comment: Refer to A7 Key. | SAT / UNSAT |

| TASK ELEMENT 5 | STANDARD |
|---|------------------------|
| 10.16.1 SI-4052A(B) leakage limit is less than or equal to 0.375 gpm. | Determined step is N/A |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 6 | STANDARD |
|--|--|
| 10.16.2 For all check valves tested, test is acceptable if leakage is less than or equal to 1 GPM. | Determined leakage is not acceptable |
| Comment: EXAMINER NOTE: This may be satisfied by either annotating on Attachment 10.12, Attachment 10.9, Attachment 10.16, or on Cue sheet. | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 7 | STANDARD |
|--|--|
| Recognize impact of unacceptable check valve leakage | Determined T.S. 3.4.5.2 Action C is applicable |
| Comment: EXAMINER NOTE: This may be satisfied by either annotating on Attachment 10.12, Attachment 10.9, Attachment 10.16, or on Cue sheet. | <u>Critical</u> SAT / UNSAT |

END OF TASK

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- Plant is in Mode 4
- OP-903-008, Reactor Coolant Leakage System Isolation Test is in progress.
- RC Loop 2 Hot Leg Injection inside Containment Check SI-510B Leak rate using HPSI Train A has been completed
- Data has been collected and leak rate calculated for valve SI-510B (RC LOOP 2 HOT LEG INJECTION INSIDE CONTAINMENT) and recorded on Attachment 10.9

INITIATING CUES:

The CRS is to review the calculation for leak rate of SI-510B. IF necessary, correct any problems found on Attachment 10.9 and identify any applicable actions per Technical Specifications. Document any comments/actions on Attachment 10.16

Waterford 3

2014 NRC Exam

JOB PERFORMANCE MEASURE

A8

Plan Work and Assign Workers Based on Dose Rates and Shielding

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Plan Work and Assign Workers Based on Dose Rates and Shielding

Task Standard: Applicant calculates dose with and without shielding, and calculates 2 workers are required, and directs job to two workers with shielding installed.

References: N/A

Alternate Path: No Time Critical: No Validation Time: 11 mins.

K/A 2.3.4 Knowledge of radiation exposure limits under normal or emergency conditions. Importance Rating 3.2

Level SRO
:

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments:

Examiner: _____

Date: _____

Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

None

READ TO APPLICANT

Each administrative JPM has a cue sheet with the instructions for that JPM. Each administrative JPM stands alone, and conditions from 1 JPM do not carry over to any other JPM. If you have any questions, raise your hand and I will come to your desk.

Provide all answers on the sheets provided.

(Read the Initial Condition and Cues from the Applicant Cue sheet, and then give the cue sheet and student handout to the applicant.)

| TASK ELEMENT 1 | STANDARD |
|---|---|
| Calculate dose for 1 worker with no shielding installed. | Applicant calculated 600 mrem total dose. |
| Comment: EXAMINER NOTE: Applicant may calculate that 1 worker is 90 work minutes and 2 workers are 72 work minutes, and therefore not calculate 1 person dose. | SAT / UNSAT |

| TASK ELEMENT 2 | STANDARD |
|---|--|
| Calculate dose for 2 workers with no shielding installed. | Applicant calculated 480 mrem total dose. |
| Comment: | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 3 | STANDARD |
|--|---|
| Calculate dose for 1 worker with shielding installed. | Applicant calculated 498 mrem total dose. |
| Comment: Installing the shielding results in 333 mrem total dose. Performing the work with 1 worker will result in 165 mrem + 333 mrem = total dose of 498 mrem EXAMINER NOTE: Applicant may calculate that 1 worker is 90 work minutes and 2 workers are 72 work minutes, and therefore not calculate 1 person dose. | SAT / UNSAT |

| TASK ELEMENT 4 | STANDARD |
|--|---|
| Calculate dose for 2 workers with shielding installed. | Applicant calculated 465 mrem total dose. |

| | |
|---|--|
| <p>Comment: Installing the shielding results in 333 mrem total dose.</p> <p>Performing the job with 2 workers will result in 132 mrem + 333 mrem = total dose of 465 mrem</p> | <p><u>Critical</u> SAT / UNSAT</p> |
|---|--|

| TASK ELEMENT 5 | STANDARD |
|---|--|
| <p>Applicant assigns job.</p> | <p>Job assigned to 2 workers with shielding installed.</p> |
| <p>Comment: Installing the shielding results in 333 mrem total dose.</p> <p>Performing the job with 2 workers will result in 132 mrem + 333 mrem = total dose of 465 mrem</p> | <p><u>Critical</u> SAT / UNSAT</p> |

END OF TASK

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER TO UPON COMPLETION OF TASK)

Refuel is in progress and Safety Injection Train A is being aligned from its Shutdown Cooling alignment to its Safety Injection alignment. You are the Work Management Center SRO and have been assigned to coordinate the venting of Safety Injection Train A.

- The dose rates in Safeguards Room A are 400 mrem/hour unshielded.
- Installing shielding will reduce the dose rate to 110 mrem/hour.
- It will take 2 workers a total of 25 minutes to install and remove the shielding (25 minutes each worker).
- It will take 1 person 90 minutes to complete the venting if he works alone.
- It will take 2 people 36 minutes to complete the venting (36 minutes each worker).

How will you direct the execution of the Safety Injection System venting to allow the least amount of total worker dose? Show all calculations to support your answer.

Waterford 3

2014 NRC Exam

JOB PERFORMANCE MEASURE

A9

Classify an Emergency Event

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Classify an Emergency event

Task Standard: Event classified correctly and declared within 15 minutes of JPM start.

References: EP-001-001, Recognition and Classification of Emergency Conditions Rev 30

Alternate Path: No Time Critical: Yes Validation Time: 13 mins.

K/A 2.4.41, Knowledge of the emergency action level thresholds and classifications Importance Rating 4.6

Level SRO
:

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Critical Time: 15 minutes

Performance Rating: SAT UNSAT

Comments:

Examiner: _____
Signature

Date: _____

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

EP-001-001, Recognition and Classification of Emergency Conditions

Description:

This JPM requires the applicant to determine the emergency action level from the initial conditions within 15 minutes IAW EP-001-001. The declaration will be CA3 Inability to maintain the plant in Cold Shutdown EAL 2 “an UNPLANNED event results in RCS pressure increase > 10 psi due to a loss of RCS cooling”. The JPM will be performed in the classroom using given data obtained from the Initial Conditions.

READ TO APPLICANT

DIRECTION TO APPLICANT:

This is a Time Critical Task

Each administrative JPM has a cue sheet with the instructions for that JPM. Each administrative JPM stands alone, and conditions from 1 JPM do not carry over to any other JPM. If you have any questions, raise your hand and I will come to your desk.

Provide all answers on the sheets provided.

(Read the Initial Condition and Cues from the Applicant cue Sheet, and then give the cue sheet and a copy of EP-001-001 to applicant)

EXAMINER NOTE

This JPM will be performed in the classroom using data obtained from the cue sheet provided. Ensure that the applicant turns in all paperwork prior to releasing.

Time Start: _____

| TASK ELEMENT 1 | STANDARD |
|---|--|
| 5.2 Classification 5.2.1 Verify the off-normal event to ensure that the event is real. | Determined Event is Real by initial conditions |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 2 | STANDARD |
|---|--------------------------------|
| 5.2.2 Match the off-normal event with one of the following six emergency categories: 5.2.2.1 Abnormal Radiation Levels/Radiological Effluents TAB A 5.2.2.2 Cold Shutdown/Refueling System Malfunction TAB C 5.2.2.3 ISFSI Malfunction TAB E 5.2.2.4 Fission Product Barrier Degradation TAB F 5.2.2.5 Hazards and Other Conditions Affecting Plant Safety TAB H 5.2.2.6 System Malfunction TAB S | Determined Tab C is applicable |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 3 | STANDARD |
|--|--|
| 5.2.3 Refer to Attachment 7.1 Emergency Categories, under the category TAB selected in step 5.2.2 above; match the off-normal condition with the appropriate IC to determine the emergency classification. | Determined CA3, EAL #2 is applicable |
| EXAMINER NOTE: CU5, EAL 1 is also applicable but is an Unusual Event. | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 4 | STANDARD |
|--|------------------------|
| 5.2.4 If an event or condition existed which met or exceeded an IC but no emergency was declared the basis for the emergency classification no longer exists at the time of the discovery (rapidly concluded event, missed classification or misclassified event), <u>then</u> do <u>not</u> classify the emergency or make offsite notifications. 5.2.4.1 Notify the NRC within one hour of the discovery of the undeclared or misclassified event in accordance with UNT-006-010. | Determined step is N/A |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 5 | STANDARD |
|--|--------------------|
| Procedure Note: The effects of combinations of initiating conditions that individually constitute a lower classification may be considered as a possibly higher emergency classification. | Note reviewed |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 6 | STANDARD |
|---|---|
| 5.2.5 Declare the highest emergency classification for which an IC has been met or exceeded | Declared CA3, EAL #2 within 15 minutes of JPM start |
| Comment: Time Complete: _____ | <u>Critical</u> SAT / UNSAT |

END OF TASK

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- Plant has just performed a plant cooldown to Mode 5 using SDC train A
- Plant conditions:
 - RCS Temperature = 192°F
 - RCS Pressure = 360 PSIA
 - PZR level = 35%
- A trip of Low Pressure Safety Injection Pump A occurs
- At 1000 a loss of offsite power occurs
- The A Emergency Diesel Generator starts and loads on bus 3A
- The B Emergency Diesel Generator overspeeds and cannot be reset
- No Charging pumps are running
- At 1010 as a result of the above events the following plant conditions exist:
 - RCS temperature = 197°F
 - RCS Pressure = 380 PSIA
 - PZR level = 38%

INITIATING CUES:

- You are directed to classify and declare this event in accordance with EP-001-001, Recognition and Classification of Emergency Conditions
- This is a time critical task
- Write your declaration on this sheet

Declaration _____

Waterford 3

2014 NRC Exam

JOB PERFORMANCE MEASURE

S1

Securing Emergency Boration

Applicant: _____

Examiner: _____

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-901-103, Emergency Boration
OP-002-005, Chemical and Volume Control

Description:

This task occurs at CP-4. The applicant will perform step 7 of OP-901-103, Emergency Boration. This task secures Emergency Boration and aligns the suction source of the Charging Pumps to the Volume Control Tank. If an applicant does not follow the procedure sequence properly and trips the running Charging Pump, then that applicant would fail this task.

The plant will be emergency borating using the Boric Acid Make-up Pumps.

DIRECTIONS TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Indicate to me when you understand your assigned task.

Read the Initial Condition and Cues from the Applicant Cue Sheet, and then give the cue sheet to the applicant.

| EXAMINER NOTE |
|---|
| Cue the Simulator Operator to place the Simulator in RUN. |

| TASK ELEMENT 1 | STANDARD |
|---|--|
| 7. <u>When</u> Emergency Boration termination criteria (Step 6) are met, <u>then</u> secure Emergency Boration by performing the following: | Applicant continued on with the procedure. |
| Comment: EXAMINER NOTE: Termination criteria is met as given in the initial conditions. | SAT / UNSAT |

| TASK ELEMENT 2 | STANDARD |
|--|--|
| 7.1 Place VCT Disch Valve, CVC-183, control switch to AUTO <u>and</u> verify valve opens | CVC-183 is opened. |
| Comment: | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 3 | STANDARD |
|---|--|
| 7.2 Stop <u>both</u> Boric Acid Pumps. | Boric Acid Pumps are stopped. |
| Comment: EXAMINER NOTE: BAM Pump B is the critical element because it is the only Boric Acid pump currently operating. Taking the control switch to either OFF or AUTO will stop the pump. | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 4 | STANDARD |
|--|--|
| 7.3 Verify the following valves closed: <ul style="list-style-type: none"> ▪ CVC-507 RWSP to Charging Pumps ▪ BAM-133 Emergency Boration Valve ▪ BAM-113A Boric Acid Makeup Gravity Feed Valve A ▪ BAM-113B Boric Acid Makeup Gravity Feed Valve B | All valves in step are closed. |
| Comment: EXAMINER NOTE: BAM-133, BAM-113A, & BAM-113B will need to be closed. CVC-507 is not critical because it is already in the correct position. | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 5 | STANDARD |
|---|--|
| 7.4 Open the following valves: <ul style="list-style-type: none"> ▪ BAM-126A Boric Acid Makeup Pump A Recirc Valve ▪ BAM-126B Boric Acid Makeup Pump B Recirc Valve | BAM-126A and B opened. |
| Comment: EXAMINER NOTE: BAM-126B is the Critical valve because it is the only one that is closed. | <u>Critical</u> SAT / UNSAT |

| EXAMINER CUE |
|--|
| After the above step has been performed, inform applicant 5 minutes has elapsed. Inform the applicant that the CRS directs him to start Charging Pump A first to flush boric acid out of the pump. |

| TASK ELEMENT 6 | STANDARD |
|---|--|
| 7.5 Operate each Charging Pump for at least 5 minutes to flush concentrated boric acid out of pump. | At least one standby Charging Pump is operated. |
| Comment: EXAMINER NOTE: The applicant may use OP-002-005 to swap charging pumps. Task elements 7 through 12 are the steps in OP-002-005, Charging and Letdown System, for swapping charging pumps. | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 7 | STANDARD |
|--|--------------------|
| Procedure Note: The Charging Pump Seal System should be operated for at least 30 minutes prior to starting the Charging Pump. | Reviewed the Note |
| Comment: EXAMINER NOTE: The seal package has been running for 30 minutes as indicated in the initial conditions. EXAMINER CUE: If the applicant calls the RCA watch to verify the seal package running for 30 minutes, then inform him that all seal water pumps have been running for at least 30 minutes. | SAT / UNSAT |

| TASK ELEMENT 8 | STANDARD |
|--|--|
| <p>6.2.1 At SM/CRS discretion, verify readiness for operation of each Charging Pump to be started as follows:</p> <ul style="list-style-type: none"> • Verify crankcase oil level $\geq 1/2$ in bulls eye. • Verify gear reducer oil level between low and high marks on dipstick. • Flush debris and fines from packing seal water system as follows: <ul style="list-style-type: none"> A. Place Seal Water Pump A(B)(AB) control switch to ON. B. Open Charging Pump A (B, AB) Packing Cooling Sump Drain, CVC-704A (B, AB). C. <u>If</u> packing cooling tank level continues to lower after makeup begins, <u>then prior to</u> tank level lowering below the bottom of the sight glass, <u>Throttle</u> Closed Charging Pump A(B, AB) Packing Cooling Sump Drain, CVC-704A(B, AB), as necessary to maintain packing cooling tank level visible but $\geq 1/2$ in sightglass. D. <u>After</u> flushing the packing cooling tank for <u>at least</u> three minutes, <u>then</u> Close Charging Pump A(B, AB) Packing Cooling Sump Drain, CVC-704A(B, AB). E. Verify packing cooling tank water level $\geq 1/2$ in sightglass. | <p>Applicant communicated with the RCA watch to verify Charging Pump AB ready for a start.</p> |
| <p>Comment:</p> <p>EXAMINER CUE: When the applicant calls the RCA watch to perform step 6.2.1, inform the applicant that all pre-start checks are complete. Including:</p> <ul style="list-style-type: none"> ▪ Proper oil level ▪ Suction and discharge valves are open ▪ Motor vents unobstructed ▪ All personnel clear of the pump | <p>SAT / UNSAT</p> |

| TASK ELEMENT 9 | STANDARD |
|---|---------------|
| Procedure Note: The purpose of securing the Pressurizer Backup Heater Bank is to minimize the impact of the Charging Pump start on Pressurizer pressure. <u>If</u> the first pump is secured shortly (within approximately one minute) after starting the second pump <u>or</u> PZR boron equalization is in progress, <u>then</u> this step is <u>not</u> necessary when swapping Charging pumps. | Note reviewed |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 10 | STANDARD |
|---|---------------------------------|
| 6.2.2 At SM/CRS discretion, <u>if</u> a Pressurizer Backup Heater Bank is operating, <u>then</u> secure the Pressurizer Backup Heater Bank by placing control switch in AUTO. | Step communicated with the CRS. |
| Comment: EXAMINER NOTE: No PZR heaters are currently operating EXAMINER CUE: If asked as SM/CRS, inform the applicant that securing a pressurizer backup heater bank is not desired. | SAT / UNSAT |

| TASK ELEMENT 11 | STANDARD |
|--|------------------|
| Procedure Caution: (1) TO MINIMIZE THERMAL SHOCK OF CHARGING NOZZLES, ONLY ONE CHARGING PUMP SHOULD BE STARTED AT A TIME. (2) EXTREME CAUTION SHALL BE USED WHEN STARTING ADDITIONAL CHARGING PUMPS WITH THE PRESSURIZER SOLID. EXCESSIVE RCS PRESSURIZATION COULD RESULT. | Caution reviewed |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 12 | STANDARD |
|---|---|
| 6.2.3 Start desired Charging Pump A(B)(AB) by placing control switch(es) to ON. | At least one standby Charging Pump is operated. |
| Comment: | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

| EXAMINER NOTE |
|--|
| The JPM is complete after the applicant has started 1 Charging pump. |

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

1. Reset to IC-181
2. Verify Emergency Boration aligned per OP-901-103 using Boric Acid Pumps
3. For 2014 NRC Exam, ensure setup of JPM S5 is performed concurrently
4. There are no malfunctions associated with this JPM

Setup with specific IC unavailable or for non NRC exams:

1. *Reset the simulator to an IC in Mode 3*
2. *Establish Emergency Boration IAW OP-901-103 specifically:*
 - a. *Place Makeup Mode switch to Manual*
 - b. *Open BAM-133*
 - c. *Start BAM pump B*
 - d. *Close BAM-126B*
 - e. *Close CVC-183*
 - f. *Open BAM-113A*
 - g. *Open BAM-113B*
 - h. *Verify Charging Pump A not the charging pump running*
3. *Place simulator in freeze and save IC*

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- An Excess Steam Demand Event is in progress
- The crew is responding in accordance with OP-902-004, Excess Steam Demand Recovery
- Safety Injection has initiated and has been reset
- The plant is Emergency Borating due to an uncontrolled cooldown
- The plant cooldown has been stopped by the crew's actions
- Emergency Boration Termination criteria has been met
- The Standby Charging Pump Seal Packages have been running for 30 minutes, all pump start prerequisites are complete, and an AO is standing by

INITIATING CUE:

- The CRS directs you to secure Emergency Boration in accordance with OP-901-103, Emergency Boration, step 7

Waterford 3

2014 NRC Exam

JOB PERFORMANCE MEASURE

S2

**Mitigate Release of Radioactivity through RWSP
following RAS Actuation**

Applicant: _____

Examiner: _____

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-902-002, Loss of Coolant Accident Recovery Procedure

Description:

This task is performed at CP-8 and CP-4. The operator performs required manipulations after Recirculation Actuation is initiated. After the simulator is taken out of freeze, the RAS will initiate in < 3 minutes.

This JPM has time critical elements. SI-120 A and B and SI-121 A and B must be closed within **two** minutes of RAS initiation to prevent recirculating SI sump water to the RWSP.

After all SI Recirc Isolation valves are closed, Steps 43.f.1 through 43.f.2 must be completed within **five** minutes to prevent SI Sump Screen clogging and LPSI Pump A damage.

DIRECTIONS TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Indicate to me when you understand your assigned task.

Read the Initial Condition and Cues from the Applicant Cue Sheet, and then give the cue sheet to the applicant.

EXAMINER NOTE

Cue the Simulator Operator to place the Simulator in RUN. RAS will actuate in < 2 minutes.

| TASK ELEMENT 1 | STANDARD |
|---|--|
| 43. IF the break is inside containment, AND RWSP level is less than 10%, THEN : a: Verify the RAS is initiated. | Verified RAS by either ROM indication at CP-7 or RAS Train A and B Logic Initiated annunciator on Panel K. |
| Comment: Time RAS actuated: _____ | SAT / UNSAT |

| TASK ELEMENT 2 | STANDARD |
|---|--|
| 43.b: Verify that BOTH LPSI pumps are stopped. | Determined LPSI A continued to run and proceeded to contingency step |
| Comment: EXAMINER NOTE: Applicant should attempt to stop LPSI pump A using the control switch. | SAT / UNSAT |

| TASK ELEMENT 3 | STANDARD |
|---|------------------------------|
| 43.b.1: IF LPSI pump continues to run THEN continue with Instruction Step 43.c. | Continued to perform step 43 |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 4 | STANDARD |
|---|----------------------------------|
| 43.c: Verify that ESF PUMPS SUCTION SI SUMP valves are open: <ul style="list-style-type: none"> • SI 602A • SI 602B | SI-602 A and B at CP-8 are open. |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 5 | STANDARD |
|--|---|
| 43.d: Close the SI PUMPS RECIRC ISOL VALVES within two minutes of receipt of RAS: <ul style="list-style-type: none"> • SI 120A • SI 120B • SI 121A • SI 121B | SI-120 A & B and SI-121 A & B at CP-8 closed within 2 minutes of RAS actuation. |
| Comment: Time Last Recirc valve closed: _____ | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 6 | STANDARD |
|--|--|
| 43.e: Close the ESF PUMPS SUCTION RWSP: <ul style="list-style-type: none"> • SI 106A • SI 106B | SI-106 A & B at CP-8 closed. |
| Comment: | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 7 | STANDARD |
|--|--------------------|
| Procedure Note: If a LPSI Pump does not trip, perform step 43.f.1-2 actions within five minutes. Time starts at SI Pumps Recirc Isol Valves closed and ends at SI FCVs closed. | Note reviewed |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 8 | STANDARD |
|--|---|
| 43.f: IF any LPSI pump operating, THEN perform the following: 1) Throttle Open SI-135A(B) RC LOOP 2(1) SHDN COOLING WARM-UP approximately 10 seconds. | SI-135A throttled open for approximately 10 seconds. |
| Comment: EXAMINER NOTE: SI-135A is a large gate valve that will be adjusted again in Task Element 10. | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

| TASK ELEMENT 9 | STANDARD |
|---|---|
| 43.f: IF any LPSI pump operating, THEN perform the following: 2) Reset Open then Close LPSI HEADER TO RC LOOP FLOW CONTROL: <ul style="list-style-type: none"> • SI-138A • SI-139A | SI-138A & SI-139A Closed. |
| Comment: Time Last SI FCV valve closed: _____ | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

| TASK ELEMENT 10 | STANDARD |
|--|---|
| 43.f: IF any LPSI pump operating, THEN perform the following: 3) Throttle Open SI-135A to establish approximately 4000 gpm. | SI-135A throttled Open to achieve 3700 – 4300 gpm LPSI flow. |
| Comment: | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

| TASK ELEMENT 11 | STANDARD |
|--|---|
| 43.f: IF any LPSI pump operating, THEN perform the following: 4) Stop operating LPSI Pump A(B). | Directed field operator to open breaker for LPSI Pump A. |
| <p>Comment: EXAMINER NOTE: Applicant should continue on with task performance.</p> <p>EXAMINER CUE: If applicant asks for permission to continue on while the NAO is opening the breaker for LPSI pump A, provide concurrence as CRS to continue in procedure.</p> <p>EXAMINER CUE: If applicant directs an NAO to open the breaker for LPSI Pump A, acknowledge request and wait 1 minute and have BOOTH Operator initiate Event Trigger 1.</p> | <p align="center"><u>Critical</u></p> <p align="center">SAT / UNSAT</p> |

| TASK ELEMENT 12 | STANDARD |
|---|---|
| 43.g: Place ALL charging pumps in "OFF." | Charging Pump A, B, & AB control switches at CP-4 are OFF. |
| Comment: | <p align="center"><u>Critical</u></p> <p align="center">SAT / UNSAT</p> |

| TASK ELEMENT 13 | STANDARD |
|--|---|
| 43.h: Close CVC 209, CHARGING HEADER ISOLATION. | CVC-209 at CP-4 closed. |
| <p>Comment: EXAMINER NOTE: Key 203 is necessary for this manipulation and is already located in the valve.</p> | <p align="center"><u>Critical</u></p> <p align="center">SAT / UNSAT</p> |

| TASK ELEMENT 14 | STANDARD |
|--|--|
| 43.i: Verify CVC-507, RWSP TO CHARGING PUMPS SUCTION ISOLATION closed. | CVC-507 checked closed |
| Comment: | <p align="center">SAT / UNSAT</p> |

END OF TASK

The following table may be filled out for evaluating performance of time critical steps:

| Time recorded Task element 1 | Time recorded Task Element 5 | Δ Task Element 1 to Task Element 5 | Required Completion Time | Time Performance |
|---|---|---|-------------------------------------|-----------------------------|
| | | | ≤ 2 minutes | SAT / UNSAT |
| Time recorded Task element 5 | Time recorded Task Element 9 | Δ Task Element 5 to Task Element 9 | Required Completion Time | Time Performance |
| | | | ≤ 5 minutes | SAT / UNSAT |

SIMULATOR OPERATOR INSTRUCTIONS

1. Reset to IC-182
2. Verify the following is inserted:
 - a. RC01 LOSS OF ALL RCPS
 - b. RC23A RCS COLD LEG 1A RUPTURE with a severity of 100%
 - c. RP08M RELAY K104 FAILED, RAS TRAIN A (LPSI) is inserted (LPSI pump A fails to trip on RAS)
 - d. DI-08A05S02-1 LPSI Pump A is set to START (C/S overridden to start)
 - e. SIR32 LPSI PUMP A is set to RACKOUT on Event Trigger 1
3. Place key 203 in CVC-209 control switch)

TO PREVENT EXAM COMPROMISE, REMOVE ANY KEYS FROM THE RTGB BETWEEN RUNS OF THIS JPM AND VERIFY THEY ARE RETURNED TO THEIR PROPER LOCATION.

Do not place the Simulator in Run until the operator is ready to perform the task and cued by lead examiner. RAS occurs within 2 minutes of going to run.

Once the Applicant reaches Step 43.f.4), and informs the NAO to open LPSI Pump A breaker, THEN initiate Event Trigger 1

Setup with specific IC unavailable or for non NRC exams:

1. *Reset the simulator to an IC at any power level*
2. *Insert commands listed above*
3. *Allow simulator to run until RAS actuates*
4. *Backtrack simulator for approximately 2 minutes*
5. *Place simulator in Run and acknowledge annunciators*
6. *Place simulator in freeze and save IC*

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- A Loss of Coolant Accident is in progress
- The crew is responding in accordance with OP-902-002, Loss of Coolant Accident Recovery
- RAS initiation is imminent
- This is a time critical task

INITIATING CUE:

- The CRS has directed you to perform step 43 of OP-902-002, after RAS initiates.

Waterford 3

2014 NRC Exam

JOB PERFORMANCE MEASURE

S3

Perform a Reactor Coolant Pump Shutdown

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Perform A Reactor Coolant Pump Shutdown (With Reverse Rotation)

Task Standard: Reactor Coolant Pump 2A secured in accordance with OP-001-002 section 6.2., reverse rotation is recognized and RCPs 1A, 1B, & 2B are secured in accordance with OP-901-130.

References: OP-001-002, Reactor Coolant Pump Operation Rev 021
OP-901-130, Reactor Coolant Pump Malfunction Rev 007

Alternate Path: Y Time Critical: N Validation Time: 18 min.

| | | | |
|-----|--|-------------------------------|---------|
| K/A | 003 A2.02 Conditions which exist for an abnormal shutdown of an RCP in comparison to a normal shutdown of an RCP | Importance Rating RO / SRO | 3.7/3.9 |
|-----|--|-------------------------------|---------|

Level RO/SRO
: _____

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments:

Examiner: _____

Date: _____

Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-001-002, Reactor Coolant Pump Operation, Section 6.2
OP-901-130, Reactor Coolant Pump Malfunction, Section E0 & E5

Description:

This task is performed at CP-2. The examinee will perform a Reactor Coolant Pump Shutdown for Reactor Coolant Pump 2A. After the Reactor Coolant Pump is shutdown it will come to a stop and then start rotating in the reverse direction. Reverse rotation is indicated on the PMC. OP-002-001, Reactor Coolant Pump Operation directs implementation of OP-901-130, Reactor Coolant Pump Malfunction.

The task is complete after the examinee secures the remaining three Reactor Coolant Pumps.

DIRECTIONS TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Indicate to me when you understand your assigned task.

Read the Initial Condition and Cues from the Applicant Cue Sheet, and then give the cue sheet to the applicant.

| EXAMINER NOTE |
|---|
| Cue the Simulator Operator to place the Simulator in RUN. |

| TASK ELEMENT 1 | STANDARD |
|---|--------------------|
| Procedure Caution: ALL CLOSED REACTOR TRIP BREAKERS WILL OPEN ON FIRST RCP TRIP UNLESS REACTOR COOLANT LOW FLOW BYPASSES ARE ENABLED. | Caution reviewed |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 2 | STANDARD |
|---|--------------------------------------|
| 6.2.1 For RCP to be secured (1A, 1B, 2A, or 2B), Place associated RCP (1A, 1B, 2A, 2B) Oil Lift Pump A or B control switch to ON and verify lift pump Starts. | One Lift Oil Pump for RCP 2A started |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 3 | STANDARD |
|---|---|
| 6.2.1.1 Verify remaining RCP 1A (1B, 2A, 2B) Oil Lift Pump B or A control switch in AUTO. | Checked remaining Lift Oil Pumps in AUTO. |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 4 | STANDARD |
|--|--------------------|
| Procedure Caution: CBO AND CCW FLOW TO SEAL COOLERS SHOULD BE MAINTAINED AFTER RCP HAS BEEN SECURED UNTIL RCS TEMPERATURE HAS BEEN REDUCED TO $\leq 140^{\circ}\text{F}$. | Caution reviewed |
| Comment: | SAT / UNSAT |

EXAMINER NOTE

RCP reverse rotation fault occurs at the following step. Approximately 45 seconds after the RCP 2A C/S is placed to STOP, the RCP speed will reduce to approximately 0 RPM and quickly rotate in the reverse direction to a speed of approximately 540 RPM and stabilize. This indication is on the Plant Monitoring Computer and should be viewed by the applicant as part of the task.

| TASK ELEMENT 5 | STANDARD |
|--|--|
| 6.2.2 Stop desired RCP 1A (1B, 2A, 2B) by placing its associated control switch at CP-2 to Stop. | RCP 2A is secured |
| Comment: | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 6 | STANDARD |
|---|-------------------------------|
| 6.2.3 When RCP 1A (1B, 2A, 2B) speed indicates rotor is at rest, as indicated by PMC PID (PIDs are listed on Attachment 11.2), or with SM/CRS authorization, then secure operating RCP 1A (1B, 2A, 2B) Oil Lift Pumps by placing their control switches to OFF. | Recognized RCP is not at rest |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 7 | STANDARD |
|---|---|
| 6.2.3.1 After RCP 1A (1B, 2A, 2B) has been secured for approximately 5 minutes, then verify all secured RCPs are not rotating in the reverse direction by observing zero speed indicated on the computer points listed in Attachment 11.2. | Determined RCP 2A is rotating in the reverse direction. |
| Comment: EXAMINER NOTE: ~45 seconds after the RCP 2A C/S is manipulated, the RCP speed will reduce to approximately 0 RPM and quickly rotate in the reverse direction to a speed of ~540 RPM and stabilize. This is when it is time to provide cue below. EXAMINER CUE: After the Reactor Coolant Pump speed has stabilized in the reverse direction, cue the applicant that 5 minutes have elapsed. | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 8 | STANDARD |
|--|--------------------|
| 6.2.3.2 If PMC points indicate any RCP is rotating in the reverse direction, then refer to OP-901-130, Reactor Coolant Pump Malfunction and notify SM/CRS. | Entered OP-901-130 |
| Comment: EXAMINER CUE: If the applicant informs the SM/CRS of the need to perform OP-901-130, cue the examinee that the CRS directs them to implement section E₅ of OP-901-130. | SAT / UNSAT |

| EXAMINER NOTE |
|---|
| The following steps are from subsection E ₅ of OP-901-130. |

| TASK ELEMENT 9 | STANDARD |
|--|---------------|
| NOTE Indicated speed will not go negative when an RCP rotates in the reverse direction, it will be an absolute number. Speed will indicate approximately 600 rpm for the affected RCP when the other three RCPs are running. | Note reviewed |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 10 | STANDARD |
|---|---|
| 1. Monitor Reactor Coolant Pump after shutdown for reverse rotation with the following methods: <ul style="list-style-type: none"> • IF conditions permit, THEN verify reverse rotation by local observation. • PMC PIDs D13214 (RCP 1A), D13614 (RCP 1B), D13414 (RCP 2A) and D13814 (RCP 2B). • Associated RCP PMC mimic | Re-verified reverse rotation of RCP 2A using PID D13414 |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 11 | STANDARD |
|--|--|
| 2. Start an oil lift pump on affected RCP. | check one Lift Oil Pump for RCP 2A running |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 13 | STANDARD |
|---|--|
| 3. Remove ALL Reactor Coolant Pumps from service. | RCP 1A, 1B, 2B secured |
| Comment: | <u>Critical</u> SAT / UNSAT |

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

1. Reset to IC-183
2. Verify RC33C RCP2A ARRDFAILURE WITH ARRDFTEMP SEVERITY set to a value of 172.229
3. Take simulator to RUN
4. Acknowledge PMC Alarms

Setup with specific IC unavailable or for non NRC exams:

1. *Reset the simulator to an IC in Mode 3*
2. *Ensure all Reactor Trip Breakers are open*
3. *Insert Malfunction listed above*
4. *Place simulator in freeze and save IC*

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- The Reactor is in MODE 3 with all Reactor Trip Breakers open
- The plant is preparing to perform an RCS cooldown to MODE 5

INITIATING CUE:

The CRS directs you to secure Reactor Coolant Pump 2A in accordance with OP-001-002, Reactor Coolant Pump Operation, section 6.2.

Waterford 3

2014 NRC Exam

JOB PERFORMANCE MEASURE

S4

Perform a Manual Startup of ACCW Pump

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Perform manual startup of ACCW pump

Task Standard: ACCW Pump started, temperature setpoint adjusted and controller placed in Auto

References: OP-002-001, Auxiliary Component Cooling water Rev 305

Alternate Path: No Time Critical: No Validation Time: 12 min.

K/A 076 A4.01 SWS pumps Importance Rating 2.9/2.9
RO / SRO

Level RO/SRO
:

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____
Signature

Date: _____

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-002-001, Auxiliary Component Cooling water

Description:

This task is performed at CP-33. The applicant will be directed to place the A train of ACCW in service in manual mode and adjust the temperature setpoint to 84°F in accordance with OP-002-001, Auxiliary Component Cooling water System. There are no faults selected for this JPM.

DIRECTIONS TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Indicate to me when you understand your assigned task.

Read the Initial Condition and Cues from the Applicant Cue Sheet, and then give the cue sheet to the applicant.

| EXAMINER NOTE |
|---|
| Cue the Simulator Operator to place the Simulator in RUN. |

| TASK ELEMENT 1 | STANDARD |
|--|--------------------|
| 6.2.1 Verify system has been filled and vented, in accordance with Section 5.1, Fill and Vent. | Step reviewed |
| Comment: EXAMINER CUE: If asked, inform applicant that section 5.1 has previously been completed | SAT / UNSAT |

| TASK ELEMENT 2 | STANDARD |
|--|--------------------|
| 6.2.2 <u>Prior to</u> starting the selected ACC Pump, verify a visible clearance exists between piping and jack stand. | NAO dispatched |
| Comment: EXAMINER CUE: Respond as NAO and inform applicant that a visible clearance between the piping and jack stand has been verified. | SAT / UNSAT |

| TASK ELEMENT 3 | STANDARD |
|---|---------------------------|
| 6.2.3 Verify following ACC Wet Cooling Tower Fan groups are in Auto: <ul style="list-style-type: none"> • ACC Wet Cooling Tower A(B) Fans 1A(B) through 4A(B) • ACC Wet Cooling Tower A(B) Fans 5A(B) through 8A(B) | Verified fans are in Auto |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 4 | STANDARD |
|--|---------------------------|
| 6.2.4 Verify ACC Pump A(B) Discharge Line Isolation, ACC-110A(B), in AUTO. | ACC-110A verified in AUTO |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 5 | STANDARD |
|---|--------------------------|
| 6.2.5 Verify Locked Open ACC Pump A(B) Recirc Line Isolation, ACC-107A(B). | Dispatched NAO to verify |
| <p>Comment:</p> <p>EXAMINER CUE: Respond as NAO and inform applicant that ACC-107A is locked open.</p> | SAT / UNSAT |

| TASK ELEMENT 6 | STANDARD |
|--|---|
| 6.2.6 Close ACC Header A(B) CCW HX Outlet Temp Control Valve, ACC-126A(B), using Component Cooling Water Header A(B) Temperature Indicating Controller, CC-ITIC-7070A(B), in Manual. | Closes ACC-126A using CC-ITIC-7070A in manual |
| <p>Comment:</p> | SAT / UNSAT |

| TASK ELEMENT 7 | STANDARD |
|--|--------------------------|
| 6.2.7 Verify ACCW Pump A(B) bearing oil level is between the OFF level marks | Dispatched NAO to verify |
| <p>Comment:</p> <p>EXAMINER CUE: Respond as NAO and inform applicant that oil level is between the OFF level marks.</p> | SAT / UNSAT |

| TASK ELEMENT 8 | STANDARD |
|--|---------------------------|
| <p>Caution – (1) REACTIVITY SHOULD BE MONITORED FOR CHANGES, <u>WHEN</u> CHANGING CCW TEMPERATURE CAUSES LETDOWN TEMPERATURE CHANGES. LOWERING LETDOWN TEMPERATURE MAY REMOVE BORON FROM ION EXCHANGER EFFLUENT <u>AND</u> RAISING LETDOWN TEMPERATURE MAY RELEASE BORON INTO ION EXCHANGER EFFLUENT.</p> <p>(2) CHANGING CCW TEMPERATURE WILL CAUSE CHANGES IN CONTAINMENT PRESSURE. LOWERING CONTAINMENT PRESSURE WILL CAUSE INDICATED CONTAINMENT SPRAY RISER LEVEL TO LOWER.</p> | <p>Caution reviewed</p> |
| <p>Comment:</p> | <p>SAT / UNSAT</p> |

| TASK ELEMENT 9 | STANDARD |
|-----------------------------------|---|
| <p>6.2.8 Start ACC Pump A(B).</p> | <p>ACC Pump A started using control switch</p> |
| <p>Comment:</p> | <p><u>Critical</u></p> <p>SAT / UNSAT</p> |

| TASK ELEMENT 10 | STANDARD |
|--|-----------------------------------|
| <p>6.2.9 Verify ACC Jockey Pump A(B) Stops</p> | <p>Verified jockey pump stops</p> |
| <p>Comment:</p> | <p>SAT / UNSAT</p> |

| TASK ELEMENT 11 | STANDARD |
|---|--------------------|
| Caution – IT MAY BE NECESSARY TO THROTTLE COOLING WATER TO ACC PUMP OIL COOLER IF THRUST BEARING TEMPERATURE IS LESS THAN 70°F AFTER 15 MINUTES OF OPERATION. | Caution reviewed |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 12 | STANDARD |
|---|--------------------------|
| 6.2.10 Verify Open ACC Pump A(B) Discharge Line Isolation, ACC-110A(B). | Verified ACC-110A opened |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 13 | STANDARD |
|---|--------------------------|
| 6.2.11 Verify ACCW Pump A(B) bearing oil level is between the RUN mark and the HIGH mark <u>and</u> flow exists through the sightglass. | Dispatched NAO to verify |
| <p>Comment:</p> <p>EXAMINER CUE: Respond as NAO and inform applicant that oil level is between the run mark and the high mark and the sightglass shows flow.</p> | SAT / UNSAT |

| TASK ELEMENT 14 | STANDARD |
|---|--------------------|
| Note – Recommend ≥ 1000 gpm flow through ACC-126A(B) to minimize pump vibration. | Note reviewed |
| <p>Comment:</p> <p>EXAMINER NOTE: Applicant may raise flow to > 1000 GPM in manual.</p> | SAT / UNSAT |

| TASK ELEMENT 15 | STANDARD |
|---|---|
| 6.2.12 Restore Component Cooling Water Header A(B) Temperature Indicating Controller, CC-ITIC-7070A(B), setpoint to $\leq 95^{\circ}\text{F}$ or as otherwise directed by the SM/CRS. | Setpoint is set $\geq 82^{\circ}\text{F}$ and $\leq 86^{\circ}\text{F}$ |
| Comment: EXAMINER CUE: If asked, direct applicant to set the setpoint to 84°F | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

| TASK ELEMENT 16 | STANDARD |
|--|---|
| 6.2.13 Verify Component Cooling Water Header A(B) Temperature Indicating Controller, CC-ITIC-7070A(B), is in AUTO. | Controller is placed in Auto |
| Comment: | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

1. Reset to IC-184
2. For 2014 NRC Exam, ensure setup of JPM S8 is performed concurrently
3. There are no malfunctions associated with this JPM

Setup with specific IC unavailable or for non NRC exams:

1. *Reset the simulator to an IC in Mode 3*
2. *Ensure no ACCW pumps are operating initially*
3. *Set ACC-126A(B) setpoint to $\geq 90^{\circ}F \leq 95^{\circ}F$*
4. *Place simulator in freeze and save IC*

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- The plant is in MODE 3
- Auxiliary Component Cooling Water System has been filled and vented in accordance with Section 5.1 of OP-002-001.

INITIATING CUE:

- The CRS directs you to manually start up the “A” train of ACCW and set the temperature setpoint to 84°F in accordance with OP-002-001 section 6.2.

Waterford 3

2014 NRC Exam

JOB PERFORMANCE MEASURE

S5

**Realign Containment Spray for Auto Initiation
following CSAS**

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Realign Containment Spray for Auto Initiation Following CSAS

Task Standard: Reset initiation and actuation relays, stopped CS Pumps, and
realigned discharge valves

References: OP-902-009, Standard Appendices Rev 309

Alternate Path: No Time Critical: No Validation Time: 13 min.

K/A 026A4.01 CSS controls Importance Rating 4.5/4.3
RO / SRO

Level RO/SRO
:

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____
Signature

Date: _____

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-902-004, Excess Steam Demand Recovery
OP-902-009, Standard Appendices

Description:

This task will be performed at CP-8, CP-10, and CP-33 during an excess steam demand accident that resulted in a CSAS. Containment pressure has since reduced below 16.4 PSIA and conditions have been met to reset Containment Spray. The operator will realign containment spray for automatic initiation IAW OP-902-009 Appendix 5 Attachment 5-E. There are no faults associated with this JPM.

DIRECTIONS TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Indicate to me when you understand your assigned task.

Read the Initial Condition and Cues from the Applicant Cue Sheet, and then give the cue sheet to the applicant.

EXAMINER NOTE

Cue the Simulator Operator to place the Simulator in RUN.

| TASK ELEMENT 1 | STANDARD |
|---|--|
| 1.1 Place control switches for the following valves to "CLOSE:" <ul style="list-style-type: none">• CC 641, CCW RCP INLET OUTSIDE ISOL• CC 710, CCW RCP OUTLET INSIDE ISOL• CC 713, CCW RCP OUTLET OUTSIDE ISOL | Control switches for CC-641, CC-710, CC-713 in CLOSE |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 2 | STANDARD |
|--|--|
| 1.2 Reset CSAS Initiation relays on ALL four channels as follows: a. Place the Reset Permissive switch to "UNLK" position. (CP-10) | Trains A, B, C, D reset permissive switch unlocked |
| Comment: | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 3 | STANDARD |
|---|---|
| 1.2 Reset CSAS Initiation relays on ALL four channels as follows: b. Press CSAS Reset pushbutton. | CSAS reset pushbuttons depressed for each train |
| Comment: | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 4 | STANDARD |
|--|------------------------------|
| 1.2 Reset CSAS Initiation relays on ALL four channels as follows: c. Verify the initiation relay indicator lit on the ENGINEERED SAFETY FEATURES SYSTEM mimic. | Verified relay indicator lit |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 5 | STANDARD |
|--|---|
| 1.2 Reset CSAS Initiation relays on ALL four channels as follows: d. Place the Reset permissive switch to "LK" position. | Trains A, B, C, D reset permissive switch to "LK" |
| Comment: | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 6 | STANDARD |
|--|--|
| 1.3 Reset CSAS actuation logic on BOTH trains as follows: a. Press the CSAS Reset pushbuttons. (CP-33) | Train A and B CSAS reset pushbuttons depressed |
| Comment: | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 7 | STANDARD |
|---|-------------------------------|
| 1.3 Reset CSAS actuation logic on BOTH trains as follows: b. Verify the actuation relay indicator lit on the ENGINEERED SAFETY FEATURES SYSTEM mimic. (CP-10) | Verified relay indicators lit |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 8 | STANDARD |
|--|--|
| 1.4 Stop ONE CS pump at a time. | Either A or B CS pump switch placed to stop |
| Comment: | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 9 | STANDARD |
|---|--|
| 1.5 IF a CS pump is operating, THEN stop the remaining CS pump. | CS pump that was not stopped previously is stopped |
| Comment: | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 10 | STANDARD |
|---|--|
| 1.6 Close the following Containment Spray valves: • CS 125A, CNTMT SPRAY HEADER A ISOL • CS 125B, CNTMT SPRAY HEADER B ISOL | CS-125A and CS-125B closed |
| Comment: | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 11 | STANDARD |
|---|--|
| 1.7 Place BOTH Containment Spray pump control switches to normal position. | Both CS pump control switches to normal |
| Comment: | <u>Critical</u> SAT / UNSAT |

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

1. Reset to IC-181
2. Verify containment pressure < 16.4 PSIA
3. For 2014 NRC Exam, ensure setup of JPM S1 is performed concurrently

IF POTENTIAL FOR EXAM COMPROMISE EXISTS THEN REMOVE ANY KEYS FROM THE RTGB BETWEEN RUNS OF THIS JPM AND VERIFY THEY ARE RETURNED TO THEIR PROPER LOCATION.

Setup with specific IC unavailable or for non NRC exams:

1. *Reset the simulator to an IC at any power level in Mode 1*
2. *Insert a main steam line break inside Containment*
3. *When Containment Spray Actuates, delete the malfunction and insert the main steam line break on the same Steam Generator outside Containment (This is to empty the Steam Generator without raising Containment pressure too high)*
4. *Stop all RCPs*
5. *Once Steam Generator Blowdown is complete, delete the malfunction*
6. *Allow Containment pressure to reduce below 16.4 PSIA*
7. *Allow conditions to stabilize*
8. *Place simulator in freeze and save IC*

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- An Excess Steam Demand Event is in progress
- The crew is responding in accordance with OP-902-004, Excess Steam Demand Recovery
- Containment pressure has reduced to <16.4 PSIA

INITIATING CUES:

- The CRS has directed you to align containment spray for automatic initiation in accordance with OP-902-009 Appendix 5E.

Waterford 3

2014 NRC Exam

JOB PERFORMANCE MEASURE

S6

Restore Power to Bus 3B

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Restore Power to Safety Bus 3B IAW OP-902-000, Standard Post Trip Actions.

Task Standard: Applicant transfers auxiliaries to the UAT and restores power to Safety Bus 3B by tripping breaker 3-2.

References: OP-006-001, Plant Distribution (7KV, 4KV, and SSD) System Rev 314
OP-902-000, Standard Post Trip Actions Rev 15

Alternate Path: Yes Time Critical: No Validation Time: 9 min.

K/A 064 A3.03 Indicating lights, meters, and recorders Importance Rating 3.4/3.3
RO / SRO

Level RO/SRO
:

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____
Signature

Date: _____

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-006-001, Plant Distribution (7KV, 4KV, and SSD) System
OP-902-000, Standard Post Trip Actions

Description:

This task takes place at CP-1. The applicant will assume the shift as the BOP operator during a plant startup at the step to transfer auxiliaries to the Unit Auxiliary Transformers. The applicant will align the A train busses and when the B train is aligned, the B UAT will fail. The failure will result in a Reactor Trip due to a loss of flow to the RCS. The "B" generator output breaker will fail to open resulting in a loss of offsite power to the "B" electrical busses. The applicant will perform the maintenance of vital auxiliaries section of OP-902-000 from memory. The applicant will trip the main generator using the trip pushbuttons, trip the generator output breaker, and recognize that the EDG started but did not supply its respective bus. The applicant will perform immediate action to open breaker 3-2 tie allowing the EDG to provide power to bus 3B.

DIRECTIONS TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Indicate to me when you understand your assigned task.

Read the Initial Condition and Cues from the Applicant Cue Sheet, and then give the cue sheet to the applicant.

| EXAMINER NOTE |
|---|
| Cue the Simulator Operator to place the Simulator in RUN. |

| TASK ELEMENT 1 | STANDARD |
|---|----------------------------------|
| 6.3.1 Transfer from Startup Transformer (SUT) A to Unit Auxiliary Transformer (UAT) A as follows: 6.3.1.1 Verify Unit Auxiliary Transformer A in service in accordance with OP-006-008, Transformer Operation. | Verified with initial conditions |
| Comment: EXAMINER CUE: If asked, provide cue that the both UAT are in service in accordance with OP-006-008, Transformer Operation | SAT / UNSAT |

| TASK ELEMENT 2 | STANDARD |
|--|-----------------------------|
| 6.3.1.2 Verify all fault relays Reset on CP-15 for Unit Auxiliary Transformer A. | Fault Relays verified reset |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 3 | STANDARD |
|---|--|
| 6.3.1.3 Place Bus A Transfer switch to UAT. | Bus A transfer switch in UAT |
| Comment: | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 4 | STANDARD |
|--|--|
| 6.3.1.3.1 Verify the following Startup Transformer A breakers Open: <ul style="list-style-type: none"> ▪ 7KV-EBKR-1A-4 Startup Transformer A 7KV Isolation ▪ 4KV-EBKR-2A-4 Startup Transformer A 4KV Isolation | 7KV-EBKR-1A-4 and 4KV-EBKR-2A-4 checked open |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 5 | STANDARD |
|---|----------------------------------|
| 6.3.2 Transfer from Startup Transformer (SUT) B to Unit Auxiliary Transformer (UAT) B as follows: 6.3.2.1 Verify Unit Auxiliary Transformer B in service in accordance with OP-006-008, Transformer Operation. | Verified with initial conditions |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 6 | STANDARD |
|--|-----------------------------|
| 6.3.2.2 Verify all fault relays Reset on CP-15 for Unit Auxiliary Transformer B. | Fault Relays verified reset |
| Comment: | SAT / UNSAT |

| EXAMINER NOTE |
|--|
| The fault is inserted at the following step and these steps should be performed from memory. |

| TASK ELEMENT 7 | STANDARD |
|---|--|
| 6.3.2.3 Place Bus B Transfer switch to UAT. | Bus B transfer switch in UAT |
| Comment: | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 8 | STANDARD |
|--|-----------------------------|
| Recognize Turbine and Reactor Trip, proceed to SPTAs | Immediate actions commenced |
| Comment: EXAMINER CUE: Provide cue to applicant to perform Standard Post Trip Actions as the Balance of Plant Operator | SAT / UNSAT |

| TASK ELEMENT 9 | STANDARD |
|---|--|
| 2. Determine that Maintenance of Vital Auxiliaries acceptance criteria are met: a. Check the Main Turbine is tripped: <ul style="list-style-type: none"> • Governor valves closed • Throttle valves closed | Governor valves and throttle valves checked closed |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 10 | STANDARD |
|---|---|
| b. Check the Main Generator is tripped: <ul style="list-style-type: none"> • GENERATOR BREAKER A tripped • GENERATOR BREAKER B tripped • EXCITER FIELD BREAKER tripped | Determined Generator Breaker B is closed and proceeded to contingency |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 11 | STANDARD |
|---|--|
| b.1 Perform ANY of the following: 1) Manually trip the Main Generator using BOTH GENERATOR EMERG TRIP pushbuttons. 2) Manually trip the Main Generator by performing ALL of the following: a. Transfer BOTH electrical buses from UAT to SUT. b. Open the following breakers: <ul style="list-style-type: none"> • GENERATOR BREAKER A • GENERATOR BREAKER B • EXCITER FIELD BREAKER | Pushed Both Generator emergency Trip pushbuttons or opened Generator Breaker B |
| Comment: EXAMINER NOTE: Applicant will be successful either by pushing both Generator Emergency pushbuttons or manually tripping the Generator output breaker. Preferred order would be using the Generator Pushbuttons as they are numbered steps. The motoring of the Generator isolated offsite power due to the breaker failure to open scheme so the Generator is no longer motoring after offsite power was lost to the B busses. | SAT / UNSAT |

| TASK ELEMENT 12 | STANDARD |
|---|---|
| <p>c. Check station loads are energized from offsite electrical power as follows:</p> <p>Train A</p> <ul style="list-style-type: none"> • A1, 6.9 KV non safety bus • A2, 4.16 KV non safety bus • A3, 4.16 KV safety bus • A-DC electrical bus • A or C vital AC Instrument Channel <p>Train B</p> <ul style="list-style-type: none"> • B1, 6.9 KV non safety bus • B2, 4.16 KV non safety bus • B3, 4.16 KV safety bus • B-DC electrical bus • B or D vital AC Instrument Channel | <p>Recognized bus B3 deenergized and proceeded to contingency</p> |
| <p>Comment:</p> | <p>SAT / UNSAT</p> |

| TASK ELEMENT 13 | STANDARD |
|---|---|
| <p>c.1 IF ANY 4.16 KV safety bus is NOT powered from offsite, THEN:</p> <p>1) Verify associated EDG has started AND EDG output breaker closed.</p> <p>2) IF EDG output breaker is NOT closed THEN:</p> <ul style="list-style-type: none"> • Verify stable EDG Voltage 3920 - 4350 AC Volts. • Verify 3-2 Breaker open. • Check Sequencer LOCKOUT NOT illuminated. <p>3) IF EDG output breaker is NOT closed AND Step c.1.2) is met THEN locally close EDG output breaker.</p> <p>4) Verify CCW cooling available to EDG.</p> | <p>Determined EDG output Breaker not closed, EDG Voltage checked, tripped breaker 3-2 tie, checked sequencer lockout not illuminated, and checked CCW pump running for B EDG.</p> |
| <p>Comment:</p> <p>EXAMINER NOTE: Only tripping the 3-2 breaker is critical for task completion.</p> | <p><u>Critical</u></p> <p>SAT / UNSAT</p> |

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

1. Reset to IC-190
2. **RESET ANY FAULT RELAYS ON CP-15 BETWEEN EACH RESET FOR THIS JPM**
3. Verify the following (Should be loaded in IC):
 - a. EG04B MAIN GENERATOR B OUTPUT BREAKER FAILS TO OPEN (Active)
 - b. EG04B is set to delete in 1 second on Event Trigger 2
 - c. ED23B 3BS TO B2 BUS BREAKER FAILS TO TRIP ON UV tied to Event Trigger 1 (Inactive)
 - d. ED02F LOSS OF UAT-B TRANSFORMER tied to Event Trigger 1 (Inactive)
4. Ensure Event Trigger 1 is inserted as follows (Should be loaded in IC)
 - a. Event – UAT/SUT B SWITCH in UAT
 - b. Code is ZDIEDSTECS2235(1) == 1
5. Ensure Event Trigger 2 is inserted as follows: (Should be loaded in IC)
 - a. Event – Generator Trip – Both Required
 - b. Code is ZDIEGGENECS2201(1) == 1 & ZDIEGGENECS2205(1) == 1

Setup with specific IC unavailable or for non NRC exams:

1. *Reset the simulator to an IC with the turbine ready to sync to the Grid*
2. *Sync the turbine to the grid in accordance with OP-010-004*
3. *Adjust Generator load to obtain approximately 60 MWe*
4. *Stabilize plant conditions*
5. *Enter malfunctions and Triggers listed above*
6. *Place simulator in freeze and save IC*

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- The plant is performing a startup
- S/G levels are being maintained by an additional operator
- ATC watch is controlling RCS parameters
- You are the BOP operator
- Both Startup Transformers are in service
- Both Unit Auxiliary Transformers are ready to be placed in service

INITIATING CUE:

- The CRS directs you to transfer auxiliaries from the Startup Transformers to the Unit Auxiliary Transformers in accordance with OP-006-001, section 6.3.

Waterford 3

2014 NRC Exam

JOB PERFORMANCE MEASURE

S7

Start Component Cooling Water Pump AB

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Start Component Cooling Water Pump AB as the second CCW Pump.

Task Standard: Transfer 3AB Bus to the A train and start Component Cooling Water Pump AB in accordance with OP-901-311, Loss of Train B Safety Bus.

References: OP-901-311, Loss of Train B Safety Bus Rev 309

Alternate Path: No Time Critical: No Validation Time: 7 min.

K/A 008 A4.01 CCW indications and controls Importance Rating 3.3/3.1
RO / SRO

Level RO/SRO
: _____

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____
Signature

Date: _____

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-901-311, Loss of Train B Safety Bus

Description:

This task takes place at CP-1 and CP-8. Plant conditions start after a Loss of B Safety bus. Emergency Diesel Generator B tripped on overspeed; the 3B Safety Bus is not energized. Component Cooling Water Pump A is running. The applicant will be directed to start CCW Pump AB as the second CCW Pump. The 3AB Bus will be aligned to Train B, requiring an AB Bus transfer prior to starting CCW Pump AB.

DIRECTIONS TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Indicate to me when you understand your assigned task.

Read the Initial Condition and Cues from the Applicant Cue Sheet, and then give the cue sheet to the applicant.

| EXAMINER NOTE |
|---|
| Cue the Simulator Operator to place the Simulator in RUN. |

| TASK ELEMENT 1 | STANDARD |
|---|--|
| 2. If BUS AB3 is not energized, then align BUS AB3 to BUS A3 as follows: 2.1 BUS TIE B TO AB to TRIP | BUS TIE B TO AB keyswitch is in TRIP |
| Comment: | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 2 | STANDARD |
|---------------------------------|--|
| 2.2 BUS AB STATUS SELECTOR to A | BUS AB STATUS SELECTOR switch is in A |
| Comment: | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 3 | STANDARD |
|------------------------------|--|
| 2.3 BUS TIE A TO AB to CLOSE | BUS TIE A TO AB keyswitch is in CLOSE |
| Comment: | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 4 | STANDARD |
|---|--|
| 3. Verify two Component Cooling Water Pumps operating and supplying both A and B loops. 3.1 If CCW Pump AB is the standby pump and it is desired to align this pump for service, then perform the following: 3.1.1 Place CCW Assignment Switch to position B. | CCW Assignment Switch is in position B |
| Comment: | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 5 | STANDARD |
|--|--|
| 3.1.2 Verify Open the following valves: <ul style="list-style-type: none"> ▪ CC-126B/CC-114B CCW Suct & Disch Header Tie Valves AB to B ▪ CC-127B/CC-115B CCW Suct & Disch Header Tie Valves AB to B | CC-126B, CC-114B, CC-127B, and CC-115B are verified open |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 6 | STANDARD |
|--------------------------|--|
| 3.1.3 Start CCW Pump AB. | CCW Pump AB is running |
| Comment: | <u>Critical</u> SAT / UNSAT |

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

1. Reset to IC-186
2. Verify the following (Should be loaded in IC):
 - a. EG10B DG OVERSPEED TRIP (Active)
 - b. DI-01A07S16-1 B2 TO B3 TIE BKR is set to TRIP
3. Ensure Bus AB is aligned to the B train

Setup with specific IC unavailable or for non NRC exams:

1. *Reset to an IC in Mode 1*
2. *Insert commands listed above*
3. *Ensure bus AB is aligned to the B train*
4. *Place simulator in freeze and save IC*

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- A Loss of Bus 3B has occurred.
- Emergency Diesel Generator B tripped on Overspeed.

INITIATING CUE:

- The CRS directs you to align the 3AB bus to the A bus and start Component Cooling Water Pump AB using OP-901-311, Loss of Train B Safety Bus, section E0 step 2 and 3.

Waterford 3

2014 NRC Exam

JOB PERFORMANCE MEASURE

S8

Waste Condensate Tank Discharge

Applicant: _____

Examiner: _____

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-007-004, Liquid Waste Management System (Handout 1)
Discharge Permit for Waste Condensate Tank A (Handout 2)
Release request form (Handout 3)

Description:

This task is performed at CP-4. The applicant will be tasked with initiating a discharge of Waste Condensate Tank A. The cue will indicate that the operator in the field has completed all required lineups and is standing by. When the applicant initiates flow, the controller output will fail to maximum. The applicant will stop discharge flow by closing the discharge isolation valve(s).

DIRECTIONS TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Indicate to me when you understand your assigned task.

Read the Initial Condition and Cues from the Applicant Cue Sheet, and then give the cue sheet to the applicant.

| EXAMINER NOTE |
|---|
| Cue the Simulator Operator to place the Simulator in RUN. |

| TASK ELEMENT 1 | STANDARD |
|---|--|
| 6.10.8 On CP-4, Reset Liquid Waste Discharge Flow Integrator to zero. | Integrator is reset to zero |
| Comment: | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 2 | STANDARD |
|---|---|
| 6.10.9 Record WCT level and Liquid Waste Discharge Integrator reading on Liquid Release Permit. | Reading is recorded on the Release Permit |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 3 | STANDARD |
|---|-----------------------|
| 6.10.10 Verify Liquid Waste Discharge Flow Controller, LWM-IFIC-0647, in Manual with 0% output. | Verification complete |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 4 | STANDARD |
|--|--------------------|
| Procedure Caution: If Circulating Water flow is reduced to less than that required by the discharge permit, then discharge shall be secured immediately. | Caution reviewed |
| Comment: | SAT / UNSAT |

EXAMINER NOTE

The combined control switch on CP-4 will open LWM-441 and give an open permissive to LWM-442. LWM-442 is operated using controller LWM-IFIC-0647, also on CP-4.

| TASK ELEMENT 5 | STANDARD |
|---|--|
| 6.10.11 To start discharging WCT, perform the following: 6.10.11.1 Momentarily position Liquid Waste Condensate Flow Control hand switch, LWM-441 and LWM-442, to Open until LWM-441 indicates Open. | LWM-441 is opened using control switch |
| Comment: | <u>Critical</u> SAT / UNSAT |

EXAMINER NOTE

When flow rises above the trigger setpoint, the controller output will fail to maximum output. The applicant will be required to secure flow by closing LWM-441 and LWM-442 on CP-4.

| TASK ELEMENT 6 | STANDARD |
|--|--|
| 6.10.11.2 Adjust flow using Liquid Waste Condensate Flow Controller, LWM-IFIC-0647, not to exceed value specified on Liquid Release Permit. | LWM-442 is throttled open using controller to a flow > 0 gpm |
| Comment: EXAMINER NOTE: The controller failure is set to occur when indicated flow exceeds 10 gpm. If applicant does not exceed 10 gpm then cue the booth operator to manually initiate Event Trigger 1. EXAMINER CUE: If asked for a desired flow rate, ask for a recommendation (Should be <50 gpm). If applicant recommends a value <10 gpm, direct the applicant to achieve a flow rate of 40 gpm. | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 7 | STANDARD |
|--|---|
| Recognize discharge flow rate is greater than release permit and stop the release | LWM-441 and LWM-442 closed |
| <p>Comment:</p> <p>EXAMINER NOTE: The applicant may proceed to step 6.10.17 to perform this action.</p> <p>EXAMINER: If directed as NAO to stop WCT Pump A, then use remote function WDR21 to stop the WCT pump and report that the pump has been stopped after 1 minute.</p> | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

1. **IF** there are no gallons indicated on the LWM Flow totalizer, **THEN** reset to IC-184, discharge greater than 100 gallons of water and proceed to step 2.
2. Reset to IC-184
3. For 2014 NRC Exam, ensure setup of JPM S4 is performed concurrently
4. Verify the following (Should be loaded in IC):
 - a. DI-04A3A12C-3 LWM-IFIC-0647 DISCHARGE VALVES LIQUID WASTE CONDEN is tied to Event Trigger 1 (Inactive) with a final value of PUSH.
 - b. DI-04A3A12D-4 LWM-IFIC-0647 DISCHARGE VALVES LIQUID WASTE CONDEN is tied to Event Trigger 1 (Inactive) with a final value of RELEASE.
 - c. DI-04A3A12A-1 LWM-IFIC-0647 DISCHARGE VALVES LIQUID WASTE CONDEN is tied to Event Trigger 1 (Inactive) with a final value of RELEASE.
5. Ensure Event Trigger 1 is inserted as follows (Should be loaded in IC)
 - a. Event – LWM Flow > 10 gpm
 - b. Code is ZAOWDLWMIFRR0647(1) > 0.1

Setup with specific IC unavailable or for non NRC exams:

1. *Prepare a discharge release permit*
2. *Reset to an IC in Mode 3*
3. *discharge greater than 100 gallons of water*
4. *Enter malfunctions and Triggers listed above*
5. *Insert Remote WDR21 WASTE COND PUMP A LWM-MPMP-005A set to START. (This will not appear in the Director Summary in a snapped IC)*
6. *Place simulator in freeze and save IC*

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- The plant is in Mode 3
- Waste Condensate Tank A has been prepared for discharge.
- The RCA Watch reports that he has completed step 6.10.6 in OP-007-004, Liquid Waste Management System, and that Attachment 11.4, Waste Condensate Tank Discharge Checklist, is complete up to step 20.

INITIATING CUE:

- The Control Room Supervisor directs you to commence discharging Waste Condensate Tank A, starting at step 6.10.8 of OP-007-004, Liquid Waste Management System.

Waterford 3

2014 NRC Exam

Job Performance Measure

P1

Establish Local Manual Control of EFW Flow

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Establish local manual control of EFW flow.

Task Standard: Local Manual control of EFW 223A, Emergency Feedwater HDR A to SG1 Backup Flow Cntrl established and valve closed.

References: OP-009-003, Emergency Feedwater Rev. 305

Alternate Path: No Time Critical: No Validation Time: 14 min.

K/A 061 K1.01 AFW and S/G system Importance Rating 4.1/4.1
RO / SRO

Level NAO/RO/SRO
:

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____
Signature

Date: _____

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-009-003, Emergency Feedwater (Handout 1)

Description:

The task takes place during a simulated station blackout with depleting station batteries. This requires the applicant to simulate securing Emergency Feedwater flow manually. This JPM takes place in a location with numerous pipes and supports that are bump hazards, but no special PPE will be required for this task. There are no special radiological requirements to perform this task.

When performing JPM validation, actions are necessary to ensure exam security is maintained.

Prior to commencing in plant JPM validation, contact Health Physics and direct them to disable all cameras in the CAA in a manner that prevents anyone from viewing any of the CAA cameras.

After all in plant JPMs are complete, contact Health Physics to restore the disabled cameras.

DIRECTIONS TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All steps for this JPM will be simulated; do not manipulate any plant components. Make all necessary communications to me. I will provide initiating cues and reports on other actions when directed by you. Indicate to me when you understand your assigned task.

Read the Initial Condition and Cues from the Applicant Cue Sheet, and then give the cue sheet and procedure to the applicant.

| TASK ELEMENT 1 | STANDARD |
|--|------------------------------|
| 8.5 LOCAL OPERATION OF EFW FLOW CONTROL VALVES 8.5.1 If local operation of an Emergency Feedwater (EFW) Flow Control Valve is required, then perform this operation in accordance with Attachment 11.4, Local Operation of EFW Flow Control Valves. | Proceeded to Attachment 11.4 |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 2 | STANDARD |
|---|----------------------|
| CAUTION – THE FOLLOWING SECTION HAS THE POTENTIAL TO AFFECT CORE REACTIVITY | Caution acknowledged |
| Comment: | SAT / UNSAT |

| EXAMINER NOTE |
|---|
| The following table is located under step 11.4.6 of Attachment 11.4 and applies to TASK ELEMENT 3 |

| COMPONENT NUMBER | COMPONENT DESCRIPTION | LOCATION | REQUIRED POSITION | PERFORMED BY (INITIAL / DATE) | IV BY (INITIAL / DATE) |
|------------------|---|--------------------------|--------------------------------------|-------------------------------|------------------------|
| EFW-223A | EMERGENCY FEEDWATER HDR A TO SG1 BACKUP FLOW CNTRL | RB +46 COL 3 A&L EL +56 | CLOSED (HANDWHEEL LOCKED IN NEUTRAL) | | |
| EFW-224A | EMERGENCY FEEDWATER HDR A TO SG1 PRIMARY FLOW CNTRL | RB +46 COL 3 A&N EL +48 | CLOSED (HANDWHEEL LOCKED IN NEUTRAL) | | |
| EFW-223B | EMERGENCY FEEDWATER HDR B TO SG2 BACKUP FLOW CNTRL | RB +46 COL 11 A&N EL +56 | CLOSED (HANDWHEEL LOCKED IN NEUTRAL) | | |
| EFW-224B | EMERGENCY FEEDWATER HDR B TO SG2 PRIMARY FLOW CNTRL | RB +46 COL 11 A&N EL +48 | CLOSED (HANDWHEEL LOCKED IN NEUTRAL) | | |

| TASK ELEMENT 3 | STANDARD |
|---|--|
| 11.4.1 Unlock the handwheel for the EFW Flow Control Valve selected below. | Handwheel unlocked from EFW-223A |
| Comment: EXAMINER CUE: Provide indication that lock has been unlocked | <u>Critical</u> SAT / UNSAT |

| EXAMINER NOTE |
|---|
| The following table is located under step 11.4.8 of Attachment 11.4 and applies to TASK ELEMENT 4 |

| COMPONENT NUMBER | COMPONENT DESCRIPTION | LOCATION | REQUIRED POSITION | PERFORMED BY (INITIAL / DATE) | IV BY (INITIAL / DATE) |
|------------------|-----------------------------|----------------------------------|-------------------|-------------------------------|------------------------|
| NG-927A | NG/IA ISOLATION TO EFW-224B | RAB +46 COL 11 AZ&M EL +52 | OPEN | | |
| NG-928B | NG/IA ISOLATION TO EFW-223B | RAB +46 COL 11 AZ&M EL +52 | OPEN | | |
| NG-827B | NG/IA ISOLATION TO EFW-223A | RAB +46 COL 2 AZ&M EL +52 | OPEN | | |
| NG-828B | NG/IS ISOLATION TO EFW-224A | RAB +46 COL 2 AZ&M EL +52 | OPEN | | |

| TASK ELEMENT 4 | STANDARD |
|---|--|
| 11.4.2 Close the Nitrogen/Instrument Air supply to the selected EFW Flow Control Valve. | NG-827B is closed |
| Comment: EXAMINER CUE: When Applicant simulates closing NG-827B by rotating handwheel in the clockwise direction, inform Applicant that the handwheel will no longer rotate in the close direction. | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 5 | STANDARD |
|---|---|
| 11.4.3 Bleed off air supply line to the selected EFW Flow Control Valve using the air regulator petcock. | Petcock opened |
| <p>Comment:</p> <p>EXAMINER CUE: When applicant has simulated opening the petcock by rotating the petcock in the counter-clockwise direction, inform the applicant that a hissing sound was heard and now that sound has diminished and stopped. The regulator pressure gage reads 0 psig.</p> | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

| TASK ELEMENT 6 | STANDARD |
|--|---|
| 11.4.4 Manually operate the selected EFW Flow Control Valve handwheel to achieve the desired EFW flowrate. | EFW-223A is closed |
| <p>Comment:</p> <p>EXAMINER CUE:</p> <p>If valve position is checked, Show initial indication that valve is currently at the top solid line. (corresponds to full open)</p> <p>When applicant simulates closing valve by rotating handwheel in the clockwise direction, provide cue that the handwheel will no longer rotate in the clockwise direction.</p> <p>If applicant states that he will look at the position indicator, provide a cue by showing valve position closed on valve position indicator (bottom solid line).</p> | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

END OF TASK

APPLICANT CUE SHEET

Do Not Manipulate Any Plant Components

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- The plant has experienced a Station Blackout
- The A & B Train Battery voltages are degrading rapidly
- Emergency Feedwater (EFW) Pump AB is operating
- The Control Room can no longer control EFW from CP-8 controllers
- You have a set of operations keys

INITIATING CUES:

- The CRS directs you to take manual control of EFW 223A, Emergency Feedwater HDR A to SG1 Backup Flow Cntrl and close the valve IAW OP-009-003 Section 8.5.

Waterford 3

2014 NRC Exam

Job Performance Measure

P2

SUPS 014 AB Operation

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Transfer SUPS 014 AB from Alternate to Normal AC power

Task Standard: SUPS 014 AB was transferred from Alternate to Normal AC alignment in accordance with OP-006-005, Inverters and Distribution.

References: OP-006-005, Inverters and Distribution Rev. 308

Alternate Path: Yes Time Critical: No Validation Time: 18 min.

K/A 062 A3.04, Operation of inverter Importance Rating 2.7 / 2.9
RO / SRO

Level: NAO/RO/SRO

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____
Signature

Date: _____

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-006-005, Inverters and Distribution (Handout 1)

Description:

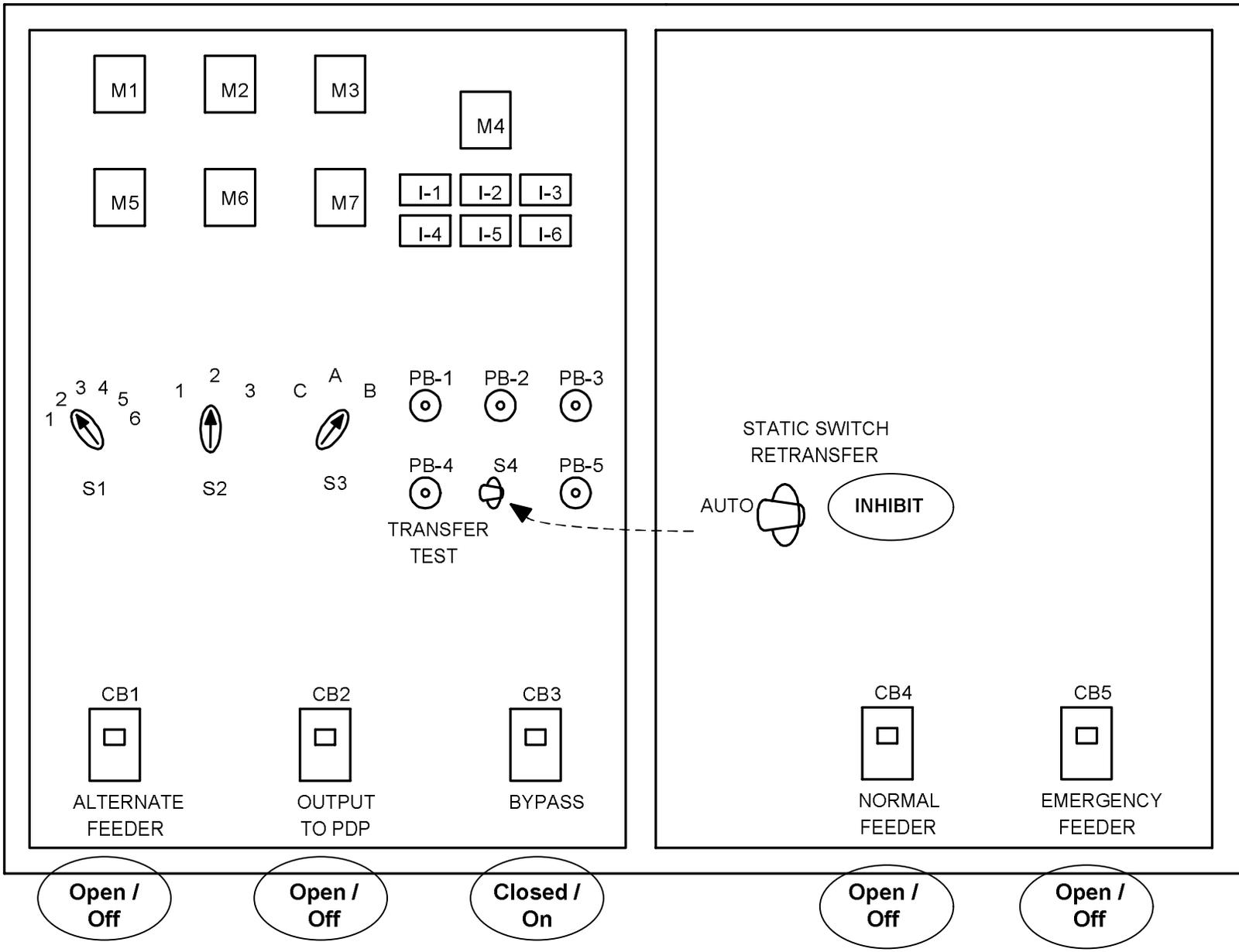
SUPS 014 AB will be simulated in the Alternate AC power alignment. Applicant will transfer SUPS 014 AB to the Normal AC alignment. All steps will be simulated in Switchgear Room A. No special PPE will be required for this task.

There is a summary of the initial breaker positions and the initial meter readings before the task elements.

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All steps for this JPM will be simulated; do not manipulate any plant components. Make all necessary communications to me. I will provide initiating cues and reports on other actions when directed by you. Indicate to me when you understand your assigned task.

Read the Initial Condition and Cues from the Applicant Cue Sheet, and then give the cue sheet and procedure to the applicant.



Indications

METERS

| <u>Item</u> | <u>Designation</u> | <u>Comment</u> |
|-------------|---|---|
| M1 | Inverter Input Voltage (0-150 VDC) | Voltage reads zero until AC power is applied to the rectifier at step 6.5.3.1.1. |
| M2 | Inverter Input Current (0-400 DC Amps) | Current reads zero until AC power is applied to the rectifier at step 6.5.3.1.1. |
| M3 | Battery Current (400 amps discharge to 400 amps charge) | Reads as displayed throughout evolution. |
| M4 | Battery Recharge Timer (0-30 Hours) | Reads as displayed throughout evolution. |
| M5 | AC Voltage (0-250 VAC) | In the Inverter position, Voltage reads zero until step 6.5.3.9. In the UPS position, voltage reads zero until step 6.5.3.4. |
| M6 | Frequency (57-63 Hz) | Frequency reads 60 (center) until step 6.5.3.9. |
| M7 | UPS Output Current (0-150 Amps AC) | System load current reads zero until step 6.5.3.6. |

INDICATOR LIGHTS

| <u>Item</u> | <u>Designation</u> | <u>Indication</u> |
|-------------|--------------------------|--|
| I-1 | Inverter Phase Locked | Illuminates at step 6.5.3.9. |
| I-2 | High-Low DC Voltage | Illuminated at the start of the JPM, clears at step 6.5.3.1. |
| I-3 | Inverter Output Overload | Remains OFF during JPM. |
| I-4 | Over temperature | Remains OFF during JPM. |
| I-5 | Static Switch Inhibited | Illuminated at the start of the JPM, clears at step 6.5.3.3. |
| I-6 | Static Switch On Reserve | Clear at the start of the JPM, illuminates at step 6.5.3.4. |

| TASK ELEMENT 1 | STANDARD |
|---|---|
| <p>6.5.3 Transfer SUPS 014AB from Alternate to Normal AC Power as follows: 6.5.3.1 If SUPS 014AB inverter has been isolated in accordance with step 6.5.2.7, then perform the following: 6.5.3.1.1 Place Normal Feeder breaker, ID-EBKR9335-1 to ON.</p> | <p>Breaker ID-EBKR9335-1 is ON.</p> |
| <p>Comment: EXAMINER CUE: Breaker will be OFF on arrival, provide cue of breaker being moved from OFF to ON. EXAMINER NOTE: Meters M1 (Inverter Input Voltage) and M2 (Inverter Input Current) move to read as is after this step is performed. EXAMINER NOTE: Indicating light I-2 (High-Low DC Voltage) extinguishes after this step is performed</p> | <p style="text-align: center;"><u>Critical</u> SAT / UNSAT</p> |

| TASK ELEMENT 2 | STANDARD |
|---|---|
| <p>6.5.3.1.2 Verify Inverter Input Voltage > 121 VDC, then place Emergency Feeder breaker, ID-EBKR9335-2 to ON.</p> | <p>Breaker ID-EBKR9335-2 is ON.</p> |
| <p>Comment: EXAMINER CUE: When meter checked Inverter Voltage reads as you see it. EXAMINER CUE: Breaker will be OFF on arrival, provide cue of breaker being moved from OFF to ON.</p> | <p style="text-align: center;"><u>Critical</u> SAT / UNSAT</p> |

| TASK ELEMENT 3 | STANDARD |
|--|---|
| <p>6.5.3.1.3 Depress and release Inverter Operate pushbutton.</p> | <p>Pushbutton is pressed and released.</p> |
| <p>Comment: EXAMINER CUE: Pushbutton moved in when depressed and popped out when released.</p> | <p style="text-align: center;"><u>Critical</u> SAT / UNSAT</p> |

| TASK ELEMENT 4 | STANDARD |
|---|---|
| <p>6.5.3.2 Verify SUPS 014AB Static Switch Retransfer toggle switch in INHIBIT.</p> | <p>Verification complete.</p> |
| <p>Comment: EXAMINER CUE: The Static Switch Retransfer toggle switch will be in INHIBIT on arrival.</p> | <p style="text-align: center;">SAT / UNSAT</p> |

| TASK ELEMENT 5 | STANDARD |
|--|---|
| 6.5.3.3 Place SUPS 014AB Alternate Feeder breaker, ID-EBKR9335-3 to ON. | Breaker ID-EBKR9335-3 is ON. |
| <p>Comment:</p> <p>EXAMINER CUE: Breaker will be OFF on arrival, provide cue of breaker being moved from OFF to ON.</p> <p>EXAMINER NOTE: Indicating light I-5 (Static Switch Inhibited) light goes OFF after this step is performed.</p> | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

| TASK ELEMENT 6 | STANDARD |
|--|---|
| 6.5.3.4 Depress and release SUPS 014AB Static Switch Transfer Test pushbutton. | Test pushbutton depressed and released. |
| <p>Comment:</p> <p>EXAMINER CUE: Pushbutton moved in when depressed and popped out when released.</p> <p>EXAMINER NOTE: Indicating light I-6 (Static Switch On Reserve) light illuminates after this step is performed.</p> | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

| TASK ELEMENT 7 | STANDARD |
|--|---|
| 6.5.3.4.1 Verify Static Switch On Reserve light Illuminates. | Verification complete. |
| <p>Comment:</p> <p>EXAMINER CUE: The Static Switch On Reserve light is illuminated.</p> | <p style="text-align: center;">SAT / UNSAT</p> |

| TASK ELEMENT 8 | STANDARD |
|--|---|
| 6.5.3.5 Depress and release SUPS 014AB Lamp Test/Reset pushbutton. | Pushbutton depressed and released. |
| <p>Comment:</p> <p>EXAMINER CUE: Pushbutton moved in when depressed and popped out when released.</p> | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

| TASK ELEMENT 9 | STANDARD |
|---|------------------------|
| 6.5.3.5.1 Verify Static Switch On Reserve light remains Illuminated. | Verification complete. |
| Comment: EXAMINER CUE: The Static Switch On Reserve light is illuminated. | SAT / UNSAT |

| TASK ELEMENT 10 | STANDARD |
|---|--|
| 6.5.3.6 Place SUPS 014AB Output To PDP014AB, ID-EBKR9335-4 breaker to ON. | Breaker ID-EBKR9335-4 is ON. |
| Comment: EXAMINER CUE: Breaker will be OFF on arrival, provide cue of breaker being moved from OFF to ON. | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 11 | STANDARD |
|--|--|
| 6.5.3.7 Place SUPS 014AB Bypass breaker, ID-EBKR9335-5 to OFF. | Breaker ID-EBKR9335-5 is OFF. |
| Comment: EXAMINER CUE: Breaker will be ON on arrival, provide cue of breaker being moved from ON to OFF. | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 12 | STANDARD |
|--|--|
| 6.5.3.8 Place SUPS 014AB AC Voltage Select Switch to INVERTER. | Select Switch is verified in INVERTER. |
| Comment: EXAMINER CUE: AC Voltage Select Switch is in INVERTER EXAMINER NOTE: The AC Voltage Select Switch could be in what ever position the last watch stander left it in. | SAT / UNSAT |

EXAMINER NOTE

Step 6.5.3.9 has been broken up into 2 task elements (13, 14) for clarity with providing cues.

When applicant observes the SUPS Output Voltage meter, provide indication of zero volts.

If the applicant presses the Operate pushbutton, provide the indications provided in Task Element 14.

If the applicant does not press the Operate pushbutton, then provide the indication that the Static Switch On Reserve light is still illuminated at Task Element 17.

| TASK ELEMENT 13 | | STANDARD |
|---|-------------------------------|---|
| 6.5.3.9 If no voltage is indicated, then depress and release SUPS 014AB Inverter Operate pushbutton, and verify the following: | | Prior to pushing the operate pushbutton, observed no voltage in any Inverter position |
| Inverter Phase Locked light | Illuminated | |
| Inverter Output voltage CN | ~120 VAC (118.8 to 121.2 VAC) | |
| Inverter Output voltage AN | ~120 VAC (118.8 to 121.2 VAC) | |
| Inverter Output voltage BN | ~120 VAC (118.8 to 121.2 VAC) | |
| Inverter Output frequency | ~60 Hz (59.97 to 60.03 Hz) | |
| Comment: EXAMINER NOTE: The applicant must use the multi-selector switch and move through these positions. EXAMINER CUE: There is no voltage indicated in any Inverter position. | | SAT / UNSAT |

| TASK ELEMENT 14 | | STANDARD |
|--|--|--|
| 6.5.3.9 If no voltage is indicated, then depress and release SUPS 014AB Inverter Operate pushbutton, and verify the following: | | Pressed and released the Operate pushbutton. |
| Comment: EXAMINER CUE: Pushbutton moved in when depressed and popped out when released. | | <u>Critical</u> SAT / UNSAT |
| EXAMINER CUE: If the applicant observes any UPS position, voltage will be as indicated. | | |

| TASK ELEMENT 15 | STANDARD |
|--|---|
| 6.5.3.10 Place SUPS 014AB Static Switch Retransfer toggle switch to AUTO. | Toggle Switch is in Auto. |
| Comment: EXAMINER CUE: Static Switch Retransfer toggle switch will be in INHIBIT at this point, cue that the switch is moved from INHIBIT to AUTO. | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

| TASK ELEMENT 16 | STANDARD |
|---|---|
| 6.5.3.11 After approximately 30 seconds, depress and release SUPS 014AB Lamp Test/Reset pushbutton. | Pushbutton pressed and released. |
| Comment: EXAMINER CUE: 30 seconds have elapsed. After this pushbutton is depressed, the Static Switch On Reserve light will extinguish. | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

| TASK ELEMENT 17 | STANDARD |
|--|---|
| 6.5.3.11.1 Verify Static Switch On Reserve light Extinguished. | Verification complete. |
| Comment: EXAMINER CUE: Provide indication that the Static Switch On Reserve light is extinguished. | <p style="text-align: center;">SAT / UNSAT</p> |

END OF TASK

APPLICANT CUE SHEET

Do Not Manipulate Any Plant Components

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- SUPS 014 AB is in the Alternate AC alignment
- The inverter was isolated in accordance with OP-006-005, Inverters and Distribution, step 6.5.2.7.

INITIATING CUES:

- The CRS directs you to place SUPS 014 AB in the Normal AC alignment in accordance with OP-006-005, Inverters and Distribution, section 6.5.3.

Waterford 3

2014 NRC Exam

Job Performance Measure

P3

Restore SFP Cooling Pumps from EDG

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Restore Spent Fuel Cooling Pump to Operation via EDG.

Task Standard: Perform correct breaker and valve alignment and contact the control room to have the Spent Fuel Pool Cooling Pump started

References: OP-901-513, Spent Fuel Pool Cooling Malfunction Rev. 009
OP-006-001, Plant Distribution (7KV, 4KV, SSD) System Rev. 313

Alternate Path: No Time Critical: No Validation Time: 14 min.

K/A 033 K3.03 Spent fuel temperature Importance Rating 3.0/3.3
RO / SRO

Level NAO/RO/SRO
:

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____
Signature

Date: _____

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-901-513, Spent Fuel Pool Cooling Malfunction (Handout 1)

Description:

The task takes place during a simulated loss of offsite power with both EDGs supplying their respective electrical busses. The applicant will be directed to restore Spent Fuel Pool Cooling flow via the EDG locally. This requires the applicant to simulate stripping loads from the non-safety related portion of MCC-314 and reenergize the bus. The applicant will then close the breaker for the Spent Fuel Pool Cooling Pump. The applicant will then throttle down on the discharge valve of the pump to be started and then contact the control room to start the Spent Fuel Pool Cooling Pump. This JPM takes place in a location with numerous pipes and supports that are bump hazards, but no special PPE will be required for this task. This task will be performed inside the RCA and RWP requirements apply.

When performing JPM validation, actions are necessary to ensure exam security is maintained.

Prior to commencing in plant JPM validation, contact Health Physics and direct them to disable all cameras in the CAA in a manner that prevents anyone from viewing any of the CAA cameras.

After all in plant JPMs are complete, contact Health Physics to restore the disabled cameras.

DIRECTIONS TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All steps for this JPM will be simulated; do not manipulate any plant components. Make all necessary communications to me. I will provide initiating cues and reports on other actions when directed by you. Indicate to me when you understand your assigned task.

Read the Initial Condition and Cues from the Applicant Cue Sheet, and then give the cue sheet and procedure to the applicant.

| TASK ELEMENT 1 | STANDARD |
|--|---------------|
| Procedure Note: If this attachment is being performed concurrently with OP-901-502, Evacuation of the Control Room & Subsequent Plant Shutdown, then assistance will be required from the Technical Support Center (TSC) to install a jumper between terminals 5 & 6 to bypass the 42 contact for the Spent Fuel Pool Cooling Pump being started. Refer to CWD B424-634 (A Train) or B424-635 (B Train). | Note Reviewed |
| Comment: | SAT / UNSAT |

| TASK ELEMENT 2 | STANDARD |
|---|--|
| 1.0 Restore SFP Cooling Pump A to service from EDG A as follows: 1.1 If MCC-314A is energized and the MCC-314A Safety to Nonsafety Tie, SSD-EBKR-314A-2M, is Open, then perform the following: | MCC-314A checked energized and SSD-EBKR-314A-2M checked Open |
| Comment: EXAMINER NOTE: MCC-314A is energized upon arrival and EBKR-314A-2M is open upon arrival EXAMINER CUE: Provide indication that EBKR-314A-2M is open | SAT / UNSAT |

| TASK ELEMENT 3 | STANDARD |
|--|--------------------------------|
| 1.1.1 Verify EDG A Sequencer has timed out. | Determined sequencer timed out |
| Comment: EXAMINER CUE: If contacted as the control room, provide report that the EDG A sequencer has timed out | SAT / UNSAT |

EXAMINER NOTE

The following table describes as found breaker positions and position required by applicant. This applies to task element 4. The applicant should not open any safety related breakers on this bus.

| Component number | Component Description | As Found | Required position |
|--------------------------|--|------------|-------------------|
| LTN-EBKR-314A-3BL | Lighting Panel 349 FHB +46 Fuel Pool Underwater Ltg | ON | OFF |
| FHS-EBKR-314A-3BR | New Fuel Elevator Supply Breaker | OFF | |
| SSD-EBKR-314A-4BL | Fhb Receptacles F1A To F4A | ON | OFF |
| ACC-EBKR-314A-4BR | Wet Cooling Tower A Basin Filtration | ON | OFF |
| SP-EBKR-314A-4F | West Dry Cooling Tower Sump Pump A | ON | OFF |
| SP-EBKR-314A-4H | Fuel Handling Building Sump Pump A | ON | OFF |
| HVF-EBKR-314A-4M | Fhb Normal Exhaust Fan A | ON | OFF |
| FHS-EBKR-314A-5BL | Spent Fuel Handling Supply Breaker | LOCKED OFF | |
| FHS-EBKR-314A-5BR | SFHM Upender | OFF | |
| FS-EBKR-314A-5D | Fuel Pool Purification Pump | OFF | |
| SP-EBKR-314A-5F | East Dry Cooling Tower Sump Pump A | ON | OFF |
| HVF-EBKR-314A-5HL | Fhb HVAC Room Heater | ON | OFF |
| FS-EBKR-314A-5M | Fuel Pool Pump A | ON | OFF |
| CRN-EBKR-314A-6C | Fuel Handling Building Crane | ON | OFF |

| TASK ELEMENT 4 | STANDARD |
|--|--|
| 1.1.2 Open ALL MCC-314A Nonsafety load breakers. | Listed breakers opened |
| Comment: EXAMINER CUE: When Applicant simulates placing selected breakers to OFF, provide cue that the breakers have been placed from on to off. | <u>Critical</u> SAT / UNSAT |

| TASK ELEMENT 5 | STANDARD |
|--|---|
| 1.1.3 Close SSD-EBKR-314A-2M, MCC314A Safety to Nonsafety Tie. | SSD-EBKR-314A-2M is closed |
| <p>Comment:</p> <p>EXAMINER NOTE: This breaker may be closed by either holding down the close pushbutton or by lifting up on the metal latch on the front of the breaker cubicle.</p> <p>EXAMINER CUE: If asked, provide indication that the spring status indicates charged</p> <p>EXAMINER CUE: When applicant has simulated closing breaker SSD-EBKR-314A-2M provide indication that breaker has gone from open to close.</p> | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

| TASK ELEMENT 6 | STANDARD |
|---|---|
| 1.2 Close FS-EBKR-314A-5M, Fuel Pool Pump A. | FS-EBKR-314A-5M is closed |
| <p>Comment:</p> <p>EXAMINER CUE: When applicant has simulated closing breaker FS-EBKR-314A-5M provide indication that breaker has gone from OFF to ON.</p> | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

| TASK ELEMENT 7 | STANDARD |
|---|---|
| 1.3 Throttle FS-106A, Fuel Pool Pump A Discharge Header Isol Valve, 12 turns open. | Valve FS-106A throttled to 12 turns open |
| <p>Comment:</p> <p>EXAMINER CUE: When applicant simulates turning valve FS-106A handwheel in the clockwise direction for several turns, provide cue that the handwheel will no longer rotate.</p> <p>When the applicant simulates turning valve FS-106A handwheel in the counter clockwise direction for 12 turns, provide cue that the valve handwheel has been turned 12 turns.</p> | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

| TASK ELEMENT 8 | STANDARD |
|---|---|
| 1.4 Start Spent Fuel Pool Cooling Pump A. | Contacted Control Room |
| <p>Comment:</p> <p>EXAMINER CUE: Respond as control room and report that the requested SFPC pump is running.</p> | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

| TASK ELEMENT 6 | STANDARD |
|---|---|
| 1.5 Open FS-106A, Fuel Pool Pump A Discharge Header Isol Valve. | Valve FS-106A opened |
| Comment: EXAMINER CUE: When the applicant simulates turning valve FS-106A handwheel in the counter clockwise direction for several turns, provide cue that the valve handwheel will no longer rotate. | <p style="text-align: center;"><u>Critical</u></p> <p style="text-align: center;">SAT / UNSAT</p> |

END OF TASK

APPLICANT CUE SHEET

Do Not Manipulate Any Plant Components

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- The plant has experienced a loss of offsite power
- Both Emergency Diesel Generators are supplying their respective busses
- Both EDG sequencers have timed out

INITIATING CUES:

- The CRS directs you to restore Spent Fuel Pool Cooling Pump A to operation from the A EDG IAW OP-901-513 Attachment 5.

| Facility: <u>Waterford 3</u> | Scenario No.: <u>1</u> | Op Test No.: _____ | |
|--|--|---|--|
| Examiners: _____ | Operators: _____ | _____ | |
| _____ | _____ | _____ | |
| Initial Conditions: <u>Reactor power is 100%, MOC</u> | _____ | | |
| _____ | | | |
| Turnover: | | | |
| <u>Protected Train is B, AB Busses are aligned to Train B, Nothing is OOS, maintain 100%</u> | | | |
| <u>power</u> | | | |
| _____ | | | |
| Event No. | Malf. No. | Event Type* | Event Description |
| 1 | CVC12A1 | I – ATC I – SRO | (A) VCT level instrument CVC-ILT-0227 Fails high diverting letdown to the Boron Management system. OP-901-113, Volume Control Tank Makeup Control Malfunction |
| 2 | MS23A | C – BOP C – SRO TS – SRO | (A) Atmospheric Dump Valve on Steam Generator #1 spuriously opens requiring closing in accordance with OP-901-221, Secondary System Transient. (TS 3.7.1.7) |
| 3 | RD02 A09 | R – ATC N – BOP N – SRO TS – SRO | (A) Control Element Assembly CEA #9 drops into the core requiring a rapid plant down power to 70%. OP-901-102, CEA or CEDMCs Malfunction. (TS 3.1.3.1) |
| 4 | FW32 B | M – ALL | Main Feedwater Pump B loss of oil pressure trip results in a Reactor Power Cutback and unanalyzed rod configuration and reactor trip. OP-902-000, Standard Post Trip Actions. |
| 5 | RD11 A07 RD11 A37 RD11 A39 | C – ATC | 3 Control Element Assemblies fail to insert into the core following the reactor trip, Emergency Boration (Critical Task 1, commence emergency boration prior to exiting step 1 of OP-902-000) |
| 6 | RP03 | C – BOP | Main Turbine fails to trip automatically requiring manual action. OP-902-000, Standard Post Trip Actions. (Critical Task 2, trip the main turbine prior to T_{COLD} lowering to 443°F) |
| 7 | FW03 A | C – ATC C – SRO | Main Feedwater Pump A overspeed trip resulting in a loss of Main Feedwater requiring stopping of 2 RCPs. OP-902-006, Loss of Main Feedwater Recovery Procedure |
| 8 | RP05 A6/A7 RP05 B6/B7 RP05 C6/C7 RP05 D6/D7 | I – BOP | Emergency Feedwater fails to actuate requiring manual action to initiate Emergency Feedwater. (Critical Task 3, manually actuate EFW prior to SG level lowering to < 55% WR) (#2 Dominant Accident Sequence) |
| * (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor | | | |

Scenario Event Description

NRC Scenario 1

The crew assumes the shift at 100% power with instructions to maintain 100% power.

After taking the shift, Volume Control Tank level instrument CVC-ILT-0227 fails high resulting in valve CVC-169 diverting letdown to the Boron Management System. The ATC should recognize this through indications on the Plant Monitoring Computer. The SRO should enter into procedure OP-901-113, Volume Control Tank Makeup Control Malfunction, and direct the ATC to place valve CVC-169 to the VCT position.

After the procedure has been reviewed and a brief has occurred, the setpoint for #1 Steam Generator Atmospheric Dump Valve (ADV) fails low and the controller MS-IPIC-0303-A1 demands the ADV fully open. The SRO should enter into procedure OP-901-221, Secondary System Transient and direct the BOP to manually close the valve by placing controller MS-IPIC-0303-A1 in manual control and lowering the output to minimum. The SRO should review Technical Specification 3.7.1.7 and determine that the ADV will need to be restored to operable status in automatic within 72 hours or be below 70% Rated Thermal Power within the next 6 hours.

After the SRO addresses Technical Specifications of the above event, Control Element Assembly #9 (Regulating group 4) drops into the core. The SRO should enter into procedure OP-901-102, CEA or CEDMCS Malfunction and proceed to section E₁, CEA Misalignment Greater than 7 inches. The SRO will direct the BOP to adjust turbine load to match T_{AVG} to T_{REF} initially and then perform a rapid plant downpower (commence direct boration to the RCS) within 15 minutes of the dropped CEA to comply with Technical Specification 3.1.3.1 and the COLR. The SRO should evaluate and enter Technical Specifications 3.1.3.1.

After the crew has performed a significant portion of the downpower and at lead Examiner discretion, Main Feedwater Pump B will develop an oil leak that will lead to a loss of oil pressure and a trip of the pump. The BOP will note the tripped pump and a Reactor Power Cutback will occur as expected. The Reactor Power cutback combined with a previous dropped CEA will result in an unanalyzed rod configuration and the ATC will conduct a manual Reactor Trip. During the trip 3 CEAs remain fully withdrawn and the ATC will commence emergency boration to the RCS in accordance with OP-902-000, Standard Post Trip Actions (**Critical Task 1**). While the ATC is emergency borating the RCS, the turbine will fail to automatically trip and MSIS will fail to actuate requiring the BOP to manually trip the turbine or close the Main Steam Isolation Valves in accordance with OP-902-000, Standard Post Trip Actions (**Critical Task 2**).

While the crew is progressing through the action steps of OP-902-000, Standard Post Trip Actions, Main Feedwater Pump A will trip on an overspeed condition resulting in a complete loss of Main Feedwater. The crew will complete Standard Post Trip Actions and enter diagnostics. The crew will enter Appendix 1 of OP-902-009, Standard Appendices and diagnose into OP-902-006, Loss of Main Feedwater Recovery Procedure. The SRO will direct the BOP to ensure that Emergency Feedwater is available to the Steam Generators. At this point, or earlier depending on when the narrow range level in the Steam Generators reaches 27.4% and lowering, Emergency Feedwater actuation failed to occur. The BOP must take action to ensure that a heat sink exists by manually actuating Emergency Feedwater Actuation Signal, establishing Auxiliary Feedwater flow, or depressurizing the Steam Generators and injecting with Condensate pumps (**Critical Task 3**). In Waterford 3 Probabilistic Risk Analysis, the #2 Dominant Accident Sequence that would lead to core damage is a "Loss of Main Feedwater with an EFW failure". This accident would (statistically speaking) constitute 20.86% of all core damage events at WF3. This is mitigated by performing Critical Task 3. The crew will continue on in OP-902-006 and stop 1 RCP in each loop.

The scenario may be terminated once all critical tasks have been completed or performance standards exceeded and when the crew stops 2 RCPs in accordance with OP-902-006, Loss of Main Feedwater Recovery or at the discretion of the lead examiner.

NRC Scenario 1

CRITICAL TASKS

1. ESTABLISH REACTIVITY CONTROL

This task is satisfied by commencing Emergency Boration flow by either Boric Acid makeup pumps or Gravity Feed valves in accordance with OP-902-000, Standard Post Trip Actions step 1 prior to exiting the step to verify Reactivity Control. This task becomes applicable following the initiation of a Reactor Trip.

2. ESTABLISH REACTIVITY CONTROL

This task is satisfied by stopping the steam flow to the Main Turbine by either tripping the Main Turbine manually or by closing the Main Steam Isolation valves before T_{COLD} lowers to below 443°F. This task becomes applicable following the initiation of the Reactor Trip signal.

3. ESTABLISH RCS HEAT REMOVAL

This task is satisfied by manually actuating Emergency Feedwater Actuation System, manually starting at least 1 Emergency Feedwater pump, aligning and starting the Auxiliary Feedwater pump, or depressurizing at least 1 Steam Generator and injecting the Steam Generator with Condensate flow prior to Steam Generator levels reducing below 55% Wide Range in both Steam Generators. This task becomes applicable once Steam Generator water level reduces below 27.4% Narrow Range in one or both Steam Generators.

Scenario Quantitative Attributes

| | |
|--|---|
| 1. Total malfunctions (5–8) | 8 |
| 2. Malfunctions after EOP entry (1–2) | 4 |
| 3. Abnormal events (2–4) | 3 |
| 4. Major transients (1–2) | 1 |
| 5. EOPs entered/requiring substantive actions (1–2) | 1 |
| 6. EOP contingencies requiring substantive actions (0–2) | 0 |
| 7. Critical tasks (2–3) | 3 |

NRC Scenario 1

SCENARIO SETUP

- A. Reset Simulator to IC-187.
- B. Verify Scenario Malfunctions, Remotes, and overrides are loaded, as listed in the Scenario Timeline.
- C. Ensure Protected Train B sign is placed in SM office window.
- D. Verify EOOS is 10.0 Green with nothing out of service
- E. Complete the simulator setup checklist.
- F. Start Insight, open file PlantParameters.tis.

SIMULATOR BOOTH INSTRUCTIONS

Event 1 VCT level instrument, CVC-ILT-0227, Fails High

1. On Lead Examiner's cue, initiate Event **Trigger 1**.
2. If Work Week Manager or PMI are called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.

Event 2 ADV #1 Controller MS-IPIC-0303A SETPOINT FAILURE

1. On Lead Examiner's cue, initiate Event **Trigger 2**.
2. If Work Week Manager or PMI are called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.

Event 3 CEA #9 Falls into the core

1. On Lead Examiner's cue, initiate Event **Trigger 3**.
2. If Work Week Manager or PMI are called, inform the caller that a work package will be assembled and a team will be sent to CEDMCS Alley.
3. If called as RAB and directed to CEDMCs Alley, respond in 3 minutes that you have arrived. If asked, report that there is no apparent cause for the dropped CEA.
4. If Chemistry is called to sample the RCS for Dose Equivalent Iodine due to the down power, acknowledge and report that samples will be taken 2-6 hours from notification time and if asked tell the caller your name is Joe Chemist.
5. If notified as Load Dispatcher (Woodlands) acknowledge the communications and inform the caller that the grid will remain stable with available backup generation.
6. If requested to monitor Polisher Vessel D/P and remove as necessary, acknowledge the report.

Event 4 Main Feedwater pump B Lube oil leak/trip

1. On Lead Examiner's cue, initiate Event **Trigger 4**.
2. After event is initiated, wait 2 minutes and report as NAO that a significant oil leak is coming from B Main Feedwater pump.
3. If directed as NAO to open the breakers from the oil pumps, wait 2 minutes and initiate Event Trigger 14.

Event 5-6 3 CEAs stuck out on Reactor Trip and Main Turbine Fails to Trip

1. No actions for these events.

Event 7 Main Feedwater Pump A overspeed trip

1. On lead examiner's cue, initiate Event **Trigger 7**.
2. If called as NAO to check status of Main Feedwater Pump A, wait 2 minutes and report that you are unable to determine why it has tripped.

Event 8 Emergency Feedwater Actuation System fails to actuate

1. No actions for this event.
2. **At the end of the scenario, before resetting, end data collection and save the file as 2014 Scenario 1-(start-end time).tid. Export to .csv file. Save the file into the folder for the appropriate crew..**

NRC Scenario 1

SCENARIO TIMELINE

| EVENT | KEY | DESCRIPTION | TRIGGER | DELAY HH:MM:SS | RAMP HH:MM:SS | FINAL |
|--------------|---------------|--|----------------|---------------------------|--------------------------|---------------|
| 8 | RP05B6 | FAILS TO TRIP CH B LO S/G LEVEL #1(EFAS-1) EFAS FAILS TO ACTUATE ON LOW S/G LEVEL | N/A | 00:00:00 | 00:00:00 | ACTIVE |
| 8 | RP05B7 | FAILS TO TRIP CH B LO S/G LEVEL #2(EFAS-2) EFAS FAILS TO ACTUATE ON LOW S/G LEVEL | N/A | 00:00:00 | 00:00:00 | ACTIVE |
| 8 | RP05C6 | FAILS TO TRIP CH C LO S/G LEVEL #1(EFAS-1) EFAS FAILS TO ACTUATE ON LOW S/G LEVEL | N/A | 00:00:00 | 00:00:00 | ACTIVE |
| 8 | RP05C7 | FAILS TO TRIP CH C LO S/G LEVEL #2(EFAS-2) EFAS FAILS TO ACTUATE ON LOW S/G LEVEL | N/A | 00:00:00 | 00:00:00 | ACTIVE |
| 8 | RP05D6 | FAILS TO TRIP CH D LO S/G LEVEL #1(EFAS-1) EFAS FAILS TO ACTUATE ON LOW S/G LEVEL | N/A | 00:00:00 | 00:00:00 | ACTIVE |
| 8 | RP05D7 | FAILS TO TRIP CH D LO S/G LEVEL #2(EFAS-2) EFAS FAILS TO ACTUATE ON LOW S/G LEVEL | N/A | 00:00:00 | 00:00:00 | ACTIVE |
| 6 | RP08G | RELAY K305 FAILED, MSISTRAN A (MS/FW) MAIN STEAM ISOLATION SIGNAL FAILS TO ACTUATE | N/A | 00:00:00 | 00:00:00 | ACTIVE |

NRC Scenario 1

| EVENT | KEY | DESCRIPTION | TRIGGER | DELAY HH:MM:SS | RAMP HH:MM:SS | FINAL |
|--------------------------|------------|---|----------------|---------------------------|--------------------------|--------------|
| EVENT DESCRIPTION | | | | | | |
| 6 | RP09F | RELAY K305 FAILED, MSISTRRAIN B (MS/FW) MAIN STEAM ISOLATION SIGNAL FAILS TO ACTUATE | N/A | 00:00:00 | 00:00:00 | ACTIVE |
| 6 | RP08H | RELAY K313 FAILED, MSISTRRAIN A (MS/FW) MAIN STEAM ISOLATION SIGNAL FAILS TO ACTUATE | N/A | 00:00:00 | 00:00:00 | ACTIVE |
| 6 | RP09H | RELAY K313 FAILED, MSISTRRAIN B (MS/FW) MAIN STEAM ISOLATION SIGNAL FAILS TO ACTUATE | N/A | 00:00:00 | 00:00:00 | ACTIVE |
| 5 | RD11A07 | CEA 07 MECHANICALLY STUCK CEA 07 FAILS TO INSERT | N/A | 00:00:00 | 00:00:00 | ACTIVE |
| 5 | RD11A37 | CEA 37 MECHANICALLY STUCK CEA 37 FAILS TO INSERT | N/A | 00:00:00 | 00:00:00 | ACTIVE |
| 5 | RD11A39 | CEA 39 MECHANICALLY STUCK CEA 39 FAILS TO INSERT | N/A | 00:00:00 | 00:00:00 | ACTIVE |
| 6 | RP03 | REACTOR TRIP WITH NO AUTO TURBINE TRIP TURBINE FAILS TO TRIP AUTOMATICALLY | N/A | 00:00:00 | 00:00:00 | ACTIVE |
| 1 | CV12A1 | VCT LEVEL XMTR CVC-ILIC-0227 FAILS HI VCT LEVEL TRANSMITTER FAILS HIGH | 1 | 00:00:00 | 00:00:00 | ACTIVE |
| 2 | MS23A | ADV 1 CNTRLR MS-IPIC-0303A SETPT FAILURE (0-1200 PSIG) ATMOSPHERIC DUMP VALVE CONTROLLER FAILURE | 2 | 00:00:00 | 00:00:00 | 0 |

NRC Scenario 1

| EVENT | KEY | DESCRIPTION | TRIGGER | DELAY HH:MM:SS | RAMP HH:MM:SS | FINAL |
|--|------------|--|----------------|---------------------------|--------------------------|--------------|
| EVENT DESCRIPTION | | | | | | |
| 3 | RD02A09 | DROPPED CEA 09 | 3 | 00:00:00 | 00:00:00 | ACTIVE |
| DROPPED CEA 09 | | | | | | |
| 4 | FW32B | MFW PUMP B LUBE OIL PIPE BREAK | 4 | 00:00:00 | 00:00:00 | 65 |
| MFW PUMP B LUBE OIL PIPE BREAK | | | | | | |
| 7 | FW03A | MFW PUMP A OVERSPEED TRIP | 7 | 00:00:00 | 00:00:00 | ACTIVE |
| MFW PUMP A OVERSPEED TRIP | | | | | | |
| 8 | RP05A6 | FAILS TO TRIP CH A LO S/G LEVEL #1(EFAS-1) | N/A | 00:00:00 | 00:00:00 | ACTIVE |
| EFAS FAILS TO ACTUATE ON LOW S/G LEVEL | | | | | | |
| 8 | RP05A7 | FAILS TO TRIP CH A LO S/G LEVEL #2(EFAS-2) | N/A | 00:00:00 | 00:00:00 | ACTIVE |
| EFAS FAILS TO ACTUATE ON LOW S/G LEVEL | | | | | | |
| 4 | FWR67 | SGFP B MOP-1 BREAKER | 14 | 00:00:00 | 00:00:00 | OPEN |
| OIL PUMP BREAKER REMOTE FUNCTION | | | | | | |
| 4 | FWR68 | SGFP B MOP-2 BREAKER | 14 | 00:00:00 | 00:00:00 | OPEN |
| OIL PUMP BREAKER REMOTE FUNCTION | | | | | | |
| 4 | FWR69 | SGFP B EOP BREAKER | 14 | 00:00:00 | 00:00:00 | OPEN |
| OIL PUMP BREAKER REMOTE FUNCTION | | | | | | |

NRC Scenario 1

REFERENCES

| Event | Procedures |
|--------------|--|
| 1 | OP-901-113, Volume Control Tank Makeup Control Malfunction, Rev. 301 |
| 2 | OP-901-221, Secondary System Transient, Rev. 0 Technical Specification 3.7.1.7 |
| 3 | OP-901-102, CEA or CEDMCS Malfunction, Rev. 301 OP-901-212, Rapid Plant Power Reduction, Rev. 6 OP-901-501, PMC or Core Operating Limit Supervisory System Malfunction, Rev. 13 Technical Specification 3.1.3.1 |
| 4 | OP-901-101, Reactor Power Cutback, Rev. 8 |
| 5 | OP-902-000, Standard Post Trip Actions, Rev. 15 OP-901-103, Emergency boration, Rev. 2 |
| 6 | OP-902-000, Standard Post Trip Actions, Rev. 15 |
| 7 | OP-902-009, Standard Appendices, Rev. 309, Appendix 1, Diagnostic Flow Chart OP-902-006, Loss of Main Feedwater Recovery Procedure, Rev. 15 |
| 8 | OP-902-006, Loss of Main Feedwater Recovery Procedure, Rev. 15 |

Op Test No.: NRC Scenario # 1 Event # 1 Page 1 of 27

Event Description: VCT level instrument CVC-ILT-0227 Fails high.

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

Examiner Note

Cue the Simulator Operator when ready for Event 1

| | | |
|--|------|--|
| | ATC | Recognizes and reports indications of failed channel. |
| | | Alarms: |
| | | <ul style="list-style-type: none"> • PMC PID D39302 NT VCT • PMC PID D39303 FLASH TK |
| | | Indications: |
| | | <ul style="list-style-type: none"> • Valve CVC-169, VCT Inlet/Bypass To Holdup Tanks indicates BMS • VCT level indication CVC-ILT-0226 slowly lowering • VCT level indication PMC-IUR-0001 Green Pen (Flashing) |
| | Note | The SRO may direct the ATC to take manual control of CVC-169, VCT Inlet/Bypass To Holdup Tanks and direct valve to the VCT position prior to entering procedure. |
| | SRO | Enter and direct the implementation of OP-901-113, Volume Control Tank Makeup Control Malfunction |
| OP-901-113, Volume Control Tank Makeup Control Malfunction | | |
| NOTE | | |
| Failure low of VCT level instrument CVC-ILT-0227(PID A39401) will cause RWSP TO CHARGING PUMPS (CVC 507) to open and VCT DISCH VALVE (CVC 183) to close. Failure of VCT level instrument CVC-ILT-0226 (PID A39400) affects CP-4 level indication and Auto makeup to the VCT. | | |
| | SRO | 1. <u>IF</u> a VCT level instrument fails, <u>THEN</u> perform the following: |
| | N/A | a. <u>IF</u> level instrument CVC-ILT-0227 fails low causing Charging Pump suction source to swap to RWSP, <u>THEN</u> perform the following: |

Op Test No.: NRC Scenario # 1 Event # 1 Page 2 of 27

Event Description: VCT level instrument CVC-ILT-0227 Fails high.

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----|--|
| | ATC | b. <u>IF</u> level instrument CVC-ILT-0227 fails high causing the VCT INLET/BYPASS VALVE (CVC 169) to divert to BMS, <u>THEN</u> perform the following: <ol style="list-style-type: none"> 1) Align VCT INLET/BYPASS VALVE (CVC 169) to VCT. 2) Makeup to VCT as required to restore level in accordance with OP-002-005, CHEMICAL AND VOLUME CONTROL. 3) Initiate corrective action to repair level instrument. 5) <u>WHEN</u> level instrument CVC-ILT-0227 is repaired, <u>THEN</u> restore VCT INLET/BYPASS VALVE (CVC 169) to AUTO. |
| | N/A | c. <u>IF</u> level instrument CVC-ILT-0226 fails, <u>THEN</u> secure auto makeup to the VCT in accordance with OP-002-005, CHEMICAL AND VOLUME CONTROL, and monitor VCT level using PMC PID A39401, CVCS VOL CONT TK LVL 1. |
| CAUTION DIRECT LOCAL DILUTION/BORATION OPERATIONS MUST BE DIRECTED FROM THE CONTROL ROOM. THIS REQUIRES THAT CONTINUOUS COMMUNICATIONS BE ESTABLISHED AND MAINTAINED BETWEEN THE CONTROL ROOM AND THE OPERATOR STATIONED IN BAMT ROOM A. <u>IF</u> COMMUNICATION IS LOST AT ANY TIME, <u>THEN</u> THE LOCAL OPERATOR SHALL IMMEDIATELY SECURE DILUTION/BORATION BY CLOSING MANUAL DIRECT BORATION ISOLATION(BAM 138) AND PMU TO CHG PMP SUCT HDR ISOL (PMU 140). | | |
| | N/A | 2. <u>IF</u> boric acid <u>OR</u> primary water flow can <u>NOT</u> be established to VCT, <u>THEN</u> makeup directly to Charging Pump suction as follows: |
| Examiner Note This event is complete after the ATC places CVC-169 to the VCT position or At Lead Examiner's Discretion | | |
| Examiner Note Cue the Simulator Operator when ready for Event 2 | | |

Op Test No.: NRC Scenario # 1 Event # 2 Page 3 of 27

Event Description: Atmospheric Dump Valve #1 spuriously opens

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|------|---|
| | BOP | Recognize and report indications of ADV open. |
| | | Alarms: |
| | | <ul style="list-style-type: none"> • SG 1 ATMOSPHERIC DUMP VLV OPEN (Cabinet M, G-1) • COLSS MASTER (Cabinet L, A-6) • LETDOWN FLOW HI/LO (Cabinet G, C-1) |
| | | Indications |
| | | <ul style="list-style-type: none"> • RCS temperature dropping • ADV 1 setpoint indicates 0 • ADV 1 output is 100% • Reactor Power Rising above 100% |
| | Note | The SRO may direct the BOP to take manual control and close ADV 1 upon the initial report, prior to entering the off normal. |
| | SRO | Enter and direct the implementation of OP-901-221, Secondary System Transient. |
| OP-901-221, Secondary System Transient, E₀ - General | | |
| NOTE | | |
| (1) Some steps of this procedure may not be applicable due to plant conditions. In these cases SM/CRS may NA the step. | | |
| (2) Steps within this procedure may be performed concurrently or out of sequence with SM/CRS concurrence. | | |
| | N/A | 1. If Reactor trip occurs, then go to OP-902-000, Standard Post Trip Actions. |
| | N/A | 2. If Reactor Power Cutback occurs, then perform OP-901-101, Reactor Power Cutback, concurrently with this procedure. |
| | BOP | 3. <u>If</u> an Atmospheric Dump Valve fails or begins to fail Open, <u>then</u> place the respective controller to MANUAL with minimum output. |
| | N/A | 4. <u>If</u> a Steam Bypass Valve fails or begins to fail Open, <u>then</u> perform any of the following (in preferred order) to close the valve. |
| | N/A | 5. <u>If</u> an uncontrollable RCS cooldown exists, <u>then</u> perform the following: |

Op Test No.: NRC Scenario # 1 Event # 2 Page 4 of 27

Event Description: Atmospheric Dump Valve #1 spuriously opens

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

NOTE

- (1) The following are initial turbine load reductions to be considered depending on the current power level, time in core life, and equipment malfunction.

| <u>Transient</u> | <u>Initial Load Reduction</u> | <u>Rate</u> |
|---|-------------------------------|-------------|
| <u>Two</u> or more Heater Drain Pumps Tripping | 100 MW | 40 MW/min |
| FW Heater #1 or #2 Extraction Steam Valve Closure | | |
| Atmospheric Dump Valve Fails Open | | |
| Steam Bypass Valve Fails Open | | |

- (2) With COLSS in service, utilize the following to observe instantaneous power changes for power levels $\geq 40\%$. Reference Attachment 3, COLSS Maneuvering Power Indications, for all other power levels.

| <u>Reactor Power</u> | <u>UFM in service</u> | <u>UFM not in service</u> |
|--------------------------|-----------------------------|-----------------------------|
| $\geq 95\%$ | MSBSRAW (PMC PID C24631) | |
| $< 95\%$ and $\geq 40\%$ | USBSRAW (PMC PID C24629) | FWBSRAW (PMC PID C24630) |

| | | |
|--|-----|---|
| | BOP | 6. <u>If</u> Main Turbine is available, <u>then</u> adjust Turbine load as necessary to maintain the following: <ul style="list-style-type: none"> ▪ Reactor Power $\leq 100\%$ ▪ Match T_{avg} with T_{ref} ▪ FWPT Suction Pressure > 300 PSIG (monitored on CP-1 via CD IPI1280, IP Htrs Outlet Hdr) ▪ RCS T_{cold} 536F – 549F |
|--|-----|---|

Op Test No.: NRC Scenario # 1 Event # 2 Page 5 of 27

Event Description: Atmospheric Dump Valve #1 spuriously opens

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

OP-005-007, Main Turbine and Generator**CAUTION**

THE FOLLOWING SECTION HAS THE POTENTIAL TO AFFECT CORE REACTIVITY. REACTOR POWER, RCS TEMPERATURE, AND MAIN GENERATOR MW LOAD SHOULD BE CLOSELY MONITORED DURING PERFORMANCE OF THIS SECTION.

| | | |
|--|-----|---|
| | BOP | 6.2.1 To change Load/Rate perform the following: 6.2.1.1 Depress LOAD/RATE MW/MIN pushbutton. 6.2.1.2 Depress appropriate numerical pushbuttons for desired load rate. 6.2.1.3 Depress ENTER pushbutton. |
| <u>NOTE</u> | | |
| Prior to changing Reference Demand, Main Turbine load <u>must not</u> be changing. | | |
| | BOP | 6.2.2 To change Main Turbine load, perform the following: 6.2.2.1 Depress REF pushbutton. 6.2.2.2 Depress appropriate numerical pushbuttons for desired MW load. 6.2.2.3 Depress ENTER pushbutton. 6.2.2.4 Depress GO pushbutton. 6.2.2.5 Verify Turbine load change stops at the desired MW load. |
| | N/A | 7. <u>If</u> needed, <u>then concurrently</u> perform OP-901-212, Rapid Plant Down Power, until a power level is reached in which the plant can be stabilized. |
| | N/A | 8. <u>If</u> a loss of Feedwater preheating occurs, <u>then go to</u> E ₁ , Loss of Feedwater Preheating. |
| | SRO | 9. <u>If</u> a loss of secondary inventory occurs (Condensate, Feedwater or Steam leak), <u>then go to</u> E ₂ , Loss of Secondary Inventory. |

Op Test No.: NRC Scenario # 1 Event # 2 Page 6 of 27

Event Description: Atmospheric Dump Valve #1 spuriously opens

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| OP-901-221, Secondary System Transient, E₂ – Loss of Secondary Inventory | | |
|---|---------|---|
| | ATC/BOP | 1. Verify the following: <ol style="list-style-type: none"> 1.1 Pressurizer Pressure Control System maintaining <u>or</u> restoring Pressurizer pressure to 2250 PSIA. 1.2 Pressurizer Level Control System maintaining <u>or</u> restoring Pressurizer level to program level. 1.3 Steam Generator levels being maintained <u>or</u> restored to 50% to 70% Narrow Range level. 1.4 Steam Bypass Control System responding to maintain Steam Generator pressure. |
| | N/A | 2. Dispatch an operator and determine leak severity and location. |
| | SRO | 3. Attempt to safely isolate the leak. <ol style="list-style-type: none"> 3.1 <u>If</u> a Atmospheric Dump Valve is isolated <u>or</u> associated controller placed in manual, <u>then</u> refer to the Technical Specification 3.7.1.7, Atmospheric Dump Valves. |
| | SRO | Reviews the following Technical Specifications and determines applicable actions: <ul style="list-style-type: none"> • 3.7.1.7 action a |
| Examiner Note This event is complete after the BOP places controller MS-IPIC-0303-A1 in manual and closes ADV #1 and the SRO has evaluated Technical Specifications or At Lead Examiner's Discretion | | |
| Examiner Note Cue the Simulator Operator when ready for Event 3 | | |

Op Test No.: NRC Scenario # 1 Event # 3 Page 7 of 27

Event Description: Control Element Assembly #9 drops into the core

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----------|---|
| | ATC / BOP | Recognize and report indications of dropped CEA |
| | | Alarms |
| | | <ul style="list-style-type: none"> RPS CHANNEL TRIP LOCAL PWR DENSITY HI (Cabinet K, A-11) |
| | | <ul style="list-style-type: none"> RPS CHANNEL TRIP DNBR LO (Cabinet K, A-12) |
| | | <ul style="list-style-type: none"> LOCAL PWR DENSITY HI PRETRIP B/D (Cabinet K, C-11) |
| | | <ul style="list-style-type: none"> DNBR LO PRETRIP B/D (Cabinet K, C-12) |
| | | <ul style="list-style-type: none"> CEA CHANNEL B DEVIATION (Cabinet K, H-12) |
| | | <ul style="list-style-type: none"> CEA CHANNEL C DEVIATION (Cabinet K, K-13) |
| | | <ul style="list-style-type: none"> CEA CALCULATOR CHNL B TROUBLE (Cabinet K, K-15) |
| | | <ul style="list-style-type: none"> CEA CALCULATOR CHNL C TROUBLE (Cabinet K, K-16) |
| | | <ul style="list-style-type: none"> RPS CHANNEL D TROUBLE (Cabinet K, H-18) |
| | | |
| | | Indications |
| | | <ul style="list-style-type: none"> Rod bottom light for CEA 9 |
| | | <ul style="list-style-type: none"> T_{COLD} dropping |
| | | <ul style="list-style-type: none"> LPD and DNBR trips on Channel D (targeted channel) |
| | | |
| Examiner Note | | |
| <p>The CRS may direct a Main Turbine load reduction before entering the off normal procedure to raise T_{COLD}. It is not required to do this before entering OP-901-102. This is not a deficiency if the CRS does not perform this step at this time. If the CRS performs this step, the guidance is located on page 8.</p> | | |
| | CRS | Enter and direct the implementation of OP-901-102, CEA or CEDMCS Malfunction. |
| | | |
| OP-901-102, CEA or CEDMCS Malfunction, Immediate Operator Actions | | |
| Examiner Note | | |
| This is the immediate action for this procedure. This is not applicable to this scenario. | | |
| | N/A | 1. If in Mode 1 and two or more Control Element Assemblies drop or are misaligned by >19 inches, then manually trip the Reactor and go to OP-902-000, Standard Post Trip Actions. |
| | | |
| OP-901-102, CEA or CEDMS Malfunction, E₀, General | | |
| | N/A | 2. If <u>any</u> of the following occur, <u>then</u> manually trip the Reactor <u>and go to</u> OP-902-000, Standard Post Trip Actions: |
| | | |
| | SRO | 3. If Control Element Assembly is misaligned >7 inches, <u>then go to</u> section E ₁ , CEA Misalignment Greater Than 7 Inches. |
| | | |

Op Test No.: NRC Scenario # 1 Event # 3 Page 8 of 27

Event Description: Control Element Assembly #9 drops into the core

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
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OP-901-102, CEA or CEDMS Malfunction, E₁, CEA Misalignment Greater than 7 inches

| | | |
|--|-----|--|
| | SRO | 1. Match T_{avg} and T_{ref} by performing the following: <ul style="list-style-type: none"> ▪ Adjust Turbine load in accordance with OP-010-004, Power Operations. ▪ Adjust RCS boron concentration in accordance with OP-002-005, Chemical and Volume Control. |
|--|-----|--|

OP-005-007, Main Turbine and Generator**CAUTION**

THE FOLLOWING SECTION HAS THE POTENTIAL TO AFFECT CORE REACTIVITY. REACTOR POWER, RCS TEMPERATURE, AND MAIN GENERATOR MW LOAD SHOULD BE CLOSELY MONITORED DURING PERFORMANCE OF THIS SECTION.

| | | |
|--|-----|--|
| | BOP | 6.2.1 To change Load/Rate perform the following: <ul style="list-style-type: none"> 6.2.1.1 Depress LOAD/RATE MW/MIN pushbutton. 6.2.1.2 Depress appropriate numerical pushbuttons for desired load rate. 6.2.1.3 Depress ENTER pushbutton. |
|--|-----|--|

NOTE

Prior to changing Reference Demand, Main Turbine load must not be changing.

| | | |
|--|-----|--|
| | BOP | 6.2.2 To change Main Turbine load, perform the following: <ul style="list-style-type: none"> 6.2.2.1 Depress REF pushbutton. 6.2.2.2 Depress appropriate numerical pushbuttons for desired MW load. 6.2.2.3 Depress ENTER pushbutton. 6.2.2.4 Depress GO pushbutton. 6.2.2.5 Verify Turbine load change stops at the desired MW load. |
|--|-----|--|

OP-901-102, CEA or CEDMS Malfunction, E₁, CEA Misalignment Greater than 7 inches

| | | |
|--|-----|---|
| | SRO | 2. Notify Duty Plant Manager <u>and</u> Duty Engineering. |
| | SRO | 3. Record time of CEA misalignment >7 inches in Station Log. |
| | SRO | 4. <u>If</u> CEA misalignment >19 inches, <u>then go to</u> step 8. |

Op Test No.: NRC Scenario # 1 Event # 3 Page 9 of 27

Event Description: Control Element Assembly #9 drops into the core

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
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CAUTION

A POWER REDUCTION MUST BE STARTED WITHIN 15 MINUTES OF CEA MISALIGNMENT >7 INCHES TO COMPLY WITH TECH SPEC 3.1.3.1.

Examiner Note

The SRO should determine that a power reduction is required within 60 minutes.

NOTE

- (1) Complete the required down-power prior to withdrawal of the affected CEA.
- (2) If a Shutdown Bank CEA has dropped or is misaligned and is <145 inches withdrawn, then CEA Group Out of Sequence annunciator (A-7 on Cabinet L) is an expected annunciator when performing ASI Control using Regulating Group CEAs.

| | | |
|--|-----|---|
| | SRO | <p>8. <u>If</u> misalignment >19 inches <u>or</u> affected CEA is <u>not</u> aligned to within 7 inches of <u>all</u> other CEAs in the same group within 15 minutes, <u>then</u> perform the following:</p> <ul style="list-style-type: none"> ▪ Reduce power in accordance with OP-901-212, Rapid Plant Power Reduction to comply with Technical Specification 3.1.3.1. ▪ Maintain T_{avg} at T_{ref} by adjusting turbine load ▪ <u>If</u> PMC is Operable, <u>then</u> verify CEA Pulse Counter indication is correct <u>or</u> enter the correct CEA position in the PMC database. ▪ Declare COLSS Inoperable <u>and</u> enter OP-901-501, PMC or COLSS Inoperable <u>and</u> perform concurrently with this procedure due to COLSS being Inoperable. ▪ Use SEC CAL PWR (C24230), CBTFSP (C24102), BDELTA (C24104), CBDELTA (C24103), <u>or</u> TURB PWR (C24101) for indication during power reduction. |
|--|-----|---|

Examiner Note

When a full crew complement is present, OP-901-501, PMC or COLSS inoperable would be performed by the STA.

Op Test No.: NRC Scenario # 1 Event # 3 Page 10 of 27

Event Description: Control Element Assembly #9 drops into the core

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

OP-901-212, Rapid Plant Power Reduction, E₀, General Actions**NOTE**

- (1) A rapid power reduction is defined as approximately 30 MW/minute load reduction on the main turbine.
- (2) Power Reduction may be stopped at any point.
- (3) Some Steps of this procedure may not be applicable due to plant conditions. In these cases SM/CRS may NA the step.
- (4) Steps within this procedure may be performed concurrently or out of sequence with SM/CRS concurrence.
- (5) During power reduction PMC PID C24650, COLSS DESCENDING PWR TRACK (DUMOUT19), will automatically select and display the correct power indication. OP-010-003, Plant Startup, provides greater detail on which power indications are displayed by PID C24650 based on power level and whether or not the UFM is in service.
- (6) Volume Control Tank (VCT) level may lower during the down power. Charging pump suction swaps to the RWSP at 8% VCT level. Makeup to the VCT in accordance with OP-002-005, Chemical and Volume Control, may be necessary if boration from the RWSP is not desired.

| | | |
|--|-----|--|
| | ATC | <ol style="list-style-type: none"> 1. Begin RCS Boration by one of the following methods: <ol style="list-style-type: none"> 1.1 Direct Boration or 1.2 Borate from the RWSP using one or two Charging Pump as follows: <ol style="list-style-type: none"> 1.2.1 Open RWSP to Charging Pumps Suction Isolation, CVC-507. 1.2.2 Close Volume Control Tank Outlet Isolation, CVC-183. 1.2.3 <u>If necessary, then</u> start another Charging pump |
|--|-----|--|

OP-005-005, Chemical and Volume Control**CAUTION**

- (1) THIS SECTION AFFECTS REACTIVITY. THIS EVOLUTION SHOULD BE CROSS-CHECKED AND COMPLETED PRIOR TO LEAVING CP-4.
- (2) AT LEAST ONE REACTOR COOLANT PUMP IN EACH LOOP SHOULD BE OPERATING PRIOR TO PERFORMING DIRECT BORATION OPERATIONS TO ENSURE PROPER CHEMICAL MIXING.

| | | |
|--|-----|---|
| | ATC | 6.7.1 Inform SM/CRS that this Section is being performed. |
|--|-----|---|

Op Test No.: NRC Scenario # 1 Event # 3 Page 11 of 27

Event Description: Control Element Assembly #9 drops into the core

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
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NOTE

When performing a Plant down power where final RCS Boron Concentration needs to be determined, the following Plant Data Book figure(s) will assist the Operator in determining the required RCS Boron PPM change.

- 1.2.1.1 Power Defect Vs Power Level
- 1.4.3.1 Inverse Boron Worth Vs. T_{mod} at BOC (<30 EFPD)
- 1.4.4.1 Inverse Boron Worth Vs. T_{mod} at Peak Boron (30 EFPD up to 170 EFPD)
- 1.4.5.1 Inverse Boron Worth Vs. T_{mod} at MOC (170 EFPD up to 340 EFPD)
- 1.4.6.1 Inverse Boron Worth Vs. T_{mod} at EOC (≥ 340 EFPD)

| | | |
|--|-----|--|
| | ATC | 6.7.2 At SM/CRS discretion, calculate volume of Boric Acid to be added on Attachment 11.6, Calculation of Boric Acid Volume for Direct Boration or VCT Borate Makeup Mode. |
| | ATC | 6.7.3 Set Boric Acid Makeup Batch Counter to volume of Boric Acid desired. |
| | ATC | 6.7.4 Verify Boric Acid Makeup Pumps selector switch aligned to desired Boric Acid Makeup Pump A(B). |
| | ATC | 6.7.5 Place Direct Boration Valve, BAM-143, control switch to AUTO. |
| | ATC | 6.7.6 Place Makeup Mode selector switch to BORATE. |
| | ATC | 6.7.7 Verify selected Boric Acid Makeup Pump A(B) Starts. |
| | ATC | 6.7.8 Verify Direct Boration Valve, BAM-143, Opens. |

NOTE

The Boric Acid Flow Totalizer will not register below 3 GPM. The Boric Acid Flow Totalizer is most accurate in the range of 10 - 25 GPM.

| | | |
|--|-----|--|
| | ATC | 6.7.9 If manual control of Boric Acid flow is desired, <u>then</u> perform the following: <ul style="list-style-type: none"> 6.7.9.1 Verify Boric Acid Flow controller, BAM-IFIC-0210Y, in Manual. 6.7.9.2 Adjust Boric Acid Flow controller, BAM-IFIC-0210Y, output to >3 GPM flow rate. |
|--|-----|--|

Op Test No.: NRC Scenario # 1 Event # 3 Page 12 of 27

Event Description: Control Element Assembly #9 drops into the core

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----|---|
| | N/A | 6.7.10 If automatic control of Boric Acid flow is desired, <u>then</u> perform the following: 6.7.10.1 Place Boric Acid Flow controller, BAM-IFIC-0210Y, in Auto. 6.7.10.2 Adjust Boric Acid Flow controller, BAM-IFIC-0210Y, setpoint potentiometer to >3 GPM flow rate. |
| | ATC | 6.7.11 Verify Boric Acid Makeup Control Valve, BAM-141, Intermediate <u>or</u> Open. |
| | ATC | 6.7.12 Observe Boric Acid flow rate for proper indication. |
| | ATC | 6.7.13 <u>When</u> Boric Acid Makeup Batch Counter has counted down to desired value, <u>then</u> verify Boric Acid Makeup Control Valve, BAM-141, Closed. |
| Examiner Note | | |
| The step below is only applicable if the ATC adds acid in small batches. | | |
| <u>NOTE</u> | | |
| Step 6.7.14 may be repeated as necessary to achieve desired total boron addition for plant conditions. | | |
| | ATC | 6.7.14 If additional boric acid addition is required <u>and</u> with SM/CRS permission, <u>then</u> perform the following: 6.7.14.1 Reset Boric Acid Makeup Batch Counter. 6.7.14.2 Verify Boric Acid Makeup Control Valve, BAM-141, Intermediate <u>or</u> Open. 6.7.14.3 Observe Boric Acid flow rate for proper indication. 6.7.14.4 <u>When</u> Boric Acid Makeup Batch Counter has counted down to desired value, <u>then</u> verify Boric Acid Makeup Control Valve, BAM-141, Closed. |
| | ATC | 6.7.15 Verify Boric Acid Flow controller, BAM-IFIC-0210Y, in Manual. |
| | ATC | 6.7.16 Verify <u>both</u> Boric Acid Flow controller, BAM-IFIC-0210Y, output <u>and</u> setpoint potentiometer set to zero. |
| | ATC | 6.7.17 Place Makeup Mode selector switch to MANUAL. |
| | ATC | 6.7.18 Verify Selected Boric Acid Makeup Pump A (B) Stops. |

Op Test No.: NRC Scenario # 1 Event # 3 Page 13 of 27

Event Description: Control Element Assembly #9 drops into the core

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
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| | | |
|---|-----|---|
| | ATC | 6.7.19 Verify Direct Boration Valve, BAM-143, Closed. |
| | | |
| | ATC | 6.7.20 Place Direct Boration Valve, BAM-143, control switch to CLOSE. |
| | | |
| OP-901-212, Rapid Plant Power Reduction, E₀, General Actions | | |
| <u>NOTE</u> | | |
| To prevent Pressurizer heater cutout, avoid operating with Pressurizer pressure near the heater cutout pressure of 2270 PSIA while on Boron Equalization. | | |
| | ATC | 2. Perform Boron Equalization as follows: 2.1 Place available Pressurizer Pressure Backup Heater Control Switches to ON. 2.2 Reduce Pressurizer Spray Valve Controller (RC-IHIC-0100) setpoint potentiometer to establish spray flow and maintain RCS pressure 2250 PSIA (2175 – 2265). |
| | | |
| <u>CAUTION</u> | | |
| REFER TO TECHNICAL SPECIFICATION 3.1.3.6 FOR TRANSIENT INSERTION LIMITS. | | |
| | ATC | 3. Operate CEAs in accordance with OP-004-004, Control Element Drive, to maintain ASI using CEA Reg. Group 5, 6 or Group P Control Element Assemblies in accordance with OP-010-005, Plant Shutdown, Attachment 9.10, Axial Shape Control Guidelines. |
| | | |
| | SRO | 4. Notify the Woodlands System Load Dispatcher that a rapid power reduction is in progress. |
| | | |
| | BOP | 5. Announce to Station Personnel over the Plant Paging System that a rapid plant power reduction is in progress. |
| | | |
| | ATC | 6. Maintain RCS Cold Leg Temperature 536°F to 549°F. |
| | | |
| | BOP | 7. Commence Turbine load reduction by performing the following: 7.1 Depress LOAD RATE MW/MIN pushbutton. 7.2 Set selected rate in Display Demand Window. 7.3 Depress ENTER pushbutton. 7.4 Depress REFERENCE pushbutton. 7.5 Set desired load in Reference Demand Window. 7.6 Depress ENTER pushbutton. 7.7 Depress GO pushbutton. |
| | | |

Op Test No.: NRC Scenario # 1 Event # 3 Page 14 of 27

Event Description: Control Element Assembly #9 drops into the core

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
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NOTE

If USBSCAL is not in service, the COLSS Steam Calorimetric will be automatically disabled when MSBSCAL, PMC PID C24246, drops below 95% Power, and will revert back to FWBSCAL, PMC PID C24235. This may result in a step change in COLSS indicated Plant Power (BSCAL) of up to 1.0% when this occurs.

| | | |
|---|-----|---|
| | ATC | 8. <u>When</u> Reactor Power consistently indicates less than 98% power, as indicated on PMC PID C24631 [MAIN STEAM RAW POWER (MSBSRAW)], <u>or</u> an alternate point provided by Reactor Engineering, <u>then</u> verify the value of C24648 [BSCAL SMOOTHING VAL. APPLD (DUMOUT17)] automatically changes to 1. |
| | N/A | 9. <u>If</u> C24648 does not automatically change to 1, <u>then</u> inform Reactor Engineering <u>and</u> set the value of 1 for COLSS power smoothing constant K24250, [ADDRSSBL SMOOTHING FOR BSCAL (ALPHA)] in accordance with OP-004-005, Core Operating Limits Supervisory System. |
| | BOP | 10. Following a Reactor Power change of >15% within a one hour period, direct Chemistry Department to sample Reactor Coolant System (RCS) for an isotopic iodine analysis two to six hours later. |
| | BOP | 11. <u>When</u> Condensate flow is <18,000 gpm, <u>verify</u> Gland Steam Condenser Bypass, CD-154, Closed (PMC PID D02404). |
| | BOP | 12. Monitor Condensate Polisher differential pressure <u>and</u> remove Polishers from service to maintain system pressure in accordance with OP-003-031, Condensate Polisher/Backwash Treatment. |
| | N/A | 13. <u>When</u> Reactor Power is approximately 70% <u>or</u> Heater Drain Pump flow is unstable, <u>then</u> remove Heater Drain Pumps from service by taking pump control switches to Stop. |
| OP-901-102, CEA or CEDMS Malfunction, E1, CEA Misalignment Greater than 7 inches | | |
| | SRO | 9. <u>If either</u> of the following occur, <u>then</u> within one hour declare CEA Inoperable <u>and</u> verify acceptable Shutdown Margin in accordance with OP-903-090, Shutdown Margin: <ul style="list-style-type: none"> ▪ Misaligned CEA is in Shutdown Bank <u>and cannot</u> be withdrawn to ≥ 145 inches [T.S. 3.1.3.5] or <ul style="list-style-type: none"> ▪ <u>Any</u> CEA is misaligned from its group by >7 inches <u>and cannot</u> be aligned [T.S. 3.1.3.1] |

Op Test No.: NRC Scenario # 1 Event # 3 Page 15 of 27

Event Description: Control Element Assembly #9 drops into the core

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----|---|
| | SRO | Reviews the following Technical Specifications and determines applicable actions: <ul style="list-style-type: none"> • 3.1.3.1 action c |
| | | |
| | ATC | 10. Monitor the following for compliance with Technical Specifications: <ul style="list-style-type: none"> ▪ Linear Heat Rate (LPD) [T.S. 3.2.1] ▪ Departure from Nucleate Boiling Ratio [T.S. 3.2.4] ▪ Azimuthal Power Tilt [T.S. 3.2.3] ▪ ASI [T.S. 3.2.7] |
| | ATC | 11. Perform the following to verify compliance with Technical Specification 3.2.3: <ul style="list-style-type: none"> ▪ Verify COLSS is detecting Azimuthal Power Tilt as influenced by the misaligned CEA. ▪ <u>If</u> measured Azimuthal Power Tilt exceeds 0.03, <u>then</u> verify Azimuthal Power Tilt within limits of Technical Specification 3.2.3 ▪ <u>If</u> measured Azimuthal Power Tilt exceeds CPC Power Tilt Allowance, <u>then</u> adjust CPC Power Tilt allowance to \geq the measured value in accordance with OP-004-006, Core Protection Calculator System. |
| <u>NOTE</u> <u>If</u> the CEA misalignment is due to a dropped rod <u>then</u> the ACTM card for the dropped rod may need to be reset if the CEA is not responding to a withdrawal demand. | | |
| | ATC | 12. Maintain ASI within ± 0.05 of target ESI to limit potential impact of transient Xenon on core peaking using Manual Group <u>or</u> Manual Sequential. |
| | | |
| | N/A | 13. Correct cause of CEA misalignment. |
| | | |
| | BOP | 14. <u>If</u> initial Reactor power is $\geq 75\%$, <u>then</u> notify Chemistry Department to sample Reactor Coolant System for an isotopic iodine analysis within two to six hours due to a power reduction of $\geq 15\%$ in one hour. |
| | | |
| Examiner Note This event is complete after the Reactivity Manipulation is satisfied and the SRO has evaluated Technical Specifications OR At Lead Examiner's Discretion | | |

Op Test No.: NRC Scenario # 1 Event # 3 Page 16 of 27

Event Description: Control Element Assembly #9 drops into the core

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

Examiner Note

Event 5 and 6 will occur automatically after the crew takes action responding to Event 4.

Examiner Note

Cue the Simulator Operator when ready for Event 4

Op Test No.: NRC Scenario # 1 Event # 4 Page 17 of 27

Event Description: Main Feedwater Pump Trip / Reactor Cutback leads to Reactor Trip

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|---|-----------|---|
| | ATC / BOP | Recognize and report indications of MFP Trip and Reactor Cutback |
| | | Alarms |
| | | <ul style="list-style-type: none"> FWPT B OIL PUMP TROUBLE (Cabinet F, R-18) |
| | | <ul style="list-style-type: none"> REACTOR PWR CUTBACK ACTUATION (Cabinet H, K-5) |
| | | <ul style="list-style-type: none"> FWPT B FLOW LO (Cabinet F, M-20) |
| | | <ul style="list-style-type: none"> FWPT B FLOW LO-LO (Cabinet F, N-20) |
| | | <ul style="list-style-type: none"> FWPT B DISCH PRESS/FLOW MONITOR FAIL (Cabinet F, P-20) |
| | | <ul style="list-style-type: none"> SG 2 LEVEL HI/LO (Cabinet F, U-18) |
| | | <ul style="list-style-type: none"> SG1 LEVEL HI/LO (Cabinet F, U-14) |
| | | <ul style="list-style-type: none"> HTR DRAIN PUMP A(B)(C) TRIP/TROUBLE [Cabinet F, P-11(12)(13)] |
| | | <ul style="list-style-type: none"> HTR DRAIN PUMP A(B)(C) SUCTION PRESS LO [Cabinet F, Q-11(12)(13)] |
| | | <ul style="list-style-type: none"> HTR DRAIN PUMP A FLOW LO (Cabinet F, R-11(12)(13)) |
| | | Indications |
| | | <ul style="list-style-type: none"> Rod bottom lights for CEAs 44, 21, 45, 22, 46, 23, 47, 20 |
| | | <ul style="list-style-type: none"> T_{COLD} dropping |
| | | <ul style="list-style-type: none"> Reactor Power Dropping |
| | CRS | Enter and direct the implementation of OP-901-101, Reactor Power Cutback. |
| Examiner Note | | |
| The SRO should direct a manual Reactor Trip due to incorrect rod configuration following the Reactor Power Cutback | | |
| | ATC | Trip the Reactor and enter OP-902-000, Standard Post Trip Actions |
| Examiner Note | | |
| The subsequent actions contained in Event 4 will be contained after events 5 and 6 which occur in order of how they will be performed during the scenario. | | |

Op Test No.: NRC Scenario # 1 Event # 5 Page 18 of 27

Event Description: 3 CEAs fail to insert on the Reactor Trip

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|---|-----|---|
| | ATC | Recognize and report indications of 3CEAs fail to insert |
| | | Alarms |
| | | <ul style="list-style-type: none"> • N/A |
| | | Indications |
| | | <ul style="list-style-type: none"> • Rod bottom lights for CEAs 7, 37, 39 extinguished • CEA position for CEA 7, 37, 39 showing withdrawn |
| OP-902-000, Standard Post Trip Actions | | |
| | ATC | 1. <u>Determine Reactivity Control</u> acceptance criteria are met: <ol style="list-style-type: none"> a. <u>Check</u> reactor power is dropping. b. <u>Check</u> startup rate is negative. c. <u>Check</u> less than TWO CEAs are NOT fully inserted. |
| | ATC | c.1 Commence emergency boration. |
| <u>CRITICAL TASK</u> | | |
| ESTABLISH REACTIVITY CONTROL | | |
| <p>This task is satisfied by commencing Emergency Boration flow by either Boric Acid makeup pumps or Gravity Feed valves in accordance with OP-902-000, Standard Post Trip Actions step 1 prior to exiting the step to verify Reactivity Control.</p> <p>This task becomes applicable following the initiation of a Reactor Trip.</p> | | |
| Examiner Note | | |
| The steps below are contained on an Operator Aid on the RTGB | | |
| | ATC | 1. Place Makeup Mode selector switch to MANUAL. (CRITICAL) |
| | ATC | 2. Align borated water source by performing one of the following (a. or b.): (CRITICAL) <ol style="list-style-type: none"> a. Initiate Emergency Boration using Boric Acid Pump as follows: <ul style="list-style-type: none"> ▪ Open Emergency Boration Valve, BAM-133. ▪ Start one Boric Acid Pump. ▪ Close recirc valve for Boric Acid Pump started: BAM-126A Boric Acid Makeup Pump Recirc Valve A or ▪ BAM-126B Boric Acid Makeup Pump Recirc Valve B |

Op Test No.: NRC Scenario # 1 Event # 5 Page 19 of 27

Event Description: 3 CEAs fail to insert on the Reactor Trip

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----|---|
| | ATC | b. Initiate Emergency Boration using Gravity Feed as follows: <ul style="list-style-type: none"> ▪ Open the following Boric Acid Makeup Gravity Feed valves: <ul style="list-style-type: none"> ▪ BAM-113A Boric Acid Makeup Gravity Feed Valve A ▪ BAM-113B Boric Acid Makeup Gravity Feed Valve B |
| | ATC | 3. Close VCT Disch Valve, CVC-183. (CRITICAL) |
| | ATC | 4. Verify at least one Charging Pump operating and Charging Header flow ≥ 40 GPM. |

Examiner Note**This event is complete after the ATC has established emergency boration****OR****At Lead Examiner's Discretion**

Op Test No.: NRC Scenario # 1 Event # 6 Page 20 of 27

Event Description: Turbine Fails to Automatically Trip

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----|--|
| | BOP | Recognize indications of Main Turbine failing to trip |
| | | Alarms |
| | | <ul style="list-style-type: none"> • N/A |
| | | Indications |
| | | <ul style="list-style-type: none"> • Main Turbine Governor and Throttle valves indicate open • T_{COLD} lowering • RCS pressure lowering |
| OP-902-000, Standard Post Trip Actions | | |
| | BOP | 2. <u>Determine Maintenance of Vital Auxiliaries</u> acceptance criteria are met: <ol style="list-style-type: none"> a. <u>Check</u> the Main Turbine is tripped: <ul style="list-style-type: none"> • Governor valves closed • Throttle valves closed |
| <u>CRITICAL TASK</u> ESTABLISH REACTIVITY CONTROL This task is satisfied by stopping the steam flow to the Main Turbine by either tripping the Main Turbine manually or by closing the Main Steam Isolation valves before T_{COLD} lowers to below 443°F. This task becomes applicable following the initiation of the Reactor Trip signal. | | |
| | BOP | a.1 Perform ANY of the following: (CRITICAL) <ol style="list-style-type: none"> 1) Manually trip the Main Turbine using TURBINE TRIP and THINK pushbuttons. 2) Close BOTH MSIVs. |
| Examiner Note This event is complete after the BOP has stopped steam flow to the Main Turbine OR At Lead Examiner's Discretion | | |

Op Test No.: NRC Scenario # 1 Event # 4 Page 21 of 27

Event Description: Main Feedwater Pump Trip / Reactor Cutback leads to Reactor Trip

| Time | Position | Applicant's Actions or Behavior |
|---|----------|---|
| | BOP | b. <u>Check</u> the Main Generator is tripped: <ul style="list-style-type: none"> • GENERATOR BREAKER A tripped • GENERATOR BREAKER B tripped • EXCITER FIELD BREAKER tripped |
| | BOP | c. <u>Check</u> station loads are energized from offsite electrical power as follows: <p><u>Train A</u></p> <ul style="list-style-type: none"> • A1, 6.9 KV non safety bus • A2, 4.16 KV non safety bus • A3, 4.16 KV safety bus • A-DC electrical bus • A or C vital AC Instrument Channel <p><u>Train B</u></p> <ul style="list-style-type: none"> • B1, 6.9 KV non safety bus • B2, 4.16 KV non safety bus • B3, 4.16 KV safety bus • B-DC electrical bus • B or D vital AC Instrument Channel |
| | ATC | 3. <u>Determine</u> RCS Inventory Control acceptance criteria are met: <p>a. <u>Check</u> that BOTH the following conditions exist:</p> <ul style="list-style-type: none"> • Pressurizer level is 7% to 60% • Pressurizer level is trending to 33% to 60% <p>b. <u>Check</u> RCS subcooling is greater than or equal to 28°F.</p> |
| Examiner Note If the Main Turbine manual trip is delayed in Event 6, this may have an effect on RCS Pressure and Temperature and PZR level which will make some of the following steps applicable. It is possible that a Safety Injection and Containment isolation could occur, but this will not impact the flow of the scenario unless a subsequent misdiagnosis is made by the crew. | | |
| | ATC | 4. <u>Determine</u> RCS Pressure Control acceptance criteria are met by checking that BOTH of the following conditions exist: <ul style="list-style-type: none"> • Pressurizer pressure is 1750 psia to 2300 psia • Pressurizer pressure is trending to 2125 psia to 2275 psia |

Op Test No.: NRC Scenario # 1 Event # 4 Page 22 of 27

Event Description: Main Feedwater Pump Trip / Reactor Cutback leads to Reactor Trip

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----|--|
| | ATC | 5. Determine Core Heat Removal acceptance criteria are met: <ol style="list-style-type: none"> <u>Check</u> at least one RCP is operating. <u>Check</u> operating loop ΔT is less than 13°F. <u>Check</u> RCS subcooling is greater than or equal to 28°F. |
| Examiner Note At any point prior to event 8, the crew may notice that Steam Generator levels have reduced below 27% NR and an Emergency Feedwater Actuation Signal failed to occur. If the operator manually initiates EFAS at this time, it will satisfy the critical task in Event 8. This is not required to be performed at this time but only prior to lowering level to below 55% WR. | | |
| | BOP | 6. Determine RCS Heat Removal acceptance criteria are met: <ol style="list-style-type: none"> <u>Check</u> that at least one steam generator has BOTH of the following: <ul style="list-style-type: none"> • Steam generator level is 10% to 76% NR • Main Feedwater is available to restore level within 55%-70% NR.[60% to 80% NR] |
| | ATC | b. <u>Check</u> RCS TC is 530 °F to 550 °F |
| | BOP | c. <u>Check</u> steam generator pressure is 885 psia to 1040 psia. |
| | BOP | d. <u>Check</u> Feedwater Control in Reactor Trip Override: <ul style="list-style-type: none"> • MAIN FW REG valves are closed • STARTUP FW REG valves are 13% to 21% open • Operating main Feedwater pumps are 3800 rpm to 4000 rpm |
| | BOP | e. <u>Reset</u> moisture separator reheaters, and <u>check</u> the temperature control valves closed. |
| | ATC | 7. <u>Determine</u> Containment Isolation acceptance criteria are met: <ol style="list-style-type: none"> <u>Check</u> containment pressure is less than 16.4 psia. <u>Check</u> NO containment area radiation monitor alarms OR unexplained rise in activity. <u>Check</u> NO steam plant activity monitor alarms OR unexplained rise in activity. |
| | BOP | 8 <u>Determine</u> Containment Temperature and Pressure Control acceptance criteria are met: <ol style="list-style-type: none"> <u>Check</u> containment temperature is less than or equal to 120°F. <u>Check</u> containment pressure is less than 16.4 psia. |

Op Test No.: NRC Scenario # 1 Event # 4 Page 23 of 27

Event Description: Main Feedwater Pump Trip / Reactor Cutback leads to Reactor Trip

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|---|-----|--|
| | N/A | 9. IF ALL safety function acceptance criteria are met, AND NO contingency actions were performed, THEN GO TO OP-902-001, "Reactor Trip Recovery" procedure. |
| | SRO | 10. IF ANY safety function acceptance criteria are NOT met, OR ANY contingency action was taken, THEN GO TO Appendix 1, "Diagnostic Flowchart." |
| | | |
| Examiner Note Cue the Simulator Operator when ready for Event 7 | | |
| Examiner Note This event is complete after the SRO has commenced diagnosis in OP-902-009, Standard Appendices OR At Lead Examiner's Discretion | | |

Op Test No.: NRC Scenario # 1 Event # 7 Page 24 of 27

Event Description: Feedwater Pump A overspeed trip / Loss of Main Feedwater

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----|--|
| | BOP | Recognize and report indications of Feedwater Pump A trip |
| | | Alarms |
| | | <ul style="list-style-type: none"> FWPT A TRIP OVERSPEED (Cabinet F, K-15) FWPT A FLOW LO (Cabinet F, M-16) FWPT A FLOW LO-LO (Cabinet F, N-16) |
| | | Indications |
| | | <ul style="list-style-type: none"> Steam Generator levels lowering Feedwater flow lowering Feedwater Pump speed lowering |
| OP-902-009, Standard Appendices, Appendix 1 | | |
| Examiner Note | | |
| Appendix 1 is a flow chart used to diagnose to the correct recovery procedure for the event in progress. The steps below will be followed by a YES or NO to indicate proper flow path. | | |
| | ATC | Rx Pwr dropping, SUR negative, and < two CEAs NOT fully inserted or Emergency Boration in progress (YES) |
| | ATC | Pressurizer pressure dropping rapidly and Pressurizer level changing (NO) |
| | SRO | Page 2 |
| | BOP | At least one 7 KV non safety bus and one 4 KV safety bus powered from offsite (same train) (YES) |
| | BOP | MFW restoring or maintaining at least one SG level 55% to 70% NR (NO) |
| | SRO | GO TO OP-902-006 Loss of Main Feedwater Recovery |
| OP-902-006, Loss of Main Feedwater Recovery | | |
| | SRO | Confirm Diagnosis *1. Confirm diagnosis of a Loss of Main Feedwater by checking Safety Function Status Check Acceptance Criteria are satisfied. |
| | BOP | Announce the Event 2. Announce the Loss of Main Feedwater in progress using the plant page. |

Op Test No.: NRC Scenario # 1 Event # 7 Page 25 of 27

Event Description: Feedwater Pump A overspeed trip / Loss of Main Feedwater

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----|---|
| | N/A | <p>Classify the Event</p> <p>*3. Advise the Shift Manager to REFER TO EP-001-001, "Recognition & Classification of Emergency Condition", and implement the Emergency Plan.</p> |
| | N/A | <p>Restore Operation of DCT Sump Pumps</p> <p>*4. IF power has been interrupted to either 3A or 3B safety buses, THEN perform Appendix 20, "Operation of DCT Sump Pumps".</p> |
| | SRO | <p>Implement Placekeeping</p> <p>5. REFER TO Section 6.0, "Placekeeper", and record the time of the reactor trip.</p> |
| | ATC | <p>Verify ONE RCP In Each Loop Secured</p> <p>6. Verify no more than two RCPs are operating.</p> |
| | N/A | <p>Stop ALL RCPs</p> <p>*7. IF ANY of the following conditions exist, THEN perform the following:</p> <ol style="list-style-type: none"> a. IF ALL feedwater is lost, THEN stop ALL RCPs. b. IF MFW is lost AND the only feedwater available is ONE motor driven EFW Pump, THEN within the following 30 minutes stop ALL RCPs. |
| | BOP | <p>Verify Proper CCW Operation</p> <p>*8. Check a CCW pump is operating for each energized 4.16 KV safety bus.</p> |
| | BOP | <p>Conserve Steam Generator Inventory</p> <p>*9. Conserve steam generator inventory:</p> <ol style="list-style-type: none"> a. Verify the following steam generator blowdown isolation valves are closed: <ul style="list-style-type: none"> • BD 102A, SG BLOWDOWN ISOL STM GEN 1 (IN) • BD 102B, SG BLOWDOWN ISOL STM GEN 2 (IN) • BD 103A, SG BLOWDOWN ISOL STM GEN 1 (OUT) • BD 103B, SG BLOWDOWN ISOL STM GEN 2 (OUT) |

Op Test No.: NRC Scenario # 1 Event # 7 Page 26 of 27

Event Description: Feedwater Pump A overspeed trip / Loss of Main Feedwater

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----|--|
| | BOP | b. Verify the following steam generator sampling valves are closed: <ul style="list-style-type: none"> • SSL 8006A, SAMPLING ISOLATION SG 1 • SSL 8006B, SAMPLING ISOLATION SG 2 • SSL 301A, SAMPLING ISOLATION MAIN STM LINE 1 • SSL 8004A, SAMPLING ISOLATION SG 1 • SSL 8004B, SAMPLING ISOLATION SG 2 • SSL 301B, SAMPLING ISOLATION MAIN STM LINE 2 |
| | N/A | Reset MSIS *10. IF MSIS has actuated AND opening the MSIVs or MFIVs will aid in the restoration of feedwater, THEN REFER TO Appendix 5-B, "MSIS Main Steam Pressure Reset Procedure", and reset the MSIS. |
| Examiner Note The Loss of Feedwater event is complete after the crew has stopped 2 Reactor Coolant Pumps and has completed Event 8 OR At Lead Examiner's Discretion | | |

Op Test No.: NRC Scenario # 1 Event # 8 Page 27 of 27

Event Description: Emergency Feedwater Fails to Actuate

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----|---|
| | BOP | Recognize and report indications of EFAS fail to actuate |
| | | Alarms |
| | | <ul style="list-style-type: none"> • Absence of Alarms: |
| | | <ul style="list-style-type: none"> • EFAS-1 TRAIN A LOGIC INITIATED (Cabinet K, M-19) |
| | | <ul style="list-style-type: none"> • EFAS-2 TRAIN A LOGIC INITIATED (Cabinet K, N-19) |
| | | <ul style="list-style-type: none"> • EFAS-1 TRAIN B LOGIC INITIATED (Cabinet K, M-20) |
| | | <ul style="list-style-type: none"> • EFAS-2 TRAIN B LOGIC INITIATED (Cabinet K, N-20) |
| | | Indications |
| | | <ul style="list-style-type: none"> • Steam Generator levels <27.4% NR |
| | | <ul style="list-style-type: none"> • EFW Pump A, B, AB not operating |
| <u>CRITICAL TASK</u> | | |
| ESTABLISH RCS HEAT REMOVAL | | |
| <p>This task is satisfied by manually actuating Emergency Feedwater Actuation System, manually starting and aligning at least 1 Emergency Feedwater pump, aligning and starting the Auxiliary Feedwater pump, or depressurizing at least 1 Steam Generator and injecting the Steam Generator with Condensate flow prior to Steam Generator levels reducing below 55% Wide Range in both Steam Generators.</p> | | |
| <p>This task becomes applicable once Steam Generator water level reduces below 27.4% Narrow Range in one or both Steam Generators.</p> | | |
| | BOP | <p>Restore Steam Generator Inventory</p> <p>*11. Replenish inventory in at least one steam generator by performing ANY of the following:</p> <ul style="list-style-type: none"> a. Check emergency Feedwater available to at least one steam generator. b. REFER TO Appendix 32, "Establishing Main Feedwater" and restore main feedwater flow to at least one steam generator. |
| | BOP | Actuate EFAS – 1 and EFAS – 2. (CRITICAL) |
| <p>Examiner Note</p> <p>This event is complete after the crew has actuated EFAS</p> <p>OR</p> <p>At Lead Examiner's Discretion</p> | | |

| Facility: | Waterford 3 | Scenario No.: | 2 | Op Test No.: | |
|--|---|---|---|--------------|-------|
| Examiners: | _____ | Operators: | _____ | _____ | _____ |
| | _____ | | _____ | _____ | _____ |
| | _____ | | _____ | _____ | _____ |
| Initial Conditions: | Reactor power is 100%, MOC | | | | |
| | _____ | | | | |
| Turnover: | Protected Train is B, AB Busses are aligned to Train B, Nothing is OOS, maintain 100% power | | | | |
| | _____ | | | | |
| | _____ | | | | |
| Event No. | Malf. No. | Event Type* | Event Description | | |
| 1 | NI01H | I – BOP I – SRO TS – SRO | Channel D Excore Nuclear Instrument Safety Channel, ENI-IJI-0001D, middle detector fails low. (TS 3.3.3.6) | | |
| 2 | CV01B | C – ATC C – SRO TS – SRO | (A) Charging Pump B trips on overcurrent requiring implementation of OP-901-112, Charging or Letdown malfunction (TS 3.1.2.4, TRM 3.1.2.4) | | |
| 3 | SG01A | R – ATC N – BOP N – SRO TS – SRO | (A) Steam Generator #1 tube leakage occurs requiring implementation of OP-901-202, Steam Generator tube leakage or High Activity and a rapid downpower in accordance with OP-901-212, Rapid Plant Downpower. (TS 3.4.5.2) | | |
| 4 | TP01A TP08B | C – BOP C – SRO | (A) Running Turbine Cooling Water Pump A trips and the standby pump does not auto start resulting in manual action to start in accordance with OP-901-512, Loss of Turbine Cooling Water | | |
| 5 | SG01A | M - All | Steam Generator tube leakage worsens leading to Reactor Trip and Safety Injection (Critical Task 1, isolate SG not before T_{HOT} reduced below 520°F) (Critical Task 3, commence RCS depressurization to 930 PSIA prior to lifting ADV (auto) or MSSV (#3 Dominant Accident Sequence)) | | |
| 6 | RP09D | I – ATC I – BOP | Relay K202 failure, RC-606, Control Bleed off Containment Isolation and FP-601B, Fire Water B Containment Isolation fail to auto close. | | |
| 7 | CC12E2 | I-ATC I-SRO | Component Cooling Water Surge Tank level Switch CC-ILS-7013A fails low, isolating Component Cooling Water to the Reactor Coolant Pumps, requiring the crew to secure all running Reactor Coolant Pumps. (Critical Task 2, trip running RCPs prior to exceeding 3 minutes without CCW flow) | | |
| * (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor | | | | | |

Scenario Event Description

NRC Scenario 2

The crew assumes the shift at 100% power with instructions to maintain 100% power.

After taking the shift, ENI Channel D Log Power Instrument (ENI-IJI-0001-D), (middle channel), fails low. The SRO should review and enter Technical Specification 3.3.1 action 2 and bypass Hi Linear Power, Hi LPD, Lo DNBR within 1 hour in accordance with OP-009-007, Plant Protection System. Bypassing High Log Power on PPS D is not required in Mode 1, but may be performed. The SRO should also evaluate and enter Technical Specification 3.3.3.6 action 29 which is to restore the channel within 30 days.

After Technical Specifications are addressed, Charging Pump B trips on overcurrent. The SRO should implement OP-901-112, Charging or Letdown Malfunction, Section E₁, Charging Malfunction. The SRO should direct the ATC to start a standby charging pump after verifying a suction path available or isolate Letdown using CVC-101, Letdown Stop Valve. If Letdown is isolated, Charging and Letdown will be re-initiated using Attachment 2 of OP-901-112. The SRO should review and enter Technical Specification 3.1.2.4 and Technical Requirement Manual 3.1.2.4. Technical Specification 3.1.2.4 may be exited after aligning Charging Pump AB to replace Charging Pump B. However, Technical Requirement Manual 3.1.2.4 should not be exited while Charging Pump B remains inoperable.

After the crew addresses the Charging pump malfunction, Steam Generator 1 develops a tube leak at ~ 3 gpm. The SRO should implement OP-901-202, Steam Generator Tube Leakage or High Activity. The SRO should determine that based on leak indications, Technical Specification 3.4.5.2 is not met for Primary-to-Secondary Leakage or Identified Leakage and enter TS 3.4.5.2 Action a to be in Mode 3 within 6 hours. The SRO should also determine that the current leakage requires implementation of OP-901-212, Rapid Plant Power Reduction.

After the reactivity manipulation has been satisfied, the running Turbine Cooling Water Pump A will trip and the standby pump will fail to start automatically. The CRS should direct the BOP to start the standby pump in accordance with OP-901-512, Loss of Turbine Cooling Water and monitor affected loads.

After the crew has restored Turbine Cooling Water, the Steam Generator tube leakage will worsen to a Steam Generator tube rupture with leakage greater than Charging Pump capacity. The SRO should direct a manual Reactor Trip and Safety Injection/Containment Isolation actuation. The crew should proceed through OP-902-000, Standard Post Trip Actions and diagnose to OP-902-007, Steam Generator Tube Rupture Recovery. After the Containment Isolation Signal is initiated, Relay K202 fails and RC-606, Control Bleed off Containment Isolation and FP-601B, Fire Water B Containment Isolation fail to auto close requiring manual action by the ATC and BOP.

The crew will perform steps of OP-902-007, Steam Generator Tube Rupture Recovery to perform a rapid cooldown of the RCS to T_{HOT} less than 520°F and isolate the #1 Steam Generator (**CRITICAL TASK 1**). While the crew is performing the rapid plant cooldown, Component Cooling Water Surge Tank level switch, CC-ILS-7013A fails low isolating Component Cooling Water to the Reactor Coolant Pumps. The ATC will have to take action and stop all running RCPs within 3 minutes of isolation of flow (**CRITICAL TASK 2**). Once the crew has stopped RCPs and isolated #1 Steam Generator, the crew should then take action to commence depressurizing the RCS in accordance with OP-902-007 (**CRITICAL TASK 3**). In Waterford 3 Probabilistic Risk Analysis, the #3 Dominant Accident Sequence that would lead to core damage is a "SGTR with a failure to depressurize". This accident would (statistically speaking) constitute 9.27% of all core damage events at WF3. This is mitigated by performing Critical Task 3.

The scenario can be terminated once the crew commences the RCS depressurization in accordance with OP-902-007, Steam Generator Tube Rupture Recovery or at the lead examiner's discretion.

CRITICAL TASKS

1. ISOLATE MOST AFFECTED STEAM GENERATOR

This task is satisfied by closing Main Steam isolation valve, Main Feedwater isolation valve, Emergency Feedwater flow control and isolation valves, steam supply to EFW pump AB, steam line drains, and Blowdown isolation valves for #1 Steam Generator not before a cooldown to RCS T_{HOT} less than 520°F has been completed. This task becomes applicable when the crew enters OP-902-007, Steam Generator Tube Rupture Recovery.

2. TRIP ANY RCP EXCEEDING OPERATING LIMITS

This task is satisfied by stopping all running Reactor Coolant Pumps prior to exceeding 3 minutes without Component Cooling Water flow to the RCPs. This task becomes applicable after all RCP CCW flow lost annunciators actuate. The alarms indicate the possibility for additional Reactor Coolant System pressure boundary degradation through the Reactor Coolant Pumps. The time requirement of 3 minutes is based on the Reactor Coolant Pump operating limit of 3 minutes without CCW cooling.

3. PREVENT LIFTING AFFECTED SG SAFETY VALVES

This task is satisfied by commencing an RCS depressurization to less than 930 PSIA using auxiliary spray valves and charging pumps prior to lifting atmospheric dump valve in automatic or main steam safety valves on affected Steam Generator. This task becomes applicable after the RCS has been cooled down to RCS T_{HOT} less than 520°F and Steam generator #1 is isolated (Critical Task 1).

Scenario Quantitative Attributes

| | |
|--|---|
| 1. Total malfunctions (5–8) | 7 |
| 2. Malfunctions after EOP entry (1–2) | 2 |
| 3. Abnormal events (2–4) | 3 |
| 4. Major transients (1–2) | 1 |
| 5. EOPs entered/requiring substantive actions (1–2) | 1 |
| 6. EOP contingencies requiring substantive actions (0–2) | 0 |
| 7. Critical tasks (2–3) | 3 |

NRC Scenario 2

SCENARIO SETUP

- A. Reset Simulator to IC-188.
- B. Verify Scenario Malfunctions, Remotes, and overrides are loaded, as listed in the Scenario Timeline.
- C. Ensure Protected Train B sign is placed in SM office window.
- D. Verify EOOS is 10.0 Green with nothing out of service
- E. Complete the simulator setup checklist.
- F. Start Insight, open file PlantParameters.tis.

NRC Scenario 2

SIMULATOR BOOTH INSTRUCTIONS

Event 1 Channel D Excure NI Safety Channel, ENI-IJI-0001D, middle detector fails low

1. On Lead Examiner's cue, initiate Event **Trigger 1**.
2. If Work Week Manager or PMI are called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.
3. If sent to LCP-43, wait 3 minutes and report channel ENI-IJI-0001-D1 appears to be failed downscale. All other power channels read approximately 100%.

Event 2 Charging Pump B Trip

1. On Lead Examiner's cue, initiate Event **Trigger 2**.
2. If Work Week Manager or PMI are called, inform the caller that a work package will be assembled and a team will be sent to the Charging Pump room and breaker.
3. If called as NAO to investigate the breaker, wait 3 minutes and report overcurrent flags are dropped for all 3 phases for Charging Pump B
4. If called as NAO to investigate the pump, wait 3 minutes and report that there are some indications of charring at the motor vent area, and an acrid odor is present but there is no fire.
5. If directed to perform prestart checks for the A or AB Charging pump, wait 2 minutes and report the following for directed pump:
 - a. Suction and discharge valves are open
 - b. Proper oil level exists
 - c. Motor vents unobstructed
 - d. All personnel clear of the pump
6. If directed to check a started Charging pump for proper operation following start, wait 1 minute and report the following:
 - a. Suction and discharge valves are open
 - b. Proper oil levels exist
 - c. No abnormal vibrations or noises present

Event 3 Steam Generator Tube Leakage #1 Steam Generator / Rapid Plant Downpower

1. On Lead Examiner's cue, initiate Event **Trigger 3**.
1. If Chemistry is called to sample the Steam Generators for activity, acknowledge and wait 30 minutes and report leakage into Steam Generator 1 is ~ 10 GPM.
2. If called as DPM or Duty OPS Manager, acknowledge the communication and tell contact person that you will make the additional communications per OI-035-000, Attachment 1.
3. If requested as Programs & Components Engineering to monitor for loose parts in the Stay Cavity Area of Steam Generator, acknowledge the request and inform the caller that will monitor and evaluate data as necessary.
4. If Chemistry is called to sample the RCS for Dose Equivalent Iodine due to the down power, acknowledge and report that samples will be taken 2-6 hours from notification time and if asked tell the caller your name is Dustan Milam.
5. If notified as Load Dispatcher (Woodlands) acknowledge the communications and inform the caller that the grid will remain stable with available backup generation.
6. If requested to remove polisher vessels from service, inform the caller that you will monitor Polisher D/P and remove vessels as necessary.

NRC Scenario 2

Event 4 Turbine Cooling Water Pump A Trip

1. On Lead Examiner's cue, initiate Event **Trigger 4**.
2. If Work Week Manager, Computer Technician, or PMI are called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.
3. If called as NAO to investigate the breaker for the tripped TCCW Pump, wait 3 minutes and report that the breaker is tripped, with overcurrent indications at the breaker.
4. If called as NAO to investigate the TCCW pump locally, wait 3 minutes and report no obvious reason why the pump has tripped.

Event 5 Steam Generator Tube Rupture

1. On Lead Examiner's cue, initiate Event **Trigger 5**.
2. If called as NAO to verify proper operation of unloaded Emergency Diesel Generators, then wait 2 minutes and manually initiate Event **Trigger 15**. Wait an additional minute and manually initiate Event **Trigger 25** to acknowledge local EDG panels. Report that both A and B EDGs are running properly unloaded.

Event 6 Relay K202 Failure (RC-606 and FP-601B no auto closure)

1. No actions for this event

Event 7 Component Cooling water Surge Tank level switch, CC-ILS-7013A fails low

1. After the crew has commenced the RCS cooldown and on Lead Examiner's cue, initiate Event **Trigger 8**.
2. **At the end of the scenario, before resetting, end data collection and save the file as 2014 Scenario 2-(start-end time).tid. Export to .csv file. Save the file into the folder for the appropriate crew**

NRC Scenario 2

SCENARIO TIMELINE

| EVENT | KEY | DESCRIPTION | TRIGGER | DELAY HH:MM:SS | RAMP HH:MM:SS | FINAL |
|--------------|---------------|---|----------------|---------------------------|--------------------------|---------------|
| 6 | RP09D | RELAY K202 FAILED, CIAS TRAIN B (CVC/RC/FP) RC-606 AND FP-601B NO AUTO CLOSURE | N/A | 00:00:00 | 00:00:00 | ACTIVE |
| 4 | TP08B | TCCW PUMP B AUTO START DISABLE TURBINE COOLING WATER PUMP NO AUTO START | N/A | 00:00:00 | 00:00:00 | ACTIVE |
| 1 | NI01H | MIDDLE DETECTOR (D2) SAFETY CHANNEL D FAIL (0-100%) LOG CHANNEL MIDDLE DETECTOR FAILURE | 1 | 00:00:00 | 00:00:00 | 0 |
| 2 | CV01B | CHARGING PUMP B TRIPPED CHARGING PUMP B TRIP | 2 | 00:00:00 | 00:00:00 | ACTIVE |
| 3 | SG01A | SG1 TUBE LEAK (100% = 3200 GPM) STEAM GENERATOR TUBE LEAK OF ~10 GPM | 3 | 00:00:00 | 00:00:00 | 0.3 |
| 4 | TP01 | TCCW PUMP A TRIP RCP 2A MIDDLE SEAL FAILS | 4 | 00:00:00 | 00:00:00 | ACTIVE |
| 5 | SG01A | SG1 TUBE LEAK (100% = 3200 GPM) STEAM GENERATOR TUBE LEAK OF ~250 GPM | 5 | 00:00:00 | 00:00:00 | 8 |
| 7 | CC12E2 | CCW SURGE TNK LVL 7013AS FAILS LO HIGH PRESSURE SAFETY INJECTION PUMP B FAILS TO AUTO START | 7 | 00:00:00 | 00:00:00 | ACTIVE |
| 5 | EGR26 | EDG A LOCAL ANNUN ACK LOCAL EDG ANNUNCIATOR ACKNOWLEDGE | 15 | 00:00:00 | 00:00:00 | ACKN |
| 5 | EGR27 | EDG B LOCAL ANNUN ACK LOCAL EDG ANNUNCIATOR ACKNOWLEDGE | 25 | 00:00:00 | 00:00:00 | ACKN |

NRC Scenario 2

REFERENCES

| Event | Procedures |
|-------|---|
| 1 | OP-009-007, Plant Protection System, Rev. 15 OP-903-013, Monthly Channel Checks, Rev. 16 Technical Specification 3.3.1 Technical Specification 3.3.3.6 |
| 2 | OP-901-112, Charging or Letdown Malfunction, Rev. 5 Technical Specification 3.1.2.4 Technical Requirements Manual 3.1.2.4 |
| 3 | OP-901-202, Steam Generator Tube Leakage or High Activity, Rev. 11 OP-901-212, Rapid Plant Power Reduction, Rev. 6 Technical Specification 3.4.5.2 |
| 4 | OP-901-512, Loss of Turbine Cooling Water, Rev. 3 |
| 5 | OP-902-000, Standard Post Trip Actions, Rev. 15 OP-902-007, Steam Generator Tube Rupture Recovery, Rev. 15 OP-902-009, Standard Appendices, Rev. 309, Appendix 2, Figures OP-902-009, Standard Appendices, Rev. 309, Appendix 1, Diagnostic Flow Chart |
| 6 | OP-902-007, Steam Generator Tube Rupture Recovery, Rev. 15 |
| 7 | OP-902-007, Steam Generator Tube Rupture Recovery, Rev. 15 |

Op Test No.: NRC Scenario # 2 Event # 1 Page 1 of 33

Event Description: Channel D Excure Nuclear Instrument middle detector fails low

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

Examiner Note

Cue the Simulator Operator when ready for Event 1

| Time | Position | Applicant's Actions or Behavior |
|------|----------|--|
| | ATC | Recognizes and reports indications of failed channel. |
| | | Alarms: |
| | | <ul style="list-style-type: none"> • RPS CHANNEL TRIP LOCAL PWR DENSITY HI (Cabinet K, A-11) • LOCAL PWR DENSITY HI PRETRIP B/D (Cabinet K, C-11) • DNBR LO PRETRIP B/D (Cabinet K, C-12) • EXCORE/CPC CHNL D POWER DEVIATION (Cabinet K, K-14) • RPS CHANNEL D TROUBLE (Cabinet K, H-18) |
| | | Indications: |
| | | <ul style="list-style-type: none"> • ENI-IJR-0001, Log Power indication fails downscale • ENI-IJI-001D, Log Power Safety Channel D indication fails downscale • Pre-Trip indication Channel D HI LOCAL POWER bistable • Trip indication Channel D HI LOCAL POWER bistable • Pre-Trip indication Channel D LOW DNBR bistable |

Examiner Note

All BOP manipulations for OP-009-007 are located at CP-10 except as noted.

OP-009-007, Plant Protection System ,Section 6.2, Trip Channel Bypass Operation

| Time | Position | Applicant's Actions or Behavior |
|------|----------|--|
| | SRO | <p>6.2.1 Refer to Attachment 11.11, PPS Bistable Bypass Chart to assist in determination of Trip Channels requiring placement in bypass.</p> <p>Determines the following bistables are affected and need to be bypassed:</p> <ul style="list-style-type: none"> • 1 - HI LN POWER • 3 - HI LOCAL POWER • 4 – LO DNBR |
| | SRO | Directs BOP to bypass the HI LN POWER, HI LOCAL POWER, and LO DNBR bistables in PPS Channel D within 1 hour in accordance with OP-009-007, Plant Protection System. |
| | BOP | 6.2.2 To place a bistable in or remove a bistable from bypass, go to Attachment 11.10, Trip Channel Bypass Operation. |

Op Test No.: NRC Scenario # 2 Event # 1 Page 2 of 33

Event Description: Channel D Excure Nuclear Instrument middle detector fails low

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

OP-009-007, Plant Protection System ,Attachment 11.10, Trip Channel Bypass Operation**CAUTION**

- (1) ATTEMPTING TO PLACE MORE THAN ONE TRIP CHANNEL IN BYPASS REMOVES BOTH TRIP CHANNELS FROM BYPASS.
- (2) PRIOR TO PLACING ANY TRIP CHANNEL IN BYPASS, VERIFY BYPASS PUSH BUTTONS ON DE-ENERGIZED PPS BAY NOT DEPRESSED.

| | | |
|--|------|--|
| | BOP | 11.10.1 To Bypass a Trip Channel, perform the following: 11.10.1.1 Circle the bistable numbers selected for bypass under Step 11.10.1.4. (Circles bistable numbers 1, 3 and 4 in Step 11.10.1.4 table) |
| | BOP | 11.10.1.2 Check desired Trip Channel is <u>not</u> Bypassed on another PPS Channel. |
| | BOP | 11.10.1.3 Open key-locked portion of BCP in desired PPS Channel. |
| | BOP | 11.10.1.4 Depress Bypass push buttons for the desired Trip Channels |
| | BOP | 11.10.1.5 Check all selected bistable Bypass push buttons remain in a Depressed state. |
| | BOP | 11.10.1.6 Check all selected bistable Bypass lights illuminate on BCP for the desired Trip Channels. |
| | CREW | 11.10.1.7 Check all selected bistable Bypass lights illuminate on ROM for the desired Trip Channels. (Verifies correct bistables lit on CP-7 PPS Channel D Remote Operator Module) |
| | SRO | Reviews the following Technical Specifications and determines applicable actions: <ul style="list-style-type: none"> • 3.3.1 action 2 • 3.3.3.5 – no actions required • 3.3.3.6 – action 29 |

Op Test No.: NRC Scenario # 2 Event # 1 Page 3 of 33

Event Description: Channel D Excore Nuclear Instrument middle detector fails low

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

Examiner Note

This event is complete when bistables are bypassed and Technical Specifications have been addressed

or

At Lead Examiner's Discretion

Examiner Note

Cue the Simulator Operator when ready for Event 2

Op Test No.: NRC Scenario # 2 Event # 2 Page 4 of 33

Event Description: Charging Pump B Trips

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----|--|
| | BOP | Recognize and report indications of failed channel. |
| | | Alarms: |
| | | <ul style="list-style-type: none"> CHARGING PUMPS HEADER FLOW LO (Cabinet G, H-5) CHARGING PUMP B TRIP/TROUBLE (Cabinet G, B-6) |
| | | Indications: |
| | | <ul style="list-style-type: none"> Charging Pump B indicates OFF Charging flow lowering PZR level lowering Letdown flow lowering |
| Examiner Note | | |
| The SRO may direct the BOP to verify a suction source and start a Charging Pump upon the initial report, prior to entering the off normal. | | |
| | SRO | Enter and direct the implementation of OP-901-112, Charging or Letdown Malfunction. |
| OP-901-112, Charging or Letdown Malfunction, E₀ – General | | |
| | N/A | 1. Stop turbine load changes. |
| | N/A | 2. <u>IF</u> malfunction is due to failure of the Pressurizer Level Control System, <u>THEN</u> go to OP-901-110, PRESSURIZER LEVEL CONTROL MALFUNCTION. |
| | SRO | 3. <u>IF</u> a Charging Malfunction is indicated, <u>THEN</u> go to Subsection E1, Charging Malfunction. |
| OP-901-112, Charging or Letdown Malfunction, E₁ – Charging Malfunction | | |
| <u>NOTE</u> | | |
| If all Charging Pumps are secured, <u>then</u> LETDOWN STOP VALVE (CVC 101) will close on high REGEN HX TUBE OUTLET temperature if RCS is $\geq 470^{\circ}\text{F}$. | | |
| <u>CAUTION</u> | | |
| THE REACTOR COOLANT SYSTEM WILL BE BORATED IF A CHARGING PUMP IS STARTED WITH THE RWSP AS THE MAKEUP WATER SOURCE. | | |
| | | |

Op Test No.: NRC Scenario # 2 Event # 2 Page 5 of 33

Event Description: Charging Pump B Trips

| Time | Position | Applicant's Actions or Behavior |
|---|----------|---|
| | ATC | 1. <u>IF</u> Charging Pumps have tripped, <u>THEN</u> perform the following: <ol style="list-style-type: none"> 1.1 Verify open <u>EITHER</u> VCT DISCH VALVE (CVC 183) <u>OR</u> RWSP TO CHARGING PUMP (CVC 507). 1.2 <u>IF</u> Letdown has <u>NOT</u> isolated, <u>THEN</u> attempt to restart Charging Pump(s). 1.3 <u>IF</u> the Charging Pump can <u>NOT</u> be restarted, <u>THEN</u> verify closed LETDOWN STOP VALVE (CVC 101). 1.4 <u>IF</u> the reason for the Charging pump trip is corrected <u>AND</u> Pressurizer level is in normal operating band, <u>THEN</u> place Charging and Letdown in service in accordance with Attachment 2. |
| | N/A | 2. <u>IF</u> normal Charging flow can <u>NOT</u> be established <u>AND</u> Pressurizer level falls below minimum Pressurizer level for operation in accordance with Attachment 1, Pressurizer Level Versus Tave Curve, <u>THEN</u> perform the following: |
| | BOP | 3. <u>IF</u> the PMC is available, <u>THEN</u> display PMC Group CVCS and monitor Charging System parameters to determine cause of Charging malfunction. |
| | SRO | 4. Inspect Charging System for possible cause of malfunction. |
| | N/A | 5. <u>IF</u> a Charging Line rupture has occurred, <u>THEN</u> perform the following: |
| <u>CAUTION</u> <u>IF</u> HPSI PUMPS ARE OPERATING, <u>THEN</u> CHARGING PUMPS SHOULD <u>NOT</u> BE ALIGNED TO HPSI HEADER. | | |
| <u>NOTE</u> Aligning Charging to HPSI Train A renders HPSI train A INOPERABLE and Charging Pumps INOPERABLE. Enter TS 3.5.2 and 3.1.2.4. Refer to TS 3.5.3. | | |
| | N/A | 6. <u>IF</u> flow can <u>NOT</u> be established through the normal Charging Pump discharge path, <u>THEN</u> align Charging Pumps to discharge through HPSI Header A as follows: |
| | N/A | 7. <u>WHEN</u> repairs have been completed to the Charging Header, <u>THEN</u> restore Charging Pumps discharge alignment to normal as follows: |

Op Test No.: NRC Scenario # 2 Event # 2 Page 6 of 33

Event Description: Charging Pump B Trips

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | SRO | Reviews and enters the following Technical Specifications and Technical Requirements Manual actions: <ul style="list-style-type: none"> • 3.1.2.4 (Technical Specification) • 3.1.2.4 (Technical Requirements Manual) | | | | | | | | |
|--|---------------|---|--------------|----------|---|---------------|---|--------|----|-------|
| Examiner Note | | | | | | | | | | |
| The SRO may align the AB Charging pump to replace the B Charging pump to allow exit of Technical Specification 3.1.2.4. The crew will remain in TRM 3.1.2.4 even if they align the AB pump. | | | | | | | | | | |
| OP-002-005, Chemical and Volume Control | | | | | | | | | | |
| <u>NOTE</u> | | | | | | | | | | |
| If there is an Inoperable Charging Pump, <u>then</u> at SM/CRS discretion the Standby Charging Pumps selector switch may be aligned so that the Operable Backup Charging Pump will be the first one selected for auto starting capability. | | | | | | | | | | |
| | ATC | 6.2.8 Verify Standby Charging Pumps selector switch in the appropriate Position for the Charging Pump started (Pump in Lead) per Table 6.2.8. (Position AB-A due to inoperable pump B) | | | | | | | | |
| TABLE 6.2.8 | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>PUMP IN LEAD</th> <th>POSITION</th> </tr> </thead> <tbody> <tr> <td>B</td> <td>AB - A</td> </tr> <tr> <td>A</td> <td>B - AB</td> </tr> <tr> <td>AB</td> <td>A - B</td> </tr> </tbody> </table> | | | PUMP IN LEAD | POSITION | B | AB - A | A | B - AB | AB | A - B |
| PUMP IN LEAD | POSITION | | | | | | | | | |
| B | AB - A | | | | | | | | | |
| A | B - AB | | | | | | | | | |
| AB | A - B | | | | | | | | | |
| | ATC | 6.2.9 Place control switch(es) for Standby Charging Pump A(B)(AB) to AUTO. | | | | | | | | |
| | ATC | 6.2.10 Place Pump AB Assignment switch to the appropriate Position for the Charging Pump A(B)(AB) to be Assigned to Trip on SIAS, per Table 6.2.10. (Position B due to inoperable pump B) | | | | | | | | |

Op Test No.: NRC Scenario # 2 Event # 2 Page 7 of 33

Event Description: Charging Pump B Trips

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

TABLE 6.2.10

| ASSIGNED TO TRIP ON SIAS | POSITION |
|--------------------------|----------|
| A | A |
| AB | NORM |
| B | B |

Examiner Note

**This event is complete after the ATC aligns the AB Charging pump to replace the B Charging pump and the SRO has evaluated Technical Specifications/Technical Requirements Manual
or**

At Lead Examiner's Discretion

Examiner Note

Cue the Simulator Operator when ready for Event 3

Op Test No.: NRC Scenario # 2 Event # 3 Page 8 of 33

Event Description: Steam Generator Tube Leakage #1 SG

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----------|---|
| | ATC / BOP | Recognize and report indications of SGTL |
| | | Alarms |
| | | <ul style="list-style-type: none"> PMC alarm for Primary to Secondary Leakage |
| | | <ul style="list-style-type: none"> BLOWDOWN ACTIVITY HI/MONITOR TROUBLE (Cabinet E, B-19) |
| | | <ul style="list-style-type: none"> VACUUM PUMPS EXHAUST ACTIVITY HI/MONITOR TROUBLE (Cabinet E, C-3) |
| | | |
| | | Indications |
| | | <ul style="list-style-type: none"> Primary to Secondary Leakage indicated on RM-11 |
| | | <ul style="list-style-type: none"> Letdown flow lowering |
| | | |
| | CRS | Enter and direct the implementation of OP-901-202, Steam Generator Tube Leakage or High Activity. |

OP-901-202, Steam Generator Tube Leakage or High Activity**Examiner Note****The step below will not be performed at this time, but will be implemented during Event 5.**

| | | |
|--|-----|---|
| | N/A | 1. <u>IF</u> Pressurizer level <u>CANNOT</u> be maintained with available Charging Pumps, <u>THEN</u> perform the following: <ol style="list-style-type: none"> 1.1 Manually trip Reactor. 1.2 Manually initiate Safety Injection Actuation (SIAS) <u>AND</u> Containment Isolation Actuation (CIAS). 1.3 <u>GO TO</u> OP-902-000, STANDARD POST TRIP ACTIONS. |
|--|-----|---|

NOTE

- (1) The calculated Primary to Secondary Leak Rate values must be considered valid, unless the reading can be quickly diagnosed as incorrect due to an obvious malfunction of the PMC or AE Discharge Rad Monitor.
- (2) The AE Discharge Rad Monitor is considered the primary Rad Monitor which has the sensitivity to measure small Primary to Secondary Leakage. The AE Discharge Rad Monitor reading inputs into the Primary to Secondary Leak Calculation on PMC Group PLSR. The MS Line N16 Rad Monitors may be used as verification of AE Discharge Rad Monitor or as primary indication if the AE Discharge Rad Monitor is OOS.
- (3) If Primary to Secondary leakage will result in a backup Charging Pump cycling to maintain Pressurizer level, starting and continuously running an additional Charging Pump will allow for a more accurate leakrate determination.

Op Test No.: NRC Scenario # 2 Event # 3 Page 9 of 33

Event Description: Steam Generator Tube Leakage #1 SG

| Time | Position | Applicant's Actions or Behavior |
|---|----------|---|
| | BOP | 2. Determine RCS leak rate using <u>ANY</u> of the following: <ul style="list-style-type: none"> ▪ Calculated Steam Generator leakage displayed on PMC Group PSLR (PMC PID C48304) ▪ Calculated Steam Generator leakage displayed on PMC PID C48251 (RE5501 CH1 LEAK RATE) <u>and</u> C48252 (RE5501 CH2 LEAK RATE) ▪ Approximate RCS leak rate by subtracting total of Letdown flow <u>AND</u> RCP CBO flow from Charging Flow ▪ Calculated Charging / Letdown Mismatch displayed on PMC Group Leakrate (PMC PID S13001) ▪ RCS Leak Rate calculation in accordance with OP-903-024, REACTOR COOLANT SYSTEM WATER INVENTORY BALANCE ▪ Calculated steam generator leakage based upon chemistry sample, per CE-003-705, DETERMINATION OF PRIMARY-TO-SECONDARY LEAK RATE |
| | | |
| | ATC | 2.1 <u>If necessary, then</u> start an additional Charging Pump. |
| <u>NOTE</u> | | |
| Any rise >30 GPD/HR followed by a subsequent lowering of the rate of change would indicate a spike and a rapid power reduction is not required. | | |
| | SRO | 3. <u>IF</u> Primary to Secondary Leakage in any Steam Generator is ≥ 75 GPD (~ 0.05 GPM) <u>AND</u> the rate of change is rising by ≥ 30 GPD/HR (~ 0.02 GPM/HR), <u>THEN</u> perform the following: |
| | | |
| | | 3.1 Commence a rapid plant shutdown in accordance with OP-901-212, RAPID PLANT POWER REDUCTION, <u>AND</u> concurrently with this Procedure, reduce Plant Power to $\leq 50\%$ within 1 hour. |
| | | |
| | | 3.2 <u>WHEN</u> Plant Power is $\leq 50\%$, <u>THEN</u> in accordance with OP-901-212, RAPID PLANT POWER REDUCTION, <u>AND</u> concurrently with this Procedure, be in Mode 3 within 2 hours <u>AND</u> Mode 5 in the following 30 hours. |
| | | |

Op Test No.: NRC Scenario # 2 Event # 3 Page 10 of 33

Event Description: Steam Generator Tube Leakage #1 SG

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

OP-901-212, Rapid Plant Power Reduction, E₀, General Actions**NOTE**

- (1) A rapid power reduction is defined as approximately 30 MW/minute load reduction on the main turbine.
- (2) Power Reduction may be stopped at any point.
- (3) Some Steps of this procedure may not be applicable due to plant conditions. In these cases SM/CRS may NA the step.
- (4) Steps within this procedure may be performed concurrently or out of sequence with SM/CRS concurrence.
- (5) During power reduction PMC PID C24650, COLSS DESCENDING PWR TRACK (DUMOUT19), will automatically select and display the correct power indication. OP-010-003, Plant Startup, provides greater detail on which power indications are displayed by PID C24650 based on power level and whether or not the UFM is in service.
- (6) Volume Control Tank (VCT) level may lower during the down power. Charging pump suction swaps to the RWSP at 8% VCT level. Makeup to the VCT in accordance with OP-002-005, Chemical and Volume Control, may be necessary if boration from the RWSP is not desired.

| | | |
|--|-----|--|
| | ATC | <ol style="list-style-type: none"> 1. Begin RCS Boration by one of the following methods: <ol style="list-style-type: none"> 1.1 Direct Boration or 1.2 Borate from the RWSP using one or two Charging Pump as follows: <ol style="list-style-type: none"> 1.2.1 Open RWSP to Charging Pumps Suction Isolation, CVC-507. 1.2.2 Close Volume Control Tank Outlet Isolation, CVC-183. 1.2.3 <u>If necessary, then</u> start another Charging pump |
|--|-----|--|

OP-002-005, Chemical and Volume Control**CAUTION**

- (1) THIS SECTION AFFECTS REACTIVITY. THIS EVOLUTION SHOULD BE CROSS-CHECKED AND COMPLETED PRIOR TO LEAVING CP-4.
- (2) AT LEAST ONE REACTOR COOLANT PUMP IN EACH LOOP SHOULD BE OPERATING PRIOR TO PERFORMING DIRECT BORATION OPERATIONS TO ENSURE PROPER CHEMICAL MIXING.

| | | |
|--|-----|---|
| | ATC | 6.7.1 Inform SM/CRS that this Section is being performed. |
|--|-----|---|

Op Test No.: NRC Scenario # 2 Event # 3 Page 11 of 33

Event Description: Steam Generator Tube Leakage #1 SG

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

NOTE

When performing a Plant down power where final RCS Boron Concentration needs to be determined, the following Plant Data Book figure(s) will assist the Operator in determining the required RCS Boron PPM change.

- 1.2.1.1 Power Defect Vs Power Level
- 1.4.3.1 Inverse Boron Worth Vs. T_{mod} at BOC (<30 EFPD)
- 1.4.4.1 Inverse Boron Worth Vs. T_{mod} at Peak Boron (30 EFPD up to 170 EFPD)
- 1.4.5.1 Inverse Boron Worth Vs. T_{mod} at MOC (170 EFPD up to 340 EFPD)
- 1.4.6.1 Inverse Boron Worth Vs. T_{mod} at EOC (\geq 340 EFPD)

| | | |
|--|-----|--|
| | ATC | 6.7.2 At SM/CRS discretion, calculate volume of Boric Acid to be added on Attachment 11.6, Calculation of Boric Acid Volume for Direct Boration or VCT Borate Makeup Mode. |
| | ATC | 6.7.3 Set Boric Acid Makeup Batch Counter to volume of Boric Acid desired. |
| | ATC | 6.7.4 Verify Boric Acid Makeup Pumps selector switch aligned to desired Boric Acid Makeup Pump A(B). |
| | ATC | 6.7.5 Place Direct Boration Valve, BAM-143, control switch to AUTO. |
| | ATC | 6.7.6 Place Makeup Mode selector switch to BORATE. |
| | ATC | 6.7.7 Verify selected Boric Acid Makeup Pump A(B) Starts. |
| | ATC | 6.7.8 Verify Direct Boration Valve, BAM-143, Opens. |

NOTE

The Boric Acid Flow Totalizer will not register below 3 GPM. The Boric Acid Flow Totalizer is most accurate in the range of 10 - 25 GPM.

| | | |
|--|-----|--|
| | ATC | 6.7.9 If manual control of Boric Acid flow is desired, <u>then</u> perform the following: 6.7.9.1 Verify Boric Acid Flow controller, BAM-IFIC-0210Y, in Manual. 6.7.9.2 Adjust Boric Acid Flow controller, BAM-IFIC-0210Y, output to >3 GPM flow rate. |
|--|-----|--|

Op Test No.: NRC Scenario # 2 Event # 3 Page 12 of 33

Event Description: Steam Generator Tube Leakage #1 SG

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----|---|
| | N/A | 6.7.10 If automatic control of Boric Acid flow is desired, <u>then</u> perform the following: 6.7.10.1 Place Boric Acid Flow controller, BAM-IFIC-0210Y, in Auto. 6.7.10.2 Adjust Boric Acid Flow controller, BAM-IFIC-0210Y, setpoint potentiometer to >3 GPM flow rate. |
| | ATC | 6.7.11 Verify Boric Acid Makeup Control Valve, BAM-141, Intermediate <u>or</u> Open. |
| | ATC | 6.7.12 Observe Boric Acid flow rate for proper indication. |
| | ATC | 6.7.13 <u>When</u> Boric Acid Makeup Batch Counter has counted down to desired value, <u>then</u> verify Boric Acid Makeup Control Valve, BAM-141, Closed. |
| NOTE | | |
| Step 6.7.14 may be repeated as necessary to achieve desired total boron addition for plant conditions. | | |
| Examiner Note | | |
| The step below is only applicable if the ATC adds acid in small batches. | | |
| | ATC | 6.7.14 If additional boric acid addition is required <u>and</u> with SM/CRS permission, <u>then</u> perform the following: 6.7.14.1 Reset Boric Acid Makeup Batch Counter. 6.7.14.2 Verify Boric Acid Makeup Control Valve, BAM-141, Intermediate <u>or</u> Open. 6.7.14.3 Observe Boric Acid flow rate for proper indication. 6.7.14.4 <u>When</u> Boric Acid Makeup Batch Counter has counted down to desired value, <u>then</u> verify Boric Acid Makeup Control Valve, BAM-141, Closed. |
| | ATC | 6.7.15 Verify Boric Acid Flow controller, BAM-IFIC-0210Y, in Manual. |
| | ATC | 6.7.16 Verify <u>both</u> Boric Acid Flow controller, BAM-IFIC-0210Y, output <u>and</u> setpoint potentiometer set to zero. |
| | ATC | 6.7.17 Place Makeup Mode selector switch to MANUAL. |
| | ATC | 6.7.18 Verify Selected Boric Acid Makeup Pump A (B) Stops. |

Op Test No.: NRC Scenario # 2 Event # 3 Page 13 of 33

Event Description: Steam Generator Tube Leakage #1 SG

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|---|-----|---|
| | ATC | 6.7.19 Verify Direct Boration Valve, BAM-143, Closed. |
| | | |
| | ATC | 6.7.20 Place Direct Boration Valve, BAM-143, control switch to CLOSE. |
| | | |
| OP-901-212, Rapid Plant Power Reduction, E₀, General Actions | | |
| <u>NOTE</u> | | |
| To prevent Pressurizer heater cutout, avoid operating with Pressurizer pressure near the heater cutout pressure of 2270 PSIA while on Boron Equalization. | | |
| | ATC | 2. Perform Boron Equalization as follows: 2.1 Place available Pressurizer Pressure Backup Heater Control Switches to ON. 2.2 Reduce Pressurizer Spray Valve Controller (RC-IHIC-0100) setpoint potentiometer to establish spray flow and maintain RCS pressure 2250 PSIA (2175 – 2265). |
| | | |
| <u>CAUTION</u> | | |
| REFER TO TECHNICAL SPECIFICATION 3.1.3.6 FOR TRANSIENT INSERTION LIMITS. | | |
| | ATC | 3. Operate CEAs in accordance with OP-004-004, Control Element Drive, to maintain ASI using CEA Reg. Group 5, 6 or Group P Control Element Assemblies in accordance with OP-010-005, Plant Shutdown, Attachment 9.10, Axial Shape Control Guidelines. |
| | | |
| | SRO | 4. Notify the Woodlands System Load Dispatcher that a rapid power reduction is in progress. |
| | | |
| | BOP | 5. Announce to Station Personnel over the Plant Paging System that a rapid plant power reduction is in progress. |
| | | |
| | ATC | 6. Maintain RCS Cold Leg Temperature 536°F to 549°F. |
| | | |
| | BOP | 7. Commence Turbine load reduction by performing the following: 7.1 Depress LOAD RATE MW/MIN pushbutton. 7.2 Set selected rate in Display Demand Window. 7.3 Depress ENTER pushbutton. 7.4 Depress REFERENCE pushbutton. 7.5 Set desired load in Reference Demand Window. 7.6 Depress ENTER pushbutton. 7.7 Depress GO pushbutton. |
| | | |

Op Test No.: NRC Scenario # 2 Event # 3 Page 14 of 33

Event Description: Steam Generator Tube Leakage #1 SG

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

NOTE

If USBSCAL is not in service, the COLSS Steam Calorimetric will be automatically disabled when MSBSCAL, PMC PID C24246, drops below 95% Power, and will revert back to FWBSCAL, PMC PID C24235. This may result in a step change in COLSS indicated Plant Power (BSCAL) of up to 1.0% when this occurs.

| | | |
|--|-----|--|
| | ATC | 8. <u>When</u> Reactor Power consistently indicates less than 98% power, as indicated on PMC PID C24631 [MAIN STEAM RAW POWER (MSBSRAW)], <u>or</u> an alternate point provided by Reactor Engineering, <u>then</u> verify the value of C24648 [BSCAL SMOOTHING VAL. APPLD (DUMOUT17)] automatically changes to 1. |
| | N/A | 9. <u>If</u> C24648 does not automatically change to 1, <u>then</u> inform Reactor Engineering <u>and</u> set the value of 1 for COLSS power smoothing constant K24250, [ADDRSSBL SMOOTHING FOR BSCAL (ALPHA)] in accordance with OP-004-005, Core Operating Limits Supervisory System. |
| | BOP | 10. Following a Reactor Power change of >15% within a one hour period, direct Chemistry Department to sample Reactor Coolant System (RCS) for an isotopic iodine analysis two to six hours later. |
| | BOP | 11. <u>When</u> Condensate flow is <18,000 gpm, <u>verify</u> Gland Steam Condenser Bypass, CD-154, Closed (PMC PID D02404). |
| | BOP | 12. Monitor Condensate Polisher differential pressure <u>and</u> remove Polishers from service to maintain system pressure in accordance with OP-003-031, Condensate Polisher/Backwash Treatment. |
| | N/A | 13. <u>When</u> Reactor Power is approximately 70% <u>or</u> Heater Drain Pump flow is unstable, <u>then</u> remove Heater Drain Pumps from service by taking pump control switches to Stop. |
| | SRO | Reviews the following Technical Specifications and determines applicable actions: <ul style="list-style-type: none"> • 3.4.5.2 action a |

Examiner Note

This event is complete after the Reactivity Manipulation is satisfied and the SRO has evaluated Technical Specifications

OR

At Lead Examiner's Discretion

Op Test No.: NRC Scenario # 2 Event # 3 Page 15 of 33

Event Description: Steam Generator Tube Leakage #1 SG

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

Examiner Note

Cue the Simulator Operator when ready for Event 4

Op Test No.: NRC Scenario # 2 Event # 4 Page 16 of 33

Event Description: Turbine Cooling Water Pump A Trips

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----------|---|
| | ATC / BOP | Recognize and report indications of Turbine Cooling water Pump Trip |
| | | Alarms |
| | | <ul style="list-style-type: none"> • TURBINE CLNG WATER DISCH HDR PRESS LO (Cabinet E, E-9) • TURBINE CLNG WTR PUMP A TRIP/TROUBLE (Cabinet E, F-9) • HYDROGEN TEMPERATURE HI (Cabinet D, H-8) • FWPT A OIL COOLER OIL DISCH TEMP HI (Cabinet F, Q-15) • FWPT B OIL COOLER OIL DISCH TEMP HI (Cabinet F, Q-19) |
| | | Indications |
| | | <ul style="list-style-type: none"> • TCCW Pump A indication STOP and Yellow Lights • TCCW Pump B indication STOP light |
| Examiner Note | | |
| If the crew neglects to start the A TCCW pump, the turbine will trip due to high vibration resulting in a Reactor Power Cutback. | | |
| Examiner Note | | |
| The BOP may start the B TCCW Pump upon indications of it failing to auto start, prior to entering the off normal. | | |
| | SRO | Enter and direct the implementation of OP-901-512, Loss of Turbine Cooling Water. |
| OP-901-512, Loss of Turbine Cooling Water, E₀, General Actions | | |
| | SRO | 1. IF loss of Turbine Cooling Water is due to loss of Turbine Cooling Water Pumps, THEN go to Subsection E1, Loss of Turbine Cooling Water Pumps. |
| OP-901-512, Loss of Turbine Cooling Water, E₁, Loss of Turbine Cooling Water Pumps | | |
| | BOP | 1. IF EITHER Turbine Cooling Water Pump is available, THEN attempt to start Turbine Cooling Water Pump to restore system flow. |

Op Test No.: NRC Scenario # 2 Event # 4 Page 17 of 33

Event Description: Turbine Cooling Water Pump A Trips

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|---|-----|--|
| | BOP | <p>2. IF ANY of the following equipment is in operation, THEN monitor the associated Turbine Cooling Water temperatures AND secure ANY unnecessary loads:</p> <ul style="list-style-type: none"> ▪ Condenser Vacuum Pumps ▪ Steam Generator Feed Pump Turbines ▪ Heater Drain Pumps ▪ Turbine EH System ▪ Condensate Pumps ▪ Main Turbine Lube Oil Coolers ▪ Generator Exciter Coolers ▪ Generator Hydrogen Coolers ▪ Instrument Air Compressors ▪ Station Air Compressors ▪ Stator Coil Water System ▪ Hydrogen Seal Oil Coolers ▪ Isophase Bus Coolers ▪ Hydrogen Dryers |
| <p>CAUTION</p> <p>AT 100% POWER A TOTAL LOSS OF TURBINE COOLING WATER WILL RESULT IN SIGNIFICANT MAIN TURBINE DAMAGE IN 2-3 MINUTES WITH THE GENERATOR AS THE MOST LIMITING COMPONENT.</p> | | |
| | N/A | <p>3. IF BOTH Turbine Cooling Water pumps are unavailable AND flow can NOT be restored, THEN perform the following:</p> |
| | N/A | <p>4. Align Potable Water to Instrument Air and Station Air Compressors as follows:</p> |
| <p>Examiner Note</p> <p>This event is complete after the BOP has started the A TCCW Pump</p> <p>OR</p> <p>At Lead Examiner's Discretion</p> | | |
| <p>Examiner Note</p> <p>Cue the Simulator Operator when ready for Event 5</p> | | |

Op Test No.: NRC Scenario # 2 Event # 5 Page 18 of 33

Event Description: Steam Generator Tube Rupture

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----|---|
| | ATC | Recognize and report indications of Steam Generator Tube Rupture |
| | | Alarms: |
| | | <ul style="list-style-type: none"> • PRESSURIZER LEVEL HI/LO (Cabinet H, B-1) |
| | | Indications: |
| | | <ul style="list-style-type: none"> • PZR level lowering • PZR pressure lowering • All Pressurizer Heaters Energized • Volume Control tank lowering |
| OP-901-202, Steam Generator Tube Leakage or High Activity | | |
| | ATC | 1. <u>IF</u> Pressurizer level <u>CANNOT</u> be maintained with available Charging Pumps, <u>THEN</u> perform the following: <ol style="list-style-type: none"> 1.1 Manually trip Reactor. 1.2 Manually initiate Safety Injection Actuation (SIAS) <u>AND</u> Containment Isolation Actuation (CIAS). 1.3 <u>GO TO</u> OP-902-000, STANDARD POST TRIP ACTIONS. |
| | ATC | 1. <u>Determine Reactivity Control</u> acceptance criteria are met: <ol style="list-style-type: none"> a. <u>Check</u> reactor power is dropping. b. <u>Check</u> startup rate is negative. c. <u>Check</u> less than TWO CEAs are NOT fully inserted. |
| | BOP | 2. <u>Determine Maintenance of Vital Auxiliaries</u> acceptance criteria are met: <ol style="list-style-type: none"> a. <u>Check</u> the Main Turbine is tripped: <ul style="list-style-type: none"> • Governor valves closed • Throttle valves closed |
| | BOP | b. <u>Check</u> the Main Generator is tripped: <ul style="list-style-type: none"> • GENERATOR BREAKER A tripped • GENERATOR BREAKER B tripped • EXCITER FIELD BREAKER tripped |

Op Test No.: NRC Scenario # 2 Event # 5 Page 19 of 33

Event Description: Steam Generator Tube Rupture

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|---|-----|--|
| | BOP | <p>c. <u>Check</u> station loads are energized from offsite electrical power as follows:</p> <p><u>Train A</u></p> <ul style="list-style-type: none"> • A1, 6.9 KV non safety bus • A2, 4.16 KV non safety bus • A3, 4.16 KV safety bus • A-DC electrical bus • A or C vital AC Instrument Channel <p><u>Train B</u></p> <ul style="list-style-type: none"> • B1, 6.9 KV non safety bus • B2, 4.16 KV non safety bus • B3, 4.16 KV safety bus • B-DC electrical bus • B or D vital AC Instrument Channel |
| <p>Examiner Note</p> <p>The Pressurizer will empty during this event and will not be able to be maintained using Charging and Letdown flow.</p> | | |
| | ATC | <p>3. <u>Determine RCS Inventory Control</u> acceptance criteria are met:</p> <p>a. <u>Check</u> that BOTH the following conditions exist:</p> <ul style="list-style-type: none"> • Pressurizer level is 7% to 60% • Pressurizer level is trending to 33% to 60% <p>b. <u>Check</u> RCS subcooling is greater than or equal to 28°F.</p> |
| | ATC | <p>a.1 Restore and maintain pressurizer level 33% to 60% by performing ANY of the following:</p> <ol style="list-style-type: none"> 1) Operate Pressurizer Level Control System. 2) Manually operate charging pumps and letdown control valves. |
| | ATC | <p>4. <u>Determine RCS Pressure Control</u> acceptance criteria are met by checking that BOTH of the following conditions exist:</p> <ul style="list-style-type: none"> • Pressurizer pressure is 1750 psia to 2300 psia • Pressurizer pressure is trending to 2125 psia to 2275 psia |
| | ATC | <p>4.1 Restore and maintain pressurizer pressure 2125 psia to 2275 psia by performing ANY of the following:</p> <ol style="list-style-type: none"> a. Operate Pressurizer Pressure Control System. b. Manually operate heaters and spray. |

Op Test No.: NRC Scenario # 2 Event # 5 Page 20 of 33

Event Description: Steam Generator Tube Rupture

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

Examiner Note

Pressurizer pressure will eventually lower to below the 2 thresholds below (1684, 1621 PSIA) after the Pressurizer empties.

| | | |
|--|-----|---|
| | ATC | 4.2 IF pressurizer pressure is less than 1684 psia, THEN verify the following have initiated. <ul style="list-style-type: none"> • SIAS • CIAS |
| | ATC | 4.3 IF pressurizer pressure is less than 1621 psia, THEN verify no more than two RCPs are operating. |
| | ATC | 4.4 IF pressurizer pressure is less than the minimum RCP NPSH of Appendix 2-A, "RCS Pressure and Temperature Limits", THEN stop ALL RCPs. |

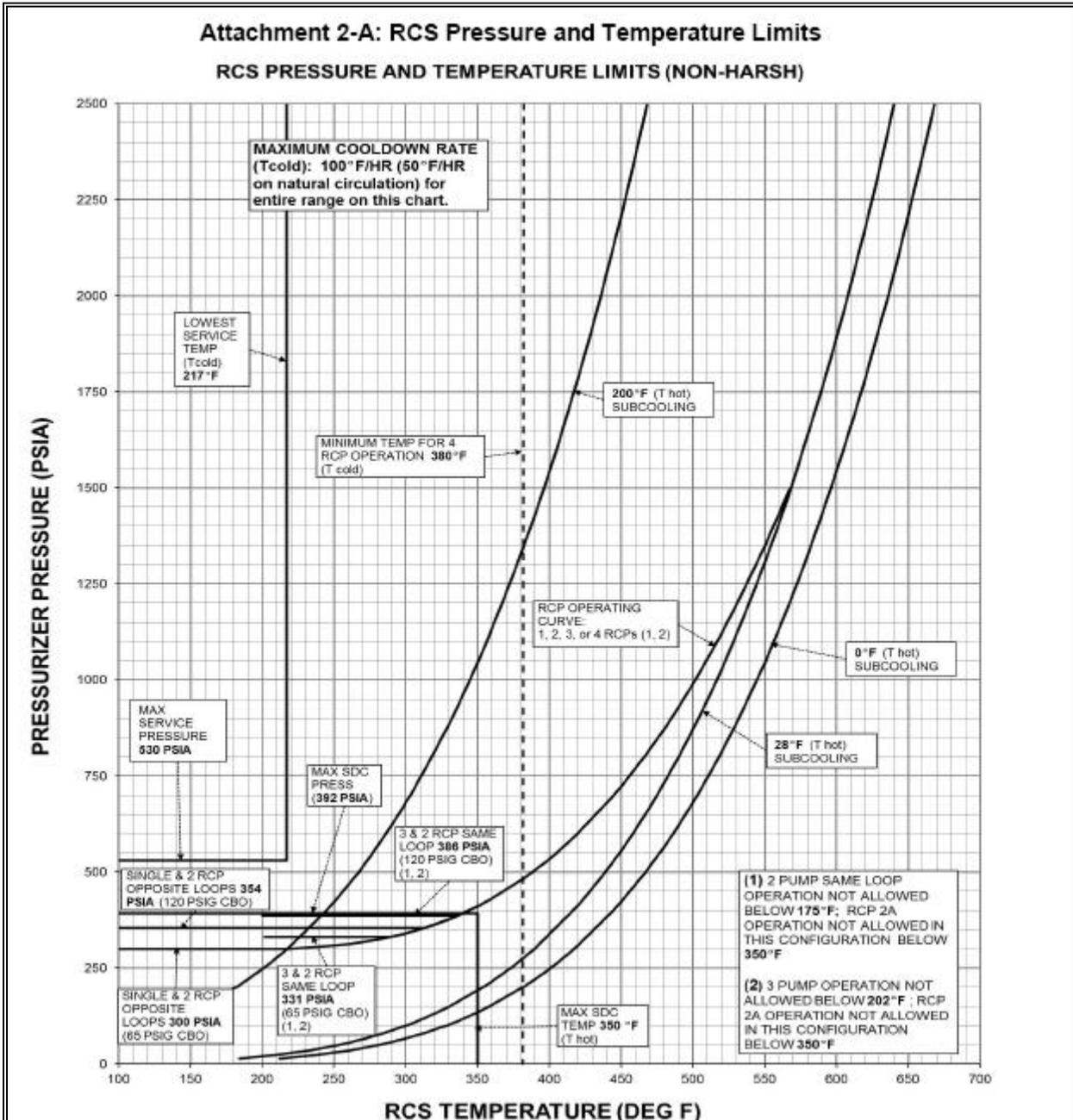
Examiner Note

Appendix 2-A is contained on the next page. Conditions should allow for 2 RCPs to remain running.

Op Test No.: NRC Scenario # 2 Event # 5 Page 21 of 33

Event Description: Steam Generator Tube Rupture

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|



| | | |
|--|-----|---|
| | ATC | <p>5. Determine Core Heat Removal acceptance criteria are met:</p> <ul style="list-style-type: none"> a. <u>Check</u> at least one RCP is operating. b. <u>Check</u> operating loop ΔT is less than 13°F. c. <u>Check</u> RCS subcooling is greater than or equal to 28°F. |
|--|-----|---|

Op Test No.: NRC Scenario # 2 Event # 5 Page 22 of 33

Event Description: Steam Generator Tube Rupture

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----|--|
| | BOP | 6. Determine RCS Heat Removal acceptance criteria are met: <ol style="list-style-type: none"> <u>Check</u> that at least one steam generator has BOTH of the following: <ul style="list-style-type: none"> Steam generator level is 10% to 76% NR Main Feedwater is available to restore level within 55%-70% NR.[60% to 80% NR] |
| | ATC | b. Check RCS TC is 530 °F to 550 °F |
| | BOP | c. Check steam generator pressure is 885 psia to 1040 psia. |
| | BOP | d. <u>Check</u> Feedwater Control in Reactor Trip Override: <ul style="list-style-type: none"> MAIN FW REG valves are closed STARTUP FW REG valves are 13% to 21% open Operating main Feedwater pumps are 3800 rpm to 4000 rpm |
| | BOP | e. <u>Reset</u> moisture separator reheaters, and <u>check</u> the temperature control valves closed. |
| | ATC | 7. <u>Determine</u> Containment Isolation acceptance criteria are met: <ol style="list-style-type: none"> <u>Check</u> containment pressure is less than 16.4 psia. <u>Check</u> NO containment area radiation monitor alarms OR unexplained rise in activity. <u>Check</u> NO steam plant activity monitor alarms OR unexplained rise in activity. |

Examiner Note

Event 6 is contained on the next page and thereafter Event 5 is recommenced. It is possible that the applicants perform the actions of Event 6 either before or after this step in OP-902-000, Standard Post Trip Actions.

Op Test No.: NRC Scenario # 2 Event # 6 Page 23 of 33

Event Description: Relay K202 failure, RC-606 and FP-601B fail to auto close

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|---|-----|---|
| | BOP | Recognize indications of RC-606 and FP-601B Failure to close |
| | | Alarms |
| | | <ul style="list-style-type: none"> N/A |
| | | Indications |
| | | <ul style="list-style-type: none"> RC-606 position indicates OPEN (Red) (CP-4) FP-601B position indicates OPEN (Red) (CP-8) |
| Examiner Note | | |
| These valves may have been noticed and closed earlier in the scenario. | | |
| | ATC | Closes RC-606, Controlled Bleedoff Inside Containment Isolation |
| | | |
| | BOP | Closes FP-601B, Firewater to Containment Isolation |
| | | |
| Examiner Note | | |
| The next section returns to actions contained in Event 5. | | |
| Examiner Note | | |
| This event is complete after the RC-606 and FP-601B are closed | | |

Op Test No.: NRC Scenario # 2 Event # 5 Page 24 of 33

Event Description: Steam Generator Tube Rupture

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|---|-----|---|
| | BOP | 8 Determine Containment Temperature and Pressure Control acceptance criteria are met: a. <u>Check</u> containment temperature is less than or equal to 120°F. b. <u>Check</u> containment pressure is less than 16.4 psia. |
| | N/A | 9. IF ALL safety function acceptance criteria are met, AND NO contingency actions were performed, THEN GO TO OP-902-001, "Reactor Trip Recovery" procedure. |
| | SRO | 10. IF ANY safety function acceptance criteria are NOT met, OR ANY contingency action was taken, THEN GO TO Appendix 1, "Diagnostic Flowchart." |
| OP-902-009, Standard Appendices, Appendix 1 | | |
| Examiner Note | | |
| Appendix 1 is a flow chart used to diagnose to the correct recovery procedure for the event in progress. The steps below will be followed by a YES or NO to indicate proper flow path. | | |
| | ATC | Rx Pwr dropping, SUR negative, and < two CEAs NOT fully inserted or Emergency Boration in progress (YES) |
| | ATC | Pressurizer pressure dropping rapidly and Pressurizer level changing (YES) |
| | BOP | Steam Generator Pressure Abnormally Low (NO) |
| | N/A | Primary Break |
| | ATC | Containment Pressure and Temperature Abnormally High (NO) |
| | ATC | Activity in the Steam Plant (YES) |
| | N/A | Steam Generator Tube Rupture |
| | BOP | At least one 4KV safety bus energized (YES) |
| | SRO | Go To OP-902-007, Steam Generator Tube Rupture Recovery |

Op Test No.: NRC Scenario # 2 Event # 5 Page 25 of 33

Event Description: Steam Generator Tube Rupture

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

OP-902-007, Steam Generator Tube Rupture Recovery**NOTE**

The Shift Chemist should be notified if a SIAS or CIAS has occurred. The secondary sampling containment isolation valves should not be opened following an SIAS or CIAS until directed by the Shift Chemist.

| | | |
|--|-----|---|
| | BOP | Confirm Diagnosis *1. Confirm diagnosis of a SGTR: a. Check Safety Function Status Check acceptance criteria are satisfied. b. IF steam generator sample path is available, THEN direct Chemistry to sample BOTH steam generators for activity. |
| | BOP | Announce the Event 2. Announce a Steam Generator Tube Rupture is in progress using the plant page. |
| | N/A | Classify the Event *3. Advise the Shift Manager to REFER TO EP-001-001, "Recognition & Classification of Emergency Condition", and implement the Emergency Plan. |
| | N/A | Restore Operation of DCT Sump Pumps *4. IF power has been interrupted to either 3A or 3B safety buses, THEN perform Appendix 20, "Operation of DCT Sump Pumps". |
| | SRO | Implement Placekeeping 5. REFER TO Section 6.0, "Placekeeper", and record the time of the reactor trip. |
| | ATC | Verify SIAS Initiation 6. IF pressurizer pressure is less than 1684 psia, THEN verify SIAS has initiated. |
| | BOP | *7. IF SIAS has initiated, THEN : a. Verify safety injection pumps have started. b. Check safety injection flow is within the following: <ul style="list-style-type: none"> ▪ Appendix 2-E, "HPSI Flow Curve" ▪ Appendix 2-F, "LPSI Flow Curve" |

Examiner Note

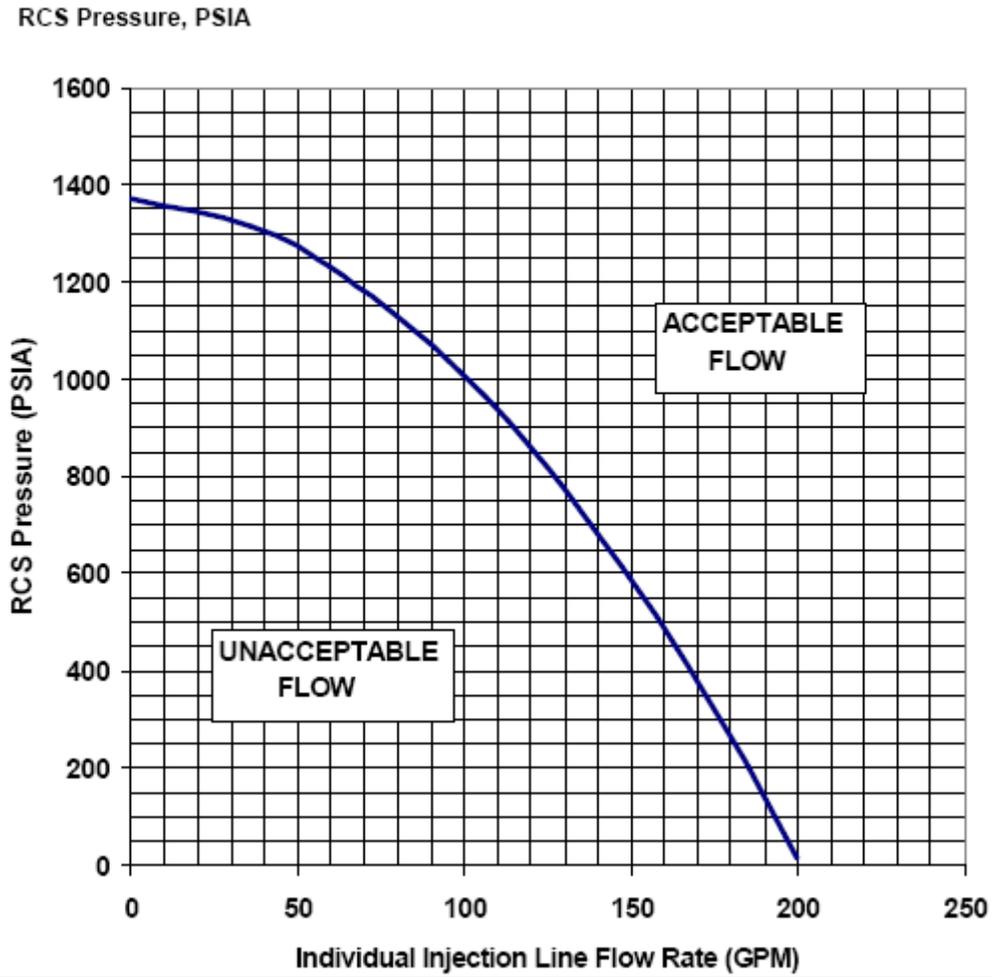
Appendix 2-E and Appendix 2-F are contained on the next 2 pages. Injection flow will be meeting all requirements.

Op Test No.: NRC Scenario # 2 Event # 5 Page 26 of 33

Event Description: Steam Generator Tube Rupture

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

Attachment 2-E: HPSI Flow Curve

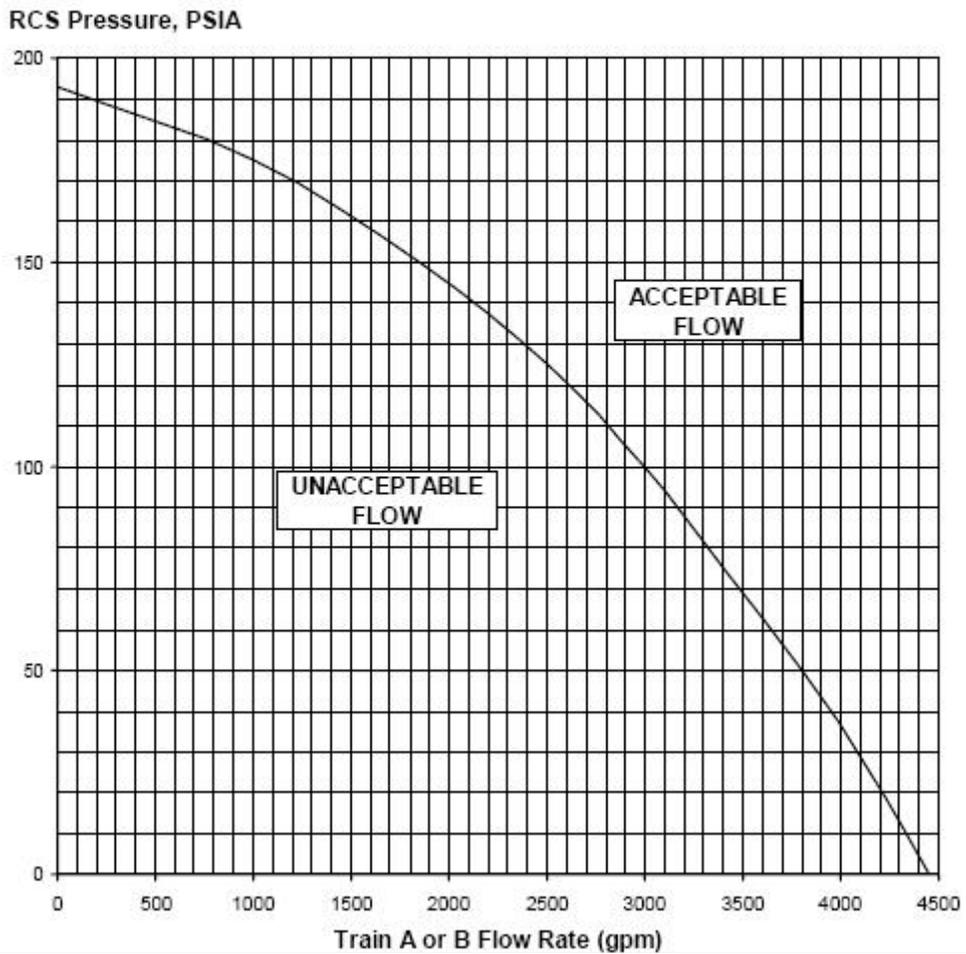


Op Test No.: NRC Scenario # 2 Event # 5 Page 27 of 33

Event Description: Steam Generator Tube Rupture

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

Attachment 2-F: LPSI Flow Curve



| | | |
|--|-----|---|
| | ATC | c. Verify ALL available charging pumps are operating. |
| | ATC | <p>RCP Trip Strategy</p> <p>8. IF pressurizer pressure is less than 1621 psia, AND SIAS is actuated, THEN:</p> <ul style="list-style-type: none"> a. Verify no more than two RCPs are operating. b. IF pressurizer pressure is less than the minimum RCP NPSH of Appendix 2A-D, "RCS Pressure and Temperature Limits", THEN stop ALL RCPs. |
| | | |

Op Test No.: NRC Scenario # 2 Event # 5 Page 28 of 33

Event Description: Steam Generator Tube Rupture

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

Examiner Note**Appendix 2A is contained earlier in this guide.****Examiner Note****The step below is not applicable now but it is continuous action throughout. Once the cooldown has commenced, Event 7 will be inserted and the step becomes applicable.**

| | | |
|--|-----|---|
| | N/A | Verify RCP Operating Limits *9. IF RCPs are operating, THEN : a. Verify CCW available to RCPs. b. IF a CSAS is initiated, THEN stop ALL RCPs. c. IF RCS TC is less than 382°F, THEN verify no more than two RCPs are operating. |
| | | |
| | BOP | Verify Proper CCW Operation *10. Check a CCW pump is operating for each energized 4.16 KV safety bus. |
| | | |
| | BOP | Cooldown RCS to Less Than 520°F T_H 11. Commence a rapid RCS cooldown to less than 520°F T _H using the steam bypass valves. |
| | | |
| | BOP | Take 1 Steam Dump permissive switch to Manual [MS-319A(B)(C) MS-320A(B)(C)] |
| | | |
| | BOP | Place controller for valve permissive switch placed in manual above to Manual [MS-IHIC-0319-A(B)(C) MS-IHIC-0320-A(B)(C)] |
| | | |
| | BOP | Raise output on controller to ~50% |

Examiner Note**Cue the simulator operator to initiate Event 7 once the cooldown has started. Event 7 is contained on the next page and thereafter Event 5 is recommenced.**

Op Test No.: NRC Scenario # 2 Event # 7 Page 29 of 33

Event Description: CCW Surge Tank level switch CC-ILS-7013A fails low

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| Time | Position | Applicant's Actions or Behavior |
|------|----------|--|
| | BOP | Recognize and report indications of CCW Surge Tank level switch failure |
| | | Alarms |
| | | <ul style="list-style-type: none"> • CCW A SURGE TANK LVL LOST(Cabinet SA, B-5) • RCP 1A(B) 2A(B) CCW FLOW LOST (Cabinet SA, A-1(2)(3)(4) • RCP 1A(B) 2A(B) CCW FLOW LOST (Cabinet SB, A-6(7)(8)(9) • RCP 1A(B) 2A(B) CCW PRESSURE LO (Cabinet H, G-3(5)(7)(9) • RCP 1A(B) 2A(B) CCW FLOW LO (Cabinet H, H-3(5)(7)(10) • CCW MAKEUP PUMP A RUNNING/POWER LOST (Cabinet M, G-2) • SHUTDOWN HX A CCW FLOW LO (Cabinet M, H-2) |
| | | Indications |
| | | <ul style="list-style-type: none"> • CC-200A/CC-727 position indicates closed (GREEN) • CC-963A position indicates closed (GREEN) • CCW Surge Tank levels indicate constant level • CCW A header pressure and flow rising |

OP-902-007, Steam Generator Tube Rupture Recovery**Examiner Note**

The step below is a continuous action step from earlier to verify CCW flow to the RCPs.

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---|
| | BOP | Verify RCP Operating Limits *9. IF RCPs are operating, THEN : a. Verify CCW available to RCPs. b. IF a CSAS is initiated, THEN stop ALL RCPs. c. IF RCS TC is less than 382°F, THEN verify no more than two RCPs are operating. |

CRITICAL TASK**TRIP ANY RCP EXCEEDING OPERATING LIMITS**

This task is satisfied by stopping all running Reactor Coolant Pumps prior to exceeding 3 minutes without Component Cooling Water flow to the RCPs.

This task becomes applicable after all RCP CCW flow lost annunciators actuate

| Time | Position | Applicant's Actions or Behavior |
|------|----------|--|
| | ATC | a.1 IF CCW is lost to RCPs AND is NOT restored within 3 minutes, THEN stop the affected pumps. (CRITICAL) |

Examiner Note

The next section returns to actions contained in Event 5.

Op Test No.: NRC Scenario # 2 Event # 7 Page 30 of 33

Event Description: CCW Surge Tank level switch CC-ILS-7013A fails low

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

Examiner Note

This event is complete after the ATC has stopped all running RCPs

OR

Critical task Performance Criteria has been exceeded

Op Test No.: NRC Scenario # 2 Event # 5 Page 31 of 33

Event Description: Steam Generator Tube Rupture

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

Examiner Note

After Event 7 has been completed and all RCPs have been turned off, the RCS will shift to Natural Circulation mode. During the transition with steady steam flow the ΔT will increase. This will give the appearance of RCS temperature stable or rising as indicated T_{HOT} will stabilize or slightly rise as T_{COLD} lowers during the buildup to establish the thermal driving head necessary to establish Natural Circulation.

Examiner Note

Appendix 2A is contained earlier in this guide.

CRITICAL TASK**PREVENT LIFTING AFFECTED SG SAFETY VALVES**

This task is satisfied by commencing an RCS depressurization to less than 930 PSIA using auxiliary spray valves and charging pumps prior to lifting atmospheric dump valve in automatic or main steam safety valves on affected Steam Generator.

This task becomes applicable after the RCS has been cooled down to RCS T_{HOT} less than 520°F and Steam Generator #1 is isolated.

| | | |
|--|-----|---|
| | ATC | Maintain RCS Pressure 12. Depressurize the RCS: <ol style="list-style-type: none"> a. Maintain pressurizer pressure within ALL of the following criteria: <ul style="list-style-type: none"> • Within Appendix 2A-D, "RCS Pressure and Temperature Limits" • Less than 930 psia • Within 50 psi of the most affected steam generator pressure • IF RCPs are operating, greater than the minimum RCP NPSH of Appendix 2AD, "RCS Pressure and Temperature Limits" |
| | ATC | b. Operate main or auxiliary pressurizer spray. (CRITICAL) |
| | BOP | c. IF HPSI throttle criteria are met, THEN perform ANY of the following: <ul style="list-style-type: none"> • Control charging and letdown flow • Throttle HPSI flow |
| | BOP | Reset MSIS Initiation Setpoints *13. IF MSIS is NOT present, THEN lower the automatic initiation setpoints as the cooldown and depressurization proceed for MSIS (low SG Pressure). |
| | N/A | Reset SIAS Initiation Setpoints 14. IF SIAS is NOT present, THEN lower the automatic initiation setpoints as the cooldown and depressurization proceed for SIAS (low PZR Pressure). |

Op Test No.: NRC Scenario # 2 Event # 5 Page 32 of 33

Event Description: Steam Generator Tube Rupture

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----|--|
| | N/A | Protect Main Condenser 15. IF offsite power has been lost, THEN : |
| | BOP | Determine Most Affected SG 16. Determine the most affected steam generator by considering ALL of the following: <ul style="list-style-type: none"> • Steam generator activities • Main steam line radiation levels • Steam generator Blowdown radiation monitor readings • Steam generator level rise when NOT feeding • One steam generator level rising faster than the other with feed and steaming rates being essentially the same for both • Feed flow mismatch between steam generators • Steam flow vs. feed flow mismatch in a steam generator prior to the reactor trip |
| <u>CRITICAL TASK</u> | | |
| ISOLATE MOST AFFECTED STEAM GENERATOR | | |
| <p>This task is satisfied by closing Main Steam isolation valve, Main Feedwater isolation valve, Emergency Feedwater flow control and isolation valves, steam supply to EFW pump AB, steam line drains, and Blowdown isolation valves for #1 Steam Generator not before a cooldown to RCS T_{HOT} less than 520°F has been completed.</p> <p>This task becomes applicable when the crew enters OP-902-007, Steam Generator Tube Rupture Recovery</p> | | |
| | BOP | Isolate the Most Affected SG 17. When the RCS TH is less than 520°F, THEN isolate the most affected steam generator: Steam Generator 1 <ol style="list-style-type: none"> a. Place the ADV setpoint to 980 psig and verify the controller in AUTO. |
| | BOP | b. Verify the MSIV is closed. (CRITICAL) |
| | BOP | c. Verify the MFIV is closed. (CRITICAL) |
| | N/A | d. IF EFAS-1 is NOT initiated, THEN close EFW Isolation Valves: <ul style="list-style-type: none"> • EFW 228A SG 1 PRIMARY • EFW 229A SG 1 BACKUP |

Op Test No.: NRC Scenario # 2 Event # 5 Page 33 of 33

Event Description: Steam Generator Tube Rupture

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----|--|
| | BOP | e. Place EFW Flow Control Valves in MAN and close: <ul style="list-style-type: none"> • EFW 224A SG 1 PRIMARY (CRITICAL) • EFW 223A SG 1 BACKUP (CRITICAL) |
| | BOP | f. Close MS 401A, PUMP AB TURB STM SUPPLY SG 1. (CRITICAL) |
| | BOP | g. Close Main Steam Line 1 Drains: <ul style="list-style-type: none"> • MS 120A NORMAL • MS 119A BYPASS |
| | BOP | h. Close Steam Generator Blowdown isolation valves: <ul style="list-style-type: none"> • BD 103A STM GEN 1 (OUT) • BD 102A STM GEN 1 (IN) |
| | BOP | i. Check the Main Steam Safety valves are closed. |

Examiner Note

This event is complete after the crew has isolated the #1 Steam Generator and commenced depressurization of the RCS

OR

At Lead Examiner's Discretion

| Facility: | Waterford 3 | Scenario No.: | 3 | Op Test No.: | |
|--|--|--------------------------------|---|--------------|--|
| Examiners: | _____ | | Operators: | _____ | |
| | _____ | | | _____ | |
| | _____ | | | _____ | |
| Initial Conditions: | Reactor power is ~1%, MOC | | | | |
| | _____ | | | | |
| Turnover: | _____ | | | | |
| | Protected Train is B, AB Bus is aligned to Train B, Raise power to 5%. | | | | |
| | _____ | | | | |
| | _____ | | | | |
| | _____ | | | | |
| Event No. | Malf. No. | Event Type* | Event Description | | |
| 1 | N/A | R – ATC N – BOP N – SRO | Secure the Auxiliary Feedwater Pump and raise power to 5% in accordance with OP-003-035, Auxiliary Feedwater and OP-010-003, Plant Startup. | | |
| 2 | SG04G | I – BOP I – SRO TS – SRO | Steam generator 1 Pressure Instrument SG-IPT-1013C, fails low requiring Technical Specification entry and bypass of multiple PPS bistables. (TS 3.3.1, 3.3.2) | | |
| 3 | RC08A | C – BOP C – SRO | (A) Reactor Coolant Pump 1A lower seal fails. OP-901-130, Reactor Coolant Pump Malfunction | | |
| 4 | RC15A2 | I – ATC I – SRO TS – SRO | (A) PZR level instrument, RC-ILI-0110X, fails low affecting letdown and heaters. OP-901-110, Pressurizer Level Control Malfunction. (TS 3.3.3.5) | | |
| 5 | RP02A RP02B RP02C RP02D RC03A | C – ATC M – ALL | RCP 1A sustains a locked rotor and an automatic reactor trip does not occur. Manual action is needed to trip the reactor (Critical Task 1, manually trip reactor prior to exiting step 1 of OP-902-000) | | |
| 6 | RC23A CS04A | M – ALL | Loss of Coolant Accident occurs inside containment and valve CS-125A (Containment Spray Hdr A Isolation) fails closed | | |
| 7 | DI-08A04S22-1 CS01B | C – BOP C – SRO | Containment Spray Pump B trips and cannot be restarted requiring entry into OP-902-008, Functional Recovery and action taken to align Low Pressure Safety Injection pump to provide Containment Spray (Critical Task 2, align LPSI pump to replace CS pump prior to exiting Appendix 28 of OP-902-009) | | |
| * (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor | | | | | |

Scenario Event Description

NRC Scenario 3

The crew assumes the shift at ~ 1% power with instructions to stop the running Auxiliary Feedwater Pump and raise power to 5%. All requirements have been met to change modes from MODE 2 to MODE 1. The Shift Manager has given permission to change modes. The SRO should direct raising power using Control Element Assemblies in accordance with OP-010-003, Plant Startup.

After conducting the required reactivity manipulation, Steam Generator 1 Pressure Instrument, SG-IPT-1013C, fails low. The SRO should review and enter Technical Specifications 3.3.1 action 2 and 3.3.2 actions 13 and 19 and direct the BOP to bypass the Steam Generator 1 Pressure Lo, Steam Generator 1 ΔP , and Steam Generator 2 ΔP trip bistables in Plant Protection System Channel C within 1 hour, in accordance with OP-009-007, Plant Protection System. The SRO should review Technical Specifications 3.3.3.5 and 3.3.3.6 and OP-903-013, Monthly Channel Checks, and determine that Technical Specification entry for 3.3.3.5 and 3.3.3.6 is not required.

After Technical Specifications are addressed, Reactor Coolant Pump 1A lower seal fails requiring entry into OP-901-130, Reactor Coolant Pump Malfunction and implement Section E₁, Seal Failure. The SRO should direct the BOP to lower Controlled Bleed off temperature by lowering Component Cooling Water temperature.

After the crew is in Section E1 of OP-901-130 AND the BOP has adjusted Component Cooling Water Temperature, PZR level instrument, RC-ILI-0110X, fails low. The crew will implement OP-901-110, Pressurizer Level Control malfunction and select the non-faulted channel and reenergize Pressurizer heaters. The SRO should review Technical Specifications 3.3.3.5 and 3.3.3.6 and OP-903-013, Monthly Channel Checks, and determine that Technical Specification 3.3.3.5 action a is applicable and the channel needs to be restored within 7 days. The SRO should determine that Technical Specification 3.3.3.6 is not applicable as long as QSPDS channel for Pressurizer level is credited in accordance with OP-903-013, Monthly Channel Checks.

Once the SRO has addressed Technical Specifications, Reactor Coolant Pump 1A sustains a locked rotor and low Reactor Coolant flow bistables actuate. The Reactor Protection System fails to open the required Reactor Trip Breakers and an ATWS condition exists. The ATC should recognize that an automatic protection system has failed to occur and manually trip the reactor by depressing both Reactor Trip pushbuttons (A and D) on CP-2 (**CRITICAL TASK 1**). The Reactor will be successfully tripped from the RTGB and the crew will enter OP-902-000, Standard Post Trip Actions.

While the crew is performing Standard Post Trip Actions (RCS Heat Removal checks), a Loss of Coolant Accident will occur inside Containment. Safety Injection, Containment Isolation, and Containment Spray will all actuate. The ATC should secure all running Reactor Coolant Pumps when Containment Spray Actuates. When Containment Spray actuates, CS-125A (Containment Spray Hdr A Isolation) fails to open and cannot be opened from the RTGB or locally as it is mechanically stuck. This will result in Containment Spray Pump B as the only source of Containment Spray. The crew should enter OP-902-009, Standard Appendices Appendix 1, Diagnostic Flowchart and diagnose to OP-902-002, Loss of Coolant Accident Recovery.

Once the crew has entered OP-902-002, Containment Spray Pump B will trip and will not be able to be restarted. The crew should determine that Containment isolation and Containment Pressure and Temperature Control Safety Functions are not being met and diagnose into OP-902-008, Functional Recovery. The SRO should prioritize Containment Isolation first due to CS-125B being open and Containment Pressure and Temperature Control second. The crew will perform steps in OP-902-008, Functional Recovery and align the LPSI pump B to replace CS Pump B to establish Containment Temperature and Pressure Control (**CRITICAL TASK 2**).

The scenario can be terminated after the established Containment Spray flow from the Low Pressure Safety Injection Pump or at the lead examiner's discretion.

NRC Scenario 3

CRITICAL TASKS

1. ESTABLISH REACTIVITY CONTROL

This task is satisfied by shutting down the Reactor by either depressing both Reactor Trip pushbuttons on CP-2 or CP-8, initiating Diverse Reactor Trip Pushbuttons on CP-2, or by deenergizing the rod drive MG sets by deenergizing busses 32A and 32B on CP-1 prior to exiting the step to Verify Reactivity Control (Step 1) of OP-902-000, Standard Post Trip Actions. This task becomes applicable following the tripped Reactor Coolant Pump 1A.

2. ESTABLISH CONTAINMENT TEMPERATURE AND PRESSURE CONTROL

This task is satisfied by aligning Low Pressure Safety Injection Pump B to replace Containment Spray Pump B in accordance with Appendix 28 of OP-902-009, Standard Appendices prior to exiting OP-902-009 Appendix 28. This task becomes applicable following the initiation of a Containment Spray Actuation Signal.

Scenario Quantitative Attributes

| | |
|--|---|
| 1. Total malfunctions (5–8) | 6 |
| 2. Malfunctions after EOP entry (1–2) | 1 |
| 3. Abnormal events (2–4) | 2 |
| 4. Major transients (1–2) | 2 |
| 5. EOPs entered/requiring substantive actions (1–2) | 1 |
| 6. EOP contingencies requiring substantive actions (0–2) | 1 |
| 7. Critical tasks (2–3) | 2 |

NRC Scenario 3

SCENARIO SETUP

- A. Reset Simulator to IC-189.
- B. Verify Scenario Malfunctions, Remotes, and overrides are loaded, as listed in the Scenario Timeline.
- C. Ensure Protected Train B sign is placed in SM office window.
- D. Verify PMC is set to MODE 2.
- E. Verify EOOS is 10.0 Green
- F. Complete the simulator setup checklist.
- G. Start Insight, open file PlantParameters.tis.

SIMULATOR BOOTH INSTRUCTIONS

Event 1 Secure AFW Pump and Raise power to 5%

1. No actions for this event.

Event 2 Steam Generator 1 Pressure Instrument SG-IPT-1013C, fails low

1. On Lead Examiner's cue, initiate Event **Trigger 2**.
2. If Work Week Manager or PMI are called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.

Event 3 RCP 1A Lower Seal Fails

1. On Lead Examiner's cue, initiate Event **Trigger 3**.
2. If the Duty Engineering or RCP Engineer is called inform the caller that you will monitor RCP 1A for further degradation.
3. If the Work Week Manager or PMM are called, inform the caller that a work package will be assembled for the next forced outage.

Event 4 PZR level instrument, RC-ILI-0110X, fails low

1. On Lead Examiner's cue, initiate Event **Trigger 4**.
2. If called as NAO to check LCP-43, wait 3 minutes and report RC-ILI-0110-X1 is failed downscale.
3. If directed to check a started Charging pump for proper operation following start, wait 3 minutes and report the following:
 - a. Suction and discharge valves are open
 - b. Proper oil levels exist
 - c. No abnormal vibrations or noises present
4. If Work Week Manager, Computer Technician, or PMI are called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.

Event 5 Reactor Coolant Pump 1A locked rotor

1. On Lead Examiner's cue, initiate Event **Trigger 5**.

Event 6 Loss of Coolant Accident and valve CS-125A fails closed

1. On Lead Examiner's cue, initiate Event **Trigger 6**
2. If directed to override CS-125A, wait 3 minutes and initiate Event **Trigger 16** and report that the keyswitch for CS-125A is in override.
3. If directed to place the keyswitch for CS-125A in NORMAL, wait 1 minute and initiate Event **Trigger 26** and report that the keyswitch for CS-125B is in NORMAL
4. If called as NAO to verify proper operation of unloaded Emergency Diesel Generators, then wait 2 minutes and manually initiate Event **Trigger 10**. Wait an additional minute and manually initiate Event **Trigger 11** to acknowledge local EDG panels. Report that both A and B EDGs are running properly unloaded.

NRC Scenario 3

Event 7 Containment Spray Pump B Trip

1. After the crew enters OP-902-002 and on Lead Examiner's cue, initiate Event **Trigger 7**.
2. If directed to override CS-125B, wait 3 minutes (1 minute if already in the area) and initiate Event **Trigger 17** and report that the keyswitch for CS-125B is in OVERRIDE
3. If directed to place the keyswitch for CS-125B in NORMAL, wait 1 minute and initiate Event **Trigger 27** and report that the keyswitch for CS-125B is in NORMAL
4. **At the end of the scenario, before resetting, end data collection and save the file as 2012 Scenario 1-(start-end time).tid. Export to .csv file. Save the file into the folder for the appropriate crew**

NRC Scenario 3

SCENARIO TIMELINE

| EVENT | KEY | DESCRIPTION | TRIGGER | DELAY HH:MM:SS | RAMP HH:MM:SS | FINAL |
|--------------|---------------|--|----------------|---------------------------|--------------------------|---------------|
| 5 | RP02A | RPS CH A AUTO TRIP FAILURE NO AUTOMATIC REACTOR TRIP | N/A | 00:00:00 | 00:00:00 | ACTIVE |
| 5 | RP02B | RPS CH B AUTO TRIP FAILURE NO AUTOMATIC REACTOR TRIP | N/A | 00:00:00 | 00:00:00 | ACTIVE |
| 5 | RP02C | RPS CH C AUTO TRIP FAILURE NO AUTOMATIC REACTOR TRIP | N/A | 00:00:00 | 00:00:00 | ACTIVE |
| 5 | RP02D | RPS CH D AUTO TRIP FAILURE NO AUTOMATIC REACTOR TRIP | N/A | 00:00:00 | 00:00:00 | ACTIVE |
| 6 | CS04A | CS TRAIN A CS-125A FAILS TO AUTO OPEN CS-125A FAILS SHUT | N/A | 00:00:00 | 00:00:00 | ACTIVE |
| 2 | SG04G | MS LINE IPT-1013C FAIL (0-100%) SG-IPT-1013C FAILS LOW | 2 | 00:00:00 | 00:00:00 | 0 |
| 3 | RC08A | RCP 1A LOWER SEAL FAILURE (0-100%) PRESSURIZER CODE SAFETY, RC-317A, FAILS OPEN, | 3 | 00:00:00 | 00:00:00 | 100 |
| 4 | RC15A2 | PZR CONTROL LT 0110X FAILS LO PZR LT 0110X FAILS LOW | 4 | 00:00:00 | 00:00:00 | ACTIVE |
| 5 | RC03A | RCP RC-MPMP-0001A SHAFT SEIZURE RCP 1A SHAFT SEIZURE | 5 | 00:00:00 | 00:00:00 | ACTIVE |

NRC Scenario 3

| EVENT | KEY | DESCRIPTION | TRIGGER | DELAY HH:MM:SS | RAMP HH:MM:SS | FINAL |
|--|----------------------|---|----------------|---------------------------|--------------------------|-----------------|
| EVENT DESCRIPTION | | | | | | |
| 6 | RC23A | RCS COLD LEG 1A RUPTURE | 6 | 00:00:00 | 00:00:00 | 3 |
| COLD LEG LOSS OF COOLANT ACCIDENT | | | | | | |
| 7 | CS01B | LOSS OF CNTMT SPRAY PUMP B | 7 | 00:00:00 | 00:00:00 | ACTIVE |
| CS PUMP B TRIP | | | | | | |
| 6 | CSR13A | CS-125A REMOTE KEY SW TO CLOSE VALVE | 16 | 00:00:00 | 00:00:00 | OVERRIDE |
| CS-125A KEY SWITCH | | | | | | |
| 6 | CSR13A | CS-125A REMOTE KEY SW TO CLOSE VALVE | 26 | 00:00:00 | 00:00:00 | NORMAL |
| CS-125A KEY SWITCH | | | | | | |
| 7 | CSR13B | CS-125B REMOTE KEY SW TO CLOSE VALVE | 17 | 00:00:00 | 00:00:00 | OVERRIDE |
| CS-125B KEY SWITCH | | | | | | |
| 7 | CSR13B | CS-125B REMOTE KEY SW TO CLOSE VALVE | 27 | 00:00:00 | 00:00:00 | NORMAL |
| CS-125B KEY SWITCH | | | | | | |
| 6 | EGR26 | EDG A LOCAL ANNUN ACK | 10 | 00:00:00 | 00:00:00 | ACKN |
| LOCAL EDG ANNUNCIATOR ACKNOWLEDGE | | | | | | |
| 6 | EGR27 | EDG B LOCAL ANNUN ACK | 11 | 00:00:00 | 00:00:00 | ACKN |
| LOCAL EDG ANNUNCIATOR ACKNOWLEDGE | | | | | | |
| 7 | DI-08A04S22-1 | CC-125A CNTMT SPRAY HEADER A ISOL | N/A | 00:00:00 | 00:00:00 | CLOSE |
| OVERRIDE CS-125A CONTROL SWITCH TO CLOSE | | | | | | |

NRC Scenario 3

REFERENCES

| Event | Procedures |
|-------|--|
| 1 | OP-003-035, Auxiliary Feedwater, Rev. 304 OP-010-003, Plant Startup, Rev. 331 (Copy marked up through Step 9.4.54) |
| 2 | OP-009-007, Plant Protection System, Rev. 15 OP-903-013, Monthly Channel Checks, Rev. 16 Technical Specification 3.3.1 Technical Specification 3.3.2 |
| 3 | OP-901-130, Reactor Coolant Pump Malfunction, Rev. 7 |
| 4 | OP-901-110, Pressurizer Level Control Malfunction, Rev. 5 Technical Specification 3.3.3.5 OP-903-013, Monthly Channel Checks, Rev. 16 |
| 5 | OP-902-000, Standard Post Trip Actions, Rev. 13 |
| 6 | OP-902-009, Standard Appendices, Rev. 309, Appendix 1, Diagnostic Flow Chart OP-902-002, Loss of Coolant Accident Recovery Procedure, Rev. 18 OP-902-009, Standard Appendices, Rev. 309, Appendix 2, Figures |
| 7 | OP-902-008, Functional Recovery, Rev. 22 OP-902-009, Standard Appendices, Rev. 309, Appendix 28, Aligning LPSI Pump to Replace CS Pump |

Op Test No.: NRC Scenario # 3 Event # 1 Page 1 of 32

Event Description: Secure AFW Pump and raise power to 5%

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| OP-010-003, Plant Startup, Section, 9.4 | | |
|--|-----|---|
| | SRO | 9.4.52.2 Secure Auxiliary Feedwater Pump in accordance with OP-003-035, Auxiliary Feedwater. |
| OP-003-035, Auxiliary Feedwater, Section, 7.0 | | |
| | N/A | 7.1 Shutdown of Auxiliary Feedwater Pump 7.1.1 If recircing Steam Generators, then re-align Blowdown to Condenser A by performing the following: |
| | BOP | 7.1.2 Secure Auxiliary Feedwater Pump. |
| | BOP | 7.1.3 Place Auxiliary Feedwater Controller, FW-IFIC-8202, in Manual (MAN). |
| | BOP | 7.1.3.1 Set controller to minimum setting. |
| | BOP | 7.1.4 Open Auxiliary Feedwater Pump Discharge Pressure Cntrl, AFW-125. |
| OP-010-003, Plant Startup, Section, 9.4 | | |
| | BOP | 9.4.52.3 Maintain Steam Generator levels 50 to 70% NR. |
| | N/A | 9.4.53 Adjust Steam Generator Blowdown flow as recommended by Chemistry Department. |
| | ATC | 9.4.54 Begin raising Reactor power by CEA withdrawal or boron dilution to ≤5% full power. |
| | ATC | Commences raising power per Reactivity plan and per OP-004-004, Control Element Drive |
| OP-004-004, Control Element drive, Section, 6.7 | | |
| | N/A | 6.7 Operation of CEAs in Manual Group (MG) Mode (c) |

Op Test No.: NRC Scenario # 3 Event # 1 Page 2 of 32

Event Description: Secure AFW Pump and raise power to 5%

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

CAUTION

- (1) CRITICALITY SHALL BE ANTICIPATED ANY TIME CEAS ARE WITHDRAWN AND THE REACTOR IS NOT CRITICAL.
- (2) OBSERVE APPLICABLE GROUP INSERTION LIMITS IN ACCORDANCE WITH TECHNICAL SPECIFICATION 3.1.3.6 (REG GROUP), AND TECHNICAL SPECIFICATION 3.1.3.5 (SHUTDOWN BANKS).
- (3) IMPROPER OPERATION OF CEAS IN MANUAL GROUP MODE MAY CAUSE A REACTOR TRIP BASED ON AN OUT-OF-SEQUENCE CONDITION.
- (4) CEA INITIALIZATION PROGRAM MUST BE RUNNING IN THE PLANT MONITORING COMPUTER TO HAVE GROUP STOPS AND SEQUENTIAL PERMISSIVES AVAILABLE.

| | | |
|--|-----|--|
| | ATC | 6.7.1 Verify Plant Monitoring Computer operable in accordance with OP-004-012, Plant Monitoring Computer. |
| | ATC | 6.7.2 Position Group Select switch to desired group. |
| | ATC | 6.7.3 Place Mode Select switch to MG <u>and</u> verify the following: <ul style="list-style-type: none"> ▪ White lights illuminated on Group Selection Matrix for selected group ▪ MG light illuminates |
| | ATC | 6.7.4 Operate CEA Manual Shim switch to WITHDRAW or INSERT group to desired height while monitoring the following: <ul style="list-style-type: none"> ▪ CEA Position Indicator selected CEA group is moving in desired direction ▪ <u>If</u> Reactor is critical, <u>then</u> monitor the following: <ul style="list-style-type: none"> ○ Reactor Power ○ Reactor Coolant System (RCS) temperature ○ Axial Shape Index (ASI) |

NOTE

The Operator should remain in the area in front of the CEA Drive Mechanism Control Panel when the Mode Select switch is not in OFF.

| | | |
|--|-----|--|
| | ATC | 6.7.5 <u>When</u> desired set of moves have been completed, <u>then</u> place Mode Select switch to OFF. |
|--|-----|--|

OP-010-003, Plant Startup, Section, 9.4

| | | |
|--|-----|--|
| | ATC | 9.4.55 <u>Prior to</u> exceeding 5% power, <u>verify</u> Linear Power Channels are on scale. |
|--|-----|--|

Op Test No.: NRC Scenario # 3 Event # 1 Page 3 of 32

Event Description: Secure AFW Pump and raise power to 5%

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

Examiner Note

**This event is complete when the AFW pump is stopped and Reactivity Manipulation is satisfied
or**

At Lead Examiner's Discretion

Examiner Note

Cue the Simulator Operator when ready for Event 2

Op Test No.: NRC Scenario # 3 Event # 2 Page 4 of 32

Event Description: Steam Generator Pressure Instrument SG-IPT-1013C fails low

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----|---|
| | ATC | Recognize and report indications of failed channel. |
| | | Alarms: |
| | | <ul style="list-style-type: none"> RPS CHANNEL TRIP SG 1 PRESSURE LO (Cabinet K, E-15) |
| | | <ul style="list-style-type: none"> SG 1 PRESSURE LO PRETRIP A/C (Cabinet K, F-15) |
| | | <ul style="list-style-type: none"> ESFAS CHANNEL TRIP PRESS SG 2 > SG 1 (Cabinet K, L-16) |
| | | <ul style="list-style-type: none"> PRESS SG 2 > SG 1 ESFAS PRETRIP A/C (Cabinet K, M-16) |
| | | <ul style="list-style-type: none"> RPS CHANNEL C TROUBLE (Cabinet K, G-18) |
| | | Indications: |
| | | <ul style="list-style-type: none"> SG #1 Pressure Safety Channel C fails downscale |
| | | <ul style="list-style-type: none"> Pre-Trip indication Channel C LO SG-1 PRESS bistable |
| | | <ul style="list-style-type: none"> Trip indication Channel C LO SG-1 PRESS bistable |
| | | <ul style="list-style-type: none"> Pre-Trip indication Channel C HI SG-2 ΔP bistable |
| | | <ul style="list-style-type: none"> Trip indication Channel C HI SG-2 ΔP bistable |
| Examiner Note | | |
| All BOP manipulations for OP-009-007 are located at CP-10 except as noted. | | |
| OP-009-007, Plant Protection System, Section 6.2, Trip Channel Bypass Operation | | |
| | SRO | <p>6.2.1 Refer to Attachment 11.11, PPS Bistable Bypass Chart to assist in determination of Trip Channels requiring placement in bypass.</p> <p>Determines the following bistables are affected and need to be bypassed:</p> <ul style="list-style-type: none"> 11 – LO SG-1 PRESS 19 – HI SG-1 ΔP 20 – HI SG-2 ΔP |
| | SRO | Directs BOP to bypass the LO SG-1 PRESS, HI SG-1 ΔP, and HI SG-2 ΔP bistables in PPS Channel C within 1 hour in accordance with OP-009-007, Plant Protection System. |
| | BOP | 6.2.2 To place a bistable in or remove a bistable from bypass, go to Attachment 11.10, Trip Channel Bypass Operation. |

Op Test No.: NRC Scenario # 3 Event # 2 Page 5 of 32

Event Description: Steam Generator Pressure Instrument SG-IPT-1013C fails low

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

OP-009-007, Plant Protection System ,Attachment 11.10, Trip Channel Bypass Operation**CAUTION**

- (1) ATTEMPTING TO PLACE MORE THAN ONE TRIP CHANNEL IN BYPASS REMOVES BOTH TRIP CHANNELS FROM BYPASS.
- (2) PRIOR TO PLACING ANY TRIP CHANNEL IN BYPASS, VERIFY BYPASS PUSH BUTTONS ON DE-ENERGIZED PPS BAY NOT DEPRESSED.

| | | |
|--|------|---|
| | BOP | 11.10.1 To Bypass a Trip Channel, perform the following: 11.10.1.1 Circle the bistable numbers selected for bypass under Step 11.10.1.4. (Circles bistable numbers 11, 19 and 20 in Step 11.10.1.4 table) |
| | BOP | 11.10.1.2 Check desired Trip Channel is <u>not</u> Bypassed on another PPS Channel. |
| | BOP | 11.10.1.3 Open key-locked portion of BCP in desired PPS Channel. |
| | BOP | 11.10.1.4 Depress Bypass push buttons for the desired Trip Channels |
| | BOP | 11.10.1.5 Check all selected bistable Bypass push buttons remain in a Depressed state. |
| | BOP | 11.10.1.6 Check all selected bistable Bypass lights illuminate on BCP for the desired Trip Channels. |
| | CREW | 11.10.1.7 Check all selected bistable Bypass lights illuminate on ROM for the desired Trip Channels. (Verifies correct bistables lit on CP-7 PPS Channel C Remote Operator Module) |
| | SRO | Reviews the following Technical Specifications and determines applicable actions: <ul style="list-style-type: none"> • 3.3.1 – action 2 • 3.3.2 – actions 13 & 19 • 3.3.3.5 – no actions required • 3.3.3.6 – no actions required |

Op Test No.: NRC Scenario # 3 Event # 2 Page 6 of 32

Event Description: Steam Generator Pressure Instrument SG-IPT-1013C fails low

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

Examiner Note

This event is complete when bistables are bypassed and Technical Specifications have been addressed

or

At Lead Examiner's Discretion

Examiner Note

Cue the Simulator Operator when ready for Event 3

Op Test No.: NRC Scenario # 3 Event # 3 Page 7 of 32

Event Description: RCP 1A Lower Seal Failure

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|---|-----------|---|
| | ATC / BOP | Recognize and report indications of RCP Seal failure |
| | | Alarms |
| | | <ul style="list-style-type: none"> PMC alarm |
| | | <ul style="list-style-type: none"> RCP 1A CONTROLLED BLEEDOFF TEMP HI (Cabinet H, F-4) (if unattended) |
| | | Indications |
| | | <ul style="list-style-type: none"> Middle Seal Pressure rising |
| | | <ul style="list-style-type: none"> Upper Seal Pressure rising |
| | | <ul style="list-style-type: none"> CCW return temperature rising |
| | | <ul style="list-style-type: none"> Controlled bleed off temperature rising |
| | CRS | Enter and direct the implementation of OP-901-130, Reactor Coolant Pump Malfunction. |
| OP-901-130, Reactor Coolant Pump Malfunction, E₀, Subsequent Operator Actions | | |
| | N/A | 1. IF Reactor Coolant Pump trips, THEN verify Reactor tripped AND GO TO OP-902-000, STANDARD POST TRIP ACTIONS. |
| | N/A | 2. IF loss of Component Cooling Water to Reactor Coolant Pumps occurs, THEN GO TO OP-901-510, COMPONENT COOLING WATER SYSTEM MALFUNCTION. |
| | SRO | 3. IF Reactor Coolant Pump Seal has failed, THEN GO TO section E1, Seal Failure. |
| OP-901-130, Reactor Coolant Pump Malfunction, E₁, Seal Failure | | |
| NOTE | | |
| 1. RCP Seal pressure and Control Bleedoff temperature and flow are normally as follows (assuming normal operating RCS temperature and pressure): | | |
| <ul style="list-style-type: none"> Vapor Seal pressure: 25 to 45 PSIG Upper Seal pressure: 585 to 915 PSIG Middle Seal pressure: 1237 to 1815 PSIG CBO temperature: 135° to 190°F CBO flow: 1.2 to 1.8 GPM | | |
| 2. (If only one Reactor Coolant Pump Seal has failed on a Reactor Coolant Pump, THEN pump operation may continue provided the seal package is monitored for further degradation. | | |
| | BOP | 1. Inform System Engineer of Reactor Coolant Pump Seal failure. |

Op Test No.: NRC Scenario # 3 Event # 3 Page 8 of 32

Event Description: RCP 1A Lower Seal Failure

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

CAUTION

- (1) CCW TEMPERATURES OF $<75^{\circ}\text{F}$ COULD LEAD TO ESSENTIAL CHILLER TRIPS ON EVAPORATOR LOW REFRIGERANT PRESSURE.
- (2) CCW TEMPERATURE SHOULD BE CHANGED AT A RATE OF $\leq 10^{\circ}\text{F}$ IN ONE HOUR TO PREVENT DEGRADATION OF THE REACTOR COOLANT PUMP SEALS.

| | | |
|--|-----|--|
| | BOP | 2. IF Controlled Bleedoff temperature is rising, THEN lower Component Cooling Water temperature by ANY of the following: <ul style="list-style-type: none"> ▪ Start Dry Cooling Tower Fans ▪ Start Auxiliary Component Cooling Water Pump(s) AND associated Wet Cooling Tower Fans. ▪ Start Auxiliary Component Cooling Water Pump(s) AND lower ACC-126A(B) setpoint. |
| | N/A | 3. IF TWO OR MORE seals fail in rapid succession, (within 12 hours) THEN perform the following: <ul style="list-style-type: none"> 3.1 Trip the Reactor. 3.2 Secure affected Reactor Coolant Pump. 3.3 GO TO OP-902-000, STANDARD POST TRIP ACTIONS |
| | N/A | 4. IF a SECOND seal fails on the same Reactor Coolant Pump, THEN commence a controlled Plant shutdown in accordance with OP-010-005, Plant Shutdown. |
| | N/A | 5. IF during the controlled Plant shutdown Controlled Bleedoff temperature rises to $\geq 200^{\circ}\text{F}$ OR a THIRD seal fails on the same Reactor Coolant Pump, THEN perform the following: |

NOTE

Manual override is accomplished by positioning control switch to CLOSED, then to OPEN. If after 100 seconds CCW Return temperature is $<145^{\circ}\text{F}$, Seal Cooler isolations will remain open.

CAUTION

IF COMPONENT COOLING WATER IS LOST TO REACTOR COOLANT PUMP SEALS FOR >10 MINUTES, THEN RESTORING COMPONENT COOLING WATER TO REACTOR COOLANT PUMPS MAY RESULT IN SEAL FAILURE.

| | | |
|--|-----|--|
| | N/A | 6. IF Component Cooling Water to a Reactor Coolant Pump Seal Cooler isolates, THEN within 3 minutes restore Component Cooling Water flow to Reactor Coolant Pump by opening the Reactor Coolant Pump Component Cooling Water Isolation valves: |
| | N/A | 7. IF CCW flow is lost to a Reactor Coolant Pump Seal AND can NOT be restored within 3 minutes, THEN perform the following: |

Op Test No.: NRC Scenario # 3 Event # 3 Page 9 of 32

Event Description: RCP 1A Lower Seal Failure

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

Examiner Note

This event is complete after the BOP takes action to lower Component Cooling Water temperature

OR

At Lead Examiner's Discretion

Examiner Note

Cue the Simulator Operator when ready for Event 4

Op Test No.: NRC Scenario # 3 Event # 4 Page 10 of 32

Event Description: Pressurizer Level Channel RC-ILI-0110X fails low

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----------|---|
| | ATC / BOP | Recognize and report indications of Channel Failure |
| | | Alarms |
| | | <ul style="list-style-type: none"> • PRESSURIZER LEVEL HI/LO (Cabinet H, B-1) • PRESSURIZER LEVEL LO-LO (Cabinet H, C-1) • LETDOWN FLOW HI/LO (Cabinet G, C-1) • • |
| | | Indications |
| | | <ul style="list-style-type: none"> • PZR Level RC-ILR-0110-X fails downscale • All PZR Heaters OFF • All Charging Pumps running • Letdown Flow lowering • Actual PZR level RC-ILR-0110-X rising |
| | SRO | Enter and direct the implementation of OP-901-110, Pressurizer Level Control Malfunction. |
| OP-901-110, Pressurizer Level Control Malfunction, E₀, General Actions | | |
| | N/A | 1. Stop Turbine load changes. |
| | N/A | 2. <u>IF</u> malfunction is due to failure of Letdown Flow Control valve, <u>THEN GO TO</u> OP-901-112, CHARGING/LETDOWN MALFUNCTION. |
| | SRO | 3. <u>IF</u> malfunction is due to failure of Pressurizer Level Control Channel (incorrect readings on <u>EITHER</u> RC-ILI-0110X <u>OR</u> RC-ILI-0110Y), <u>THEN GO TO</u> Subsection E ₁ , Pressurizer Level Control Channel Malfunction. |
| OP-901-110, Pressurizer Level Control Malfunction, E₁, Pressurizer Level Control Channel Malfunction | | |
| <u>NOTE</u> | | |
| Selecting the non-faulted channel may cause automatic actions to occur if actual level is not at program level. | | |
| | ATC | 1. Place Pressurizer Level Controller (RC-ILIC-0110) in MAN <u>AND</u> adjust OUTPUT to slowly adjust letdown flow to restore Pressurizer level. |

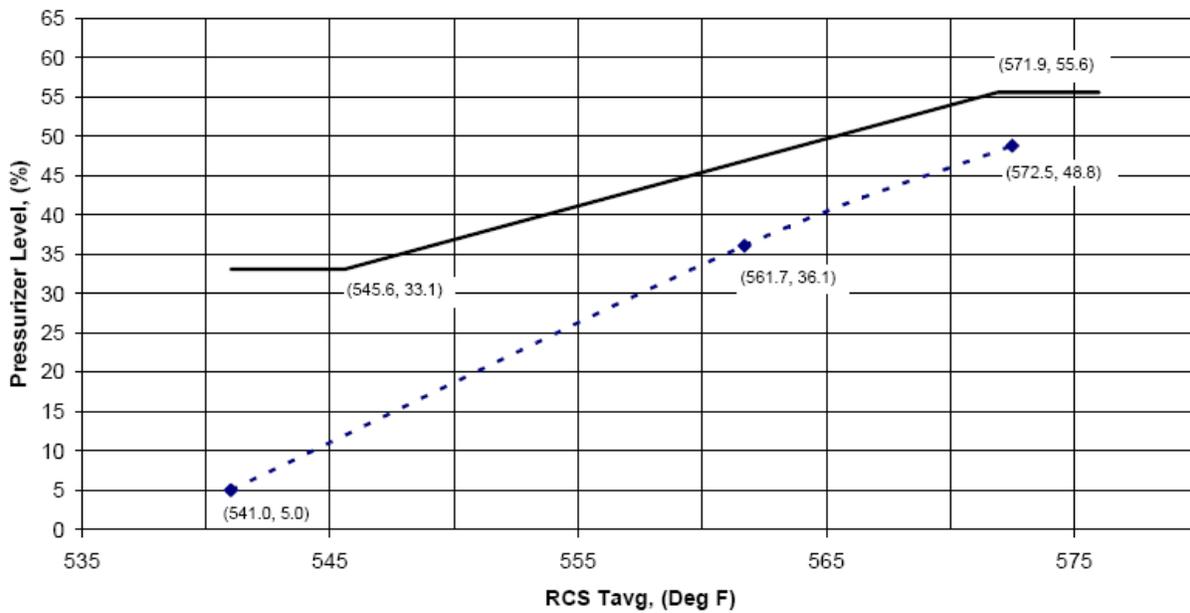
Op Test No.: NRC Scenario # 3 Event # 4 Page 11 of 32

Event Description: Pressurizer Level Channel RC-ILI-0110X fails low

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----|---|
| | ATC | 2. Transfer Pressurizer Level Control CHANNEL SELECT switch to non-faulted channel. |
| | ATC | 3. Transfer Pressurizer CHANNEL SELECT LO LEVEL HEATER CUTOFF switch to non-faulted channel. |
| | ATC | 4. Verify desired backup Charging pumps in AUTO. |
| | ATC | 5. Verify <u>ALL</u> <u>PROPORTIONAL AND BACKUP</u> HEATER BANKS reset. |
| | ATC | 6. Place Pressurizer Level Controller (RC-ILIC-0110) in AUTO and verify Pressurizer Level is being restored to setpoint. |
| | ATC | 7. Verify Pressurizer level controlling at program setpoint in accordance with Attachment 1, Pressurizer Level Versus Tave Curve. |

Pressurizer Level vs. Tavg Curve



| | | |
|--|-----|---|
| | SRO | 8. Refer to Technical Specifications 3.3.3.5 and 3.3.3.6 for Remote Shutdown and Accident Monitoring operability determination. |
|--|-----|---|

Op Test No.: NRC Scenario # 3 Event # 4 Page 12 of 32

Event Description: Pressurizer Level Channel RC-ILI-0110X fails low

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----|---|
| | SRO | Reviews the following Technical Specifications and determines applicable actions: <ul style="list-style-type: none"> • 3.3.3.5 – action a • 3.3.3.6 – no actions required |
| | | |

Examiner Note

This event is complete after the ATC has restored automatic Pressurizer level control and the SRO has evaluated Technical Specifications

OR**At Lead Examiner's Discretion****Examiner Note****Cue the Simulator Operator when ready for Event 5**

Op Test No.: NRC Scenario # 3 Event # 5 Page 13 of 32

Event Description: RCP 1A locked rotor no automatic Reactor Trip

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---|
| | ATC | Recognize and report indications of RCP trip and no Auto RX Trip |
| | | Alarms: |
| | | • RCP 1A TRIP/TROUBLE (Cabinet H, A-3) |
| | | • RCP 1A LUBE OIL PRESSURE LO (Cabinet H, E-3) |
| | | • RCP 1A VIBRATION HI (Cabinet H, A-4) |
| | | • RCP 1A CCW FLOW LO (Cabinet H, H-4) |
| | | • RCP 1A CCW FLOW LOST (Cabinet SA(SB), A-1(6)) |
| | | • RPS CHANNEL TRIP LOCAL PWR DENSITY HI (Cabinet K, A-11) |
| | | • RPS CHANNEL TRIP DNBR LO (Cabinet K, A-12) |
| | | • LOCAL PWR DENSITY HI PRETRIP A/C(B/D) (Cabinet K, B(C)-11) |
| | | • DNBR LO PRETRIP A/C(B/D) (Cabinet K, B(C)-12) |
| | | • RPS CHANNEL TRIP COOLANT FLOW LOST (Cabinet K, D-12) |
| | | • RPS CHANNEL A(B)(C)(D) TROUBLE (Cabinet K, E(F)(G)(H)-18) |
| | | Indications: |
| | | • RCP 1A STOP light and Yellow Trip indication |
| | | • RCP 1A Oil Lift Pumps running |
| | | • RCP 1A motor amps indicate 0amps |
| | | • RCP 1A ΔP lowering |
| | | • Trip indication Channel A(B)(C)(D) HI LOCAL POWER bistables |
| | | • Pre-Trip indication Channel A(B)(C)(D) HI LOCAL POWER bistables |
| | | • Trip indication Channel A(B)(C)(D) LOW DNBR bistables |
| | | • Pre-Trip indication Channel A(B)(C)(D) LOW DNBR bistables |
| | | • Trip indication Channel A(B)(C)(D) SG LO FLOW bistables |
| | | • All Reactor Trip breakers remain closed |
| | | • All CEAs remain withdrawn |

CRITICAL TASK**ESTABLISH REACTIVITY CONTROL**

This task is satisfied by shutting down the Reactor by either depressing both Reactor Trip pushbuttons on CP-2 or CP-8, initiating Diverse Reactor Trip Pushbuttons on CP-2, or by deenergizing the rod drive MG sets by deenergizing busses 32A and 32B on CP-1 prior to exiting the step to Verify Reactivity Control (Step 1) of OP-902-000, Standard Post Trip Actions.

This task becomes applicable following the tripped Reactor Coolant Pump 1A.

| | | |
|--|-----|---|
| | ATC | Manually Trip the Reactor (CRITICAL) |
|--|-----|---|

Op Test No.: NRC Scenario # 3 Event # 5 Page 14 of 32

Event Description: RCP 1A locked rotor no automatic Reactor Trip

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| OP-902-000, Standard Post Trip Actions | | |
|---|-----|---|
| | ATC | 1. <u>Determine Reactivity Control</u> acceptance criteria are met: <ol style="list-style-type: none"> <u>Check</u> reactor power is dropping. <u>Check</u> startup rate is negative. <u>Check</u> less than TWO CEAs are NOT fully inserted. |
| | BOP | 2. <u>Determine Maintenance of Vital Auxiliaries</u> acceptance criteria are met: <ol style="list-style-type: none"> <u>Check</u> the Main Turbine is tripped: <ul style="list-style-type: none"> Governor valves closed Throttle valves closed |
| | BOP | b. <u>Check</u> the Main Generator is tripped: <ul style="list-style-type: none"> GENERATOR BREAKER A tripped GENERATOR BREAKER B tripped EXCITER FIELD BREAKER tripped |
| | BOP | c. <u>Check</u> station loads are energized from offsite electrical power as follows: <p><u>Train A</u></p> <ul style="list-style-type: none"> A1, 6.9 KV non safety bus A2, 4.16 KV non safety bus A3, 4.16 KV safety bus A-DC electrical bus A or C vital AC Instrument Channel <p><u>Train B</u></p> <ul style="list-style-type: none"> B1, 6.9 KV non safety bus B2, 4.16 KV non safety bus B3, 4.16 KV safety bus B-DC electrical bus B or D vital AC Instrument Channel |
| | ATC | 3. <u>Determine RCS Inventory Control</u> acceptance criteria are met: <ol style="list-style-type: none"> <u>Check</u> that BOTH the following conditions exist: <ul style="list-style-type: none"> Pressurizer level is 7% to 60% Pressurizer level is trending to 33% to 60% <u>Check</u> RCS subcooling is greater than or equal to 28°F. |

Op Test No.: NRC Scenario # 3 Event # 5 Page 15 of 32

Event Description: RCP 1A locked rotor no automatic Reactor Trip

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|---|-----|--|
| | ATC | 4. <u>Determine</u> RCS Pressure Control acceptance criteria are met by checking that BOTH of the following conditions exist: <ul style="list-style-type: none"> • Pressurizer pressure is 1750 psia to 2300 psia • Pressurizer pressure is trending to 2125 psia to 2275 psia |
| | ATC | 5. Determine Core Heat Removal acceptance criteria are met: <ol style="list-style-type: none"> a. <u>Check</u> at least one RCP is operating. b. <u>Check</u> operating loop ΔT is less than 13°F. c. <u>Check</u> RCS subcooling is greater than or equal to 28°F. |
| Examiner Note This event is complete after the crew has reached the steps to check RCS Heat Removal OR At Lead Examiner's Discretion | | |
| Examiner Note Cue the Simulator Operator when ready for Event 6 | | |

Op Test No.: NRC Scenario # 3 Event # 6 Page 16 of 32

Event Description: Loss of Coolant Accident CS-125A fails closed

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----|---|
| | BOP | Recognize and report indications of LOCA |
| | | Alarms |
| | | <ul style="list-style-type: none"> • CONTAINMENT WATER LEAKAGE HI (Cabinet N, L-20) • CONTAINMENT WATER LEAKAGE HI-HI (Cabinet N, K-20) • PRESSURIZER PRESSURE HI/LO (Cabinet H, E-1) • CIAS TRAIN A(B) LOGIC INITIATED [Cabinet K, E-19(20)] • SIAS TRAIN A(B) LOGIC INITIATED [Cabinet K, G-19(20)] • CSAS TRAIN A(B) LOGIC INITIATED [Cabinet K, H-19(20)] • MSIS TRAIN A(B) LOGIC INITIATED [Cabinet K, L-19(20)] • SUBCOOLED MARGIN LO [Cabinet M(N), M-7(17)] • RPS CHANNEL TRIP PZR PRESSURE LO (Cabinet K, A-16) • RPS CHANNEL TRIP CNTMT PRESSURE HI (Cabinet K, A-17) • ESFAS CHANNEL TRIP CNTMT PRESSURE HI (Cabinet K, L-17) • CNTMT SPRAY HDR A FLOW LO (Cabinet M, F-4) |
| | | Indications |
| | | <ul style="list-style-type: none"> • RCS pressure lowering • PZR level lowering • Containment Pressure and Temperature rising • Containment activity rising • Containment water level rising • ESFAS components actuating • CS-125A indicates in CLOSE (GREEN) |
| Examiner Note | | |
| The crew should report indications but continue in OP-902-000, Standard Post Trip Actions | | |
| | BOP | 6. Determine RCS Heat Removal acceptance criteria are met: <ol style="list-style-type: none"> a. <u>Check</u> that at least one steam generator has BOTH of the following: <ul style="list-style-type: none"> • Steam generator level is 10% to 76% NR • Main Feedwater is available to restore level within 55%-70% NR.[60% to 80% NR] |
| | ATC | b. Check RCS TC is 530 °F to 550 °F |
| | BOP | c. Check steam generator pressure is 885 psia to 1040 psia. |

Op Test No.: NRC Scenario # 3 Event # 6 Page 17 of 32

Event Description: Loss of Coolant Accident CS-125A fails closed

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---|
| | BOP | d. <u>Check</u> Feedwater Control in Reactor Trip Override: <ul style="list-style-type: none"> • MAIN FW REG valves are closed • STARTUP FW REG valves are 13% to 21% open • Operating main Feedwater pumps are 3800 rpm to 4000 rpm |
| | BOP | e. <u>Reset</u> moisture separator reheaters, and <u>check</u> the temperature control valves closed. |
| | ATC | 7. <u>Determine Containment Isolation</u> acceptance criteria are met: <ol style="list-style-type: none"> a. <u>Check</u> containment pressure is less than 16.4 psia. b. <u>Check</u> NO containment area radiation monitor alarms OR unexplained rise in activity. c. <u>Check</u> NO steam plant activity monitor alarms OR unexplained rise in activity. |
| | ATC | a.1 IF containment pressure is greater than or equal to 17.1 psia, THEN verify the following: <ul style="list-style-type: none"> • CIAS is initiated • SIAS is initiated • MSIS is initiated |
| | BOP | 8 <u>Determine Containment Temperature and Pressure Control</u> acceptance criteria are met: <ol style="list-style-type: none"> a. <u>Check</u> containment temperature is less than or equal to 120°F. b. <u>Check</u> containment pressure is less than 16.4 psia. |
| | BOP | 8.1 Verify at least three containment fan coolers are operating. |
| | BOP | 8.2 IF containment pressure is greater than or equal to 17.1 psia, THEN verify ALL available containment fan coolers are operating in emergency mode. |
| | BOP/ATC | 8.3 IF containment pressure is greater than or equal to 17.7 psia, THEN verify ALL of the following: <ul style="list-style-type: none"> • CSAS is initiated • ALL available containment spray pumps are delivering flow greater than 1750 gpm • ALL RCPs are secured |
| | N/A | 9. IF ALL safety function acceptance criteria are met, AND NO contingency actions were performed, THEN GO TO OP-902-001, "Reactor Trip Recovery" procedure. |

Op Test No.: NRC Scenario # 3 Event # 6 Page 18 of 32

Event Description: Loss of Coolant Accident CS-125A fails closed

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----|--|
| | SRO | 10. IF ANY safety function acceptance criteria are NOT met, OR ANY contingency action was taken, THEN GO TO Appendix 1, "Diagnostic Flowchart. |
| OP-902-009, Standard Appendices, Appendix 1 | | |
| Examiner Note | | |
| Appendix 1 is a flow chart used to diagnose to the correct recovery procedure for the event in progress. The steps below will be followed by a YES or NO to indicate proper flow path. | | |
| | ATC | Rx Pwr dropping, SUR negative, and < two CEAs NOT fully inserted or Emergency Boration in progress (YES) |
| | ATC | Pressurizer pressure dropping rapidly and Pressurizer level changing (YES) |
| | BOP | Steam Generator Pressure Abnormally Low (NO) |
| | N/A | Primary Break |
| | ATC | Containment Pressure and Temperature Abnormally High (YES) |
| | ATC | Activity in the Steam Plant (NO) |
| | N/A | LOCA inside Containment |
| | BOP | At least one 4KV safety bus energized (YES) |
| | SRO | Go To OP-902-002, LOCA Recovery |
| OP-902-002, Loss of Coolant accident Recovery | | |
| NOTE | | |
| The Shift Chemist should be notified if a SIAS or CIAS has occurred. The secondary sampling containment isolation valves should not be opened following an SIAS or CIAS until directed by the Shift Chemist. | | |
| | BOP | Confirm Diagnosis *1. Confirm diagnosis of a LOCA: a. Check Safety Function Status Check acceptance criteria are satisfied. b. IF steam generator sample path is available, THEN direct Chemistry to sample BOTH steam generators for activity. |

Op Test No.: NRC Scenario # 3 Event # 6 Page 19 of 32

Event Description: Loss of Coolant Accident CS-125A fails closed

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----|---|
| | BOP | Announce the Event 2. Announce a Loss of Coolant Accident is in progress using the plant page. |
| | N/A | Classify the Event *3. Advise the Shift Manager to REFER TO EP-001-001, "Recognition & Classification of Emergency Condition", and implement the Emergency Plan. |
| | N/A | Restore Operation of DCT Sump Pumps *4. IF power has been interrupted to either 3A or 3B safety buses, THEN perform Appendix 20, "Operation of DCT Sump Pumps". |
| | SRO | Implement Placekeeping 5. REFER TO Section 6.0, "Placekeeper", and record the time of the reactor trip. |
| | ATC | Verify SIAS Initiation 6. IF pressurizer pressure is less than 1684 psia, THEN check SIAS has initiated. |
| | BOP | *7. IF SIAS has initiated, THEN : a. Verify safety injection pumps have started. b. Check safety injection flow is within the following: <ul style="list-style-type: none"> ▪ Appendix 2-E, "HPSI Flow Curve" ▪ Appendix 2-F, "LPSI Flow Curve" |

Examiner Note

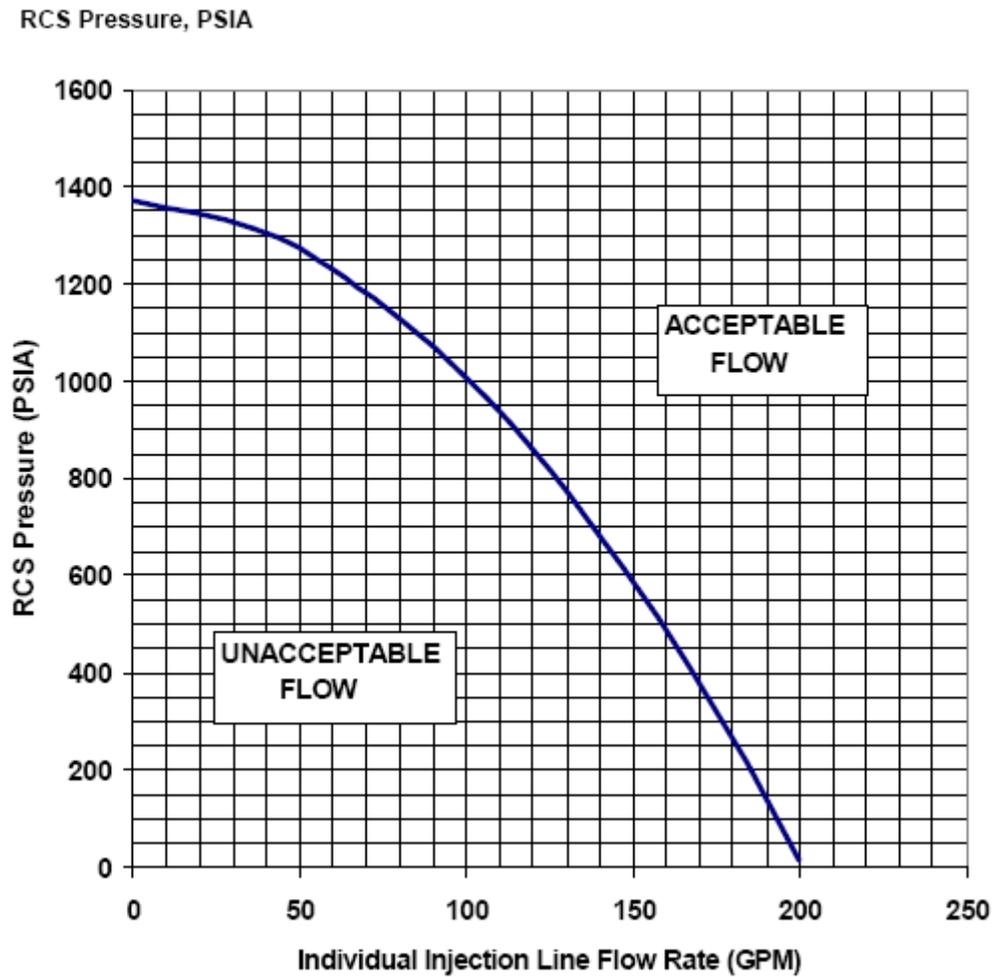
Appendix 2-E and Appendix 2-F are contained on the next 2 pages. Injection flow will be meeting all requirements.

Op Test No.: NRC Scenario # 3 Event # 6 Page 20 of 32

Event Description: Loss of Coolant Accident CS-125A fails closed

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

Attachment 2-E: HPSI Flow Curve

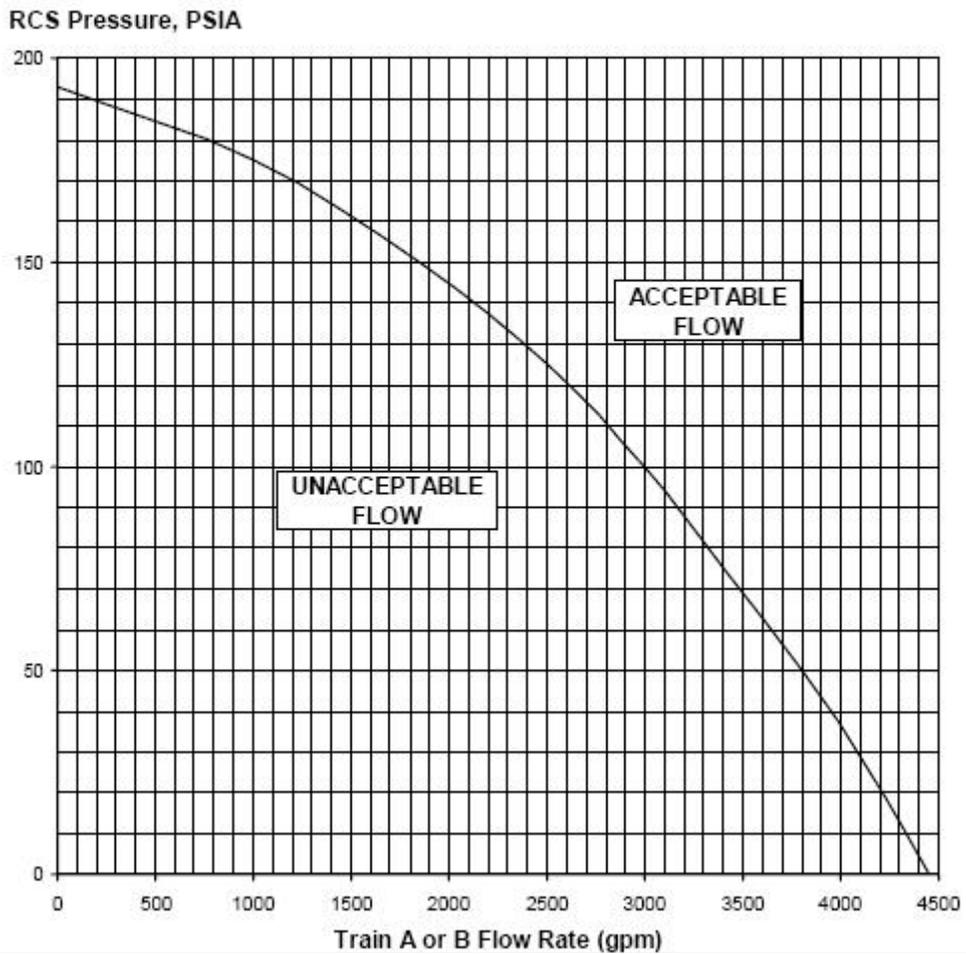


Op Test No.: NRC Scenario # 3 Event # 6 Page 21 of 32

Event Description: Loss of Coolant Accident CS-125A fails closed

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

Attachment 2-F: LPSI Flow Curve



| | | |
|--|-----|---|
| | ATC | c. Verify ALL available charging pumps are operating. |
| | N/A | <p>RCP Trip Strategy</p> <p>8. IF pressurizer pressure is less than 1621 psia, AND SIAS is actuated, THEN:</p> <ul style="list-style-type: none"> a. Verify no more than two RCPs are operating. b. IF pressurizer pressure is less than the minimum RCP NPSH of Appendix 2A-D, "RCS Pressure and Temperature Limits", THEN stop ALL RCPs. |
| | | |

Op Test No.: NRC Scenario # 3 Event # 6 Page 22 of 32

Event Description: Loss of Coolant Accident CS-125A fails closed

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|--|-----|---|
| | ATC | <p>Verify RCP Operating Limits</p> <p>*9. IF RCPs are operating, THEN:</p> <ul style="list-style-type: none"> a. Verify CCW available to RCPs. b. IF a CSAS is initiated, THEN stop ALL RCPs. c. IF RCS TC is less than 382°F, THEN verify no more than two RCPs are operating. |
| | BOP | <p>Verify Proper CCW Operation</p> <p>*10. Check a CCW pump is operating for each energized 4.16 KV safety bus.</p> |
| | ATC | <p>Isolate the LOCA</p> <p>11. Isolate the LOCA:</p> <ul style="list-style-type: none"> a. Verify the following letdown containment isolation valves are closed: <ul style="list-style-type: none"> ▪ CVC 101, LETDOWN STOP VALVE ▪ CVC 103, LETDOWN ISOL VALVE ▪ CVC 109, LETDOWN ISOL VALVE |
| | BOP | <p>b. Verify the following RCS sampling containment isolation valves are closed:</p> <p>Train A</p> <ul style="list-style-type: none"> ▪ PSL 107, HOT LEG ▪ PSL 204, PZR SURGE ▪ PSL 304, PZR STEAM <p>Train B</p> <ul style="list-style-type: none"> ▪ PSL 105, HOT LEG ▪ PSL 203, PZR SURGE ▪ PSL 303, PZR ISOL VLV |

Examiner Note

This event is complete after the crew has entered OP-902-002, Loss of Coolant Accident Recovery and all RCPs are secured

OR

At Lead Examiner's Discretion

Examiner Note

Cue the Simulator Operator when ready for Event 7

Examiner Note

It takes approximately 30 seconds from when the simulator operator initiates Event 7 for the first indication to be present to the applicants.

Op Test No.: NRC Scenario # 3 Event # 7 Page 23 of 32

Event Description: Containment Spray Pump B Trips

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

| | | |
|---|-----|---|
| | BOP | Recognize and report indications of B Spray Pump Trip |
| | | Alarms |
| | | <ul style="list-style-type: none"> • CNTMT SPRAY PUMP B TRIP/TROUBLE (Cabinet N, B-14) |
| | | Indications |
| | | <ul style="list-style-type: none"> • Containment Spray Pump B indicates OFF (GREEN) • Containment Spray flow indicates 0 GPM |
| OP-902-002, Loss of Coolant accident Recovery | | |
| | SRO | Confirm Diagnosis *1. Confirm diagnosis of a LOCA: <ol style="list-style-type: none"> Check Safety Function Status Check acceptance criteria are satisfied. IF steam generator sample path is available, THEN direct Chemistry to sample BOTH steam generators for activity. |
| | SRO | Evaluate Safety Functions |
| | SRO | Determine Containment Pressure and Temperature Control Safety Function not met |
| | SRO | SAFETY FUNCTION: 8. Containment Temperature and Pressure Control Condition 2 <ol style="list-style-type: none"> Containment fan coolers > 1 operating in emerg mode <u>Containment spray pump > 1 operating with flow > 1750 gpm</u> Containment pressure < 50 psia |
| | SRO | a.1 GO TO ONE of the following: <ul style="list-style-type: none"> ▪ Appendix 1, "Diagnostic Flowchart" ▪ OP-902-008, "Functional Recovery Procedure" |
| Examiner Note | | |
| Appendix 1 "Diagnostic Flowchart" will not provide guidance for this event. OP-902-008, "Functional Recovery Procedure" is the procedure to recover from this event. | | |
| OP-902-008, Functional Recovery | | |
| | BOP | Announce the Event 1. Announce that the Functional Recovery Procedure is in progress using the plant page. |

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Event Description: Containment Spray Pump B Trips

| Time | Position | Applicant's Actions or Behavior |
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| | N/A | <p>Classify the Event</p> <p>*2. Advise the Shift Manager to REFER TO EP-001-001, "Recognition & Classification of Emergency Condition", and implement the Emergency Plan.</p> |
| | SRO | <p>Implement Placekeeping</p> <p>3. REFER TO the "Placekeeper", and record the time of the reactor trip.</p> |
| | ATC | <p>RCP Trip Strategy</p> <p>4. IF pressurizer pressure is less than 1621 psia, AND SIAS is actuated, THEN:</p> <p>a. Verify no more than two RCPs are operating.</p> <p>b. IF pressurizer pressure is less than the minimum RCP NPSH of Appendix 2A-D, "RCS Pressure and Temperature Limits", THEN stop ALL RCPs.</p> |
| | N/A | <p>Verify RCP Operating Limits</p> <p>*5. IF RCPs are operating, THEN:</p> <p>a. IF a CSAS is initiated, THEN stop ALL RCPs.</p> <p>b. Verify CCW available to RCPs. c. IF RCS TC is less than 382°F [384°F], THEN verify no more than two RCPs are operating.</p> |
| <p>NOTE</p> <p>The Shift Chemist should be notified if a SIAS or CIAS has occurred. The secondary sampling containment isolation valves should not be opened following an SIAS or CIAS until directed by the Shift Chemist.</p> | | |
| | BOP | <p>Sample BOTH Steam Generators</p> <p>6. Direct Chemistry to sample BOTH steam generators for activity and boron.</p> |
| | N/A | <p>Verify Equipment Ventilation</p> <p>*7. IF power is lost to both 3A and 3B safety buses and NOT expected to be restored within 30 minutes, THEN perform the following:</p> |
| <p>NOTE</p> <p>Portable emergency lighting is available in Appendix R lockers located at LCP-43, Remote Shutdown Panel and +35 RAB Relay Room.</p> | | |
| | N/A | <p>Reduce Battery Loads</p> <p>*8. IF power is lost to both 3A and 3B safety buses and NOT expected to be restored within 30 minutes, THEN perform the following to reduce unnecessary station loads:</p> |

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Event Description: Containment Spray Pump B Trips

| Time | Position | Applicant's Actions or Behavior |
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| | N/A | <p>Restore Operation of DCT Sump Pumps</p> <p>*9. IF power has been interrupted to either 3A or 3B safety buses, THEN perform Appendix 20, "Operation of DCT Sump Pumps".</p> |
| | BOP | <p>Place Hydrogen Analyzers in Service</p> <p>10. Place Hydrogen Analyzers in service:</p> <p>Train A</p> <ul style="list-style-type: none"> a. Place Train A H2 ANALYZER CNTMT ISOL VALVE keyswitch to "OPEN". (Key 216) b. Place H2 ANALYZER A POWER to "ON". c. Check H2 ANALYZER A PUMP indicates ON. |
| | BOP | <p>Train B</p> <ul style="list-style-type: none"> a. Place Train B H2 ANALYZER CNTMT ISOL VALVE keyswitch to "OPEN". (Key 217) b. Place H2 ANALYZER B POWER to "ON". c. Check H2 ANALYZER B PUMP indicates ON. |
| | SRO | <p>Identify Success Paths</p> <p>*11. Identify success paths to be used to satisfy each safety function using BOTH of the following:</p> <ul style="list-style-type: none"> ▪ Resource Assessment Trees ▪ Safety Function Tracking Sheet |
| | Note | <ol style="list-style-type: none"> 1. Reactivity Control RC-1 2. Maintenance of Vital Auxiliaries (DC) MVA-DC-1 3. Maintenance of Vital Auxiliaries (AC) MVA-AC-1 4. RCS Inventory Control IC-2 5. RCS Pressure Control PC-2 6. RCS and Core Heat Removal HR-2 7. Containment Isolation CI-1 8. Containment Pressure and Temperature Control CPTC-2 |
| | SRO | <p>Perform Safety Function Status Checks</p> <p>*12. REFER TO Section 6.0, "Safety Function Status Check", and perform Safety Function Status Checks.</p> |

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Event Description: Containment Spray Pump B Trips

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
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Examiner Note

1. RC-1 – Met
2. MVA-DC-1 – Met
3. MVA-AC-1 – Met
4. IC-2 – Met
5. PC-2 – Met
6. HR-2 – Met
7. CI-1 – NOT Met
8. CPTC-2 – NOT Met

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| | SRO | <p>Maintain Success Paths</p> <p>*13. Prioritize Safety Functions based on ALL of the following:</p> <ol style="list-style-type: none"> a. Instructions for those Safety Functions which do NOT meet any success path. b. Instructions for those Safety Functions for which success path one criteria is NOT met. c. Instructions for Safety Functions for which success path one criteria is met. |
| | Note | <ol style="list-style-type: none"> 1. Containment Isolation CI-1 2. Containment Pressure and Temperature Control CPTC-2 3. RCS Inventory Control IC-2 4. RCS Pressure Control PC-2 5. RCS and Core Heat Removal HR-2 6. Reactivity Control RC-1 7. Maintenance of Vital Auxiliaries (DC) MVA-DC-1 8. Maintenance of Vital Auxiliaries (AC) MVA-AC-1 |
| | SRO | <p>Implement Success Paths</p> <p>14. Implement success paths based on prioritization from previous step.</p> |

Examiner Note

The SRO may decide that by establishing Containment Pressure and Temperature control, that this would satisfy the Containment Isolation Safety Function. The SRO may decide to implement CPTC-2 to restore both Safety Functions. However this guide contains CI-1 steps below followed by CPTC-2 steps.

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Event Description: Containment Spray Pump B Trips

| Time | Position | Applicant's Actions or Behavior |
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| OP-902-008, Functional Recovery, CI-1 | | |
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| | SRO | <p>Verify Containment Isolation</p> <p>*1. IF ANY of the following conditions exist:</p> <ul style="list-style-type: none"> ▪ Containment pressure is greater than 17.1 psia ▪ Pressurizer pressure is less than 1684 psia ▪ Containment area radiation monitors greater than the Hi Alarm setpoint <p>THEN perform BOTH of the following:</p> <ol style="list-style-type: none"> a. Verify CIAS is initiated. b. Verify that an isolation valve is closed for each containment penetration required to be closed. |
| | N/A | b.1 IF ANY containment fan cooler is NOT operating AND containment pressure is greater than 17.1 psia, THEN REFER TO Appendix 21-B, "CFC CCW Override" and close the associated Containment Fan Cooler CCW Isolation Valves. |
| | SRO | b.2 IF ANY CS-125, Containment Spray Header Isolation is open AND the associated CS pump is NOT operating, THEN REFER TO Appendix 21-A, "CS-125 Override," and close the valve. |
| OP-902-009, Standard Appendices, Appendix 21-A | | |
| | BOP | 1.1 Place Containment Spray Pump A(B) control switch to "OFF." |
| Examiner Note | | |
| CNTMT SPRAY HDR B ISOL VLV IN CSAS OVERRIDE (Cabinet N, K-14) will actuate upon the execution of the step below to place the keyswitch for CS-125B in OVERRIDE. | | |
| | BOOTH | 1.2 Place the keyswitch for CS-125A(B), Containment Spray Isolation Valve, located on the side of Auxiliary Panel 1(Auxiliary Panel 2) to "OVERRIDE." |
| | BOP | 1.3 Place CS-125A(B), CNTMT SPRAY HEADER A(B) ISOL valve to "OPEN" and then to "CLOSE." |
| | SRO | Transition back to OP-902-008, Functional Recovery |

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Event Description: Containment Spray Pump B Trips

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
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| OP-902-008, Functional Recovery, CI-1 (cont) | | |
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| | N/A | <p>Determine Most Affected SG</p> <p>2. IF a SGTR is indicated by ANY of the following:</p> <ul style="list-style-type: none"> ▪ Steam generator activities ▪ Main Steam Line radiation levels ▪ Steam generator Blowdown radiation monitor readings ▪ Steam generator level rise when NOT feeding ▪ One steam generator level rising faster than the other with feed and steaming rates being essentially the same for both ▪ Feed flow mismatch between steam generators ▪ Steam flow versus feed flow mismatch in a steam generator prior to the reactor trip <p>THEN REFER TO Heat Removal success path in use and isolate the most affected steam generator:</p> |
| | BOP | <p>CCW Leakage</p> <p>3. Check the following CCW Radiation Monitor AB indications:</p> <ul style="list-style-type: none"> ▪ Hi Alarm clear ▪ No abnormal rise in radiation monitor reading |
| | SRO | <p>Check CI-1 Acceptance Criteria</p> <p>*4. Check CI-1, Automatic/Manual Isolation is satisfied by ANY of the following:</p> <p>Condition 1</p> <p>a. IF steam plant activity monitor alarms or an unexplained rise in steam plant activity exists, THEN ALL release paths from the most affected steam generator to the environment are closed.</p> <p>b. Containment pressure is less than 17.1 psia.</p> <p>c. NO Containment area radiation monitor alarms or unexplained rise.</p> <p>d. IF SGTR diagnosed, THEN steam generator pressure less than 1000 psia [960 psia] AND NOT steaming via ADV.</p> |
| | SRO | <p>Condition 2</p> <p>a. IF steam plant activity monitor alarms or an unexplained rise in steam plant activity exists, THEN ALL release paths from the most affected steam generator to the environment are closed.</p> <p>b. Each containment penetration required to be closed for current plant conditions has an isolation valve closed.</p> <p>c. IF SGTR diagnosed, THEN steam generator pressure less than 1000 psia [960 psia] AND NOT steaming via ADV.</p> |

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Event Description: Containment Spray Pump B Trips

| Time | Position | Applicant's Actions or Behavior |
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| | N/A | <p>Continue Efforts to Restore Safety Functions</p> <p>1. IF the Containment Isolation safety function is still NOT met, THEN continue efforts to establish Containment Isolation by evaluating further actions based on ALL of the following:</p> <ul style="list-style-type: none"> ▪ The urgency of other safety functions that are NOT met ▪ The risk to plant personnel and the public of leaving certain containment penetrations unisolated ▪ The feasibility of isolating containment penetration(s) by alternate means |
| OP-902-008, Functional Recovery, CPTC-2 | | |
| | BOP | <p>Verify Containment Spray Actuation</p> <p>*1. IF containment pressure is greater than 17.7 psia, THEN perform BOTH of the following:</p> <ol style="list-style-type: none"> a. Verify CSAS is initiated. b. Verify ALL containment spray pumps are delivering flow greater than 1750 gpm. |
| | BOP | <p>a.1 IF ANY CS-125, Containment Spray Header Isolation is open AND the associated CS pump is NOT operating, THEN REFER TO Appendix 21-A, "CS-125 Override," and close the valve.</p> |
| OP-902-009, Standard Appendices, Appendix 21-A | | |
| | BOP | <p>1.1 Place Containment Spray Pump A(B) control switch to "OFF."</p> |
| <p>Examiner Note</p> <p>CNTMT SPRAY HDR B ISOL VLV IN CSAS OVERRIDE (Cabinet N, K-14) will actuate upon the execution of the step below to place the keyswitch for CS-125B in OVERRIDE.</p> | | |
| | BOOTH | <p>1.2 Place the keyswitch for CS-125A(B), Containment Spray Isolation Valve, located on the side of Auxiliary Panel 1(Auxiliary Panel 2) to "OVERRIDE."</p> |
| | BOP | <p>1.3 Place CS-125A(B), CNTMT SPRAY HEADER A(B) ISOL valve to "OPEN" and then to "CLOSE."</p> |
| | SRO | <p>Transition back to OP-902-008, Functional Recovery</p> |

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Event Description: Containment Spray Pump B Trips

| Time | Position | Applicant's Actions or Behavior |
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OP-902-008, Functional Recovery, CPTC-2 (cont)

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| | N/A | <p>Containment Spray Termination</p> <p>*2. IF CS pumps are operating AND ALL of the following conditions are satisfied:</p> <ul style="list-style-type: none"> ▪ Containment pressure is less than 16.4 psia and stable or lowering ▪ RAS has NOT actuated ▪ Containment Spray is NOT required for iodine removal THEN REFER TO Appendix 5-E, "CSAS Reset Procedure", and reset CSAS actuation. |
| | SRO | <p>Check CTPC-2 Acceptance Criteria</p> <p>3. Check CTPC-2, Containment Spray is satisfied by ANY of the following:</p> <p>Condition 1</p> <p>a. BOTH containment spray pumps delivering flow greater than or equal to 1750 gpm.</p> <p>b. Containment pressure is less than 50 psia.</p> <p>Condition 2</p> <p>a. At least one containment fan cooler is operating in the emergency mode.</p> <p>b. At least one containment spray pump delivering flow greater than or equal to 1750 gpm.</p> <p>c. Containment pressure is less than 50 psia.</p> |
| | SRO | <p>3.1 IF the Containment Temperature and Pressure safety function is still NOT met, THEN REFER TO CTPC Continuing Actions.</p> |

OP-902-008, Functional Recovery, CPTC Continuing Actions

| | | |
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| | SRO | <p>Continue Efforts to Restore Safety Functions</p> <p>1. IF the Containment Temperature and Pressure safety function is still NOT met, THEN continue efforts to establish Containment Temperature and Pressure by evaluating further actions using ALL of the following:</p> <p>a. The urgency of other safety functions that are NOT met.</p> <p>b. The rate of change of containment temperature and pressure and potential for damage to the containment.</p> <p>c. The feasibility of restoring a success path by restoring ALL of the following:</p> <ul style="list-style-type: none"> ▪ Vital auxiliaries necessary to operate systems or components in the success path ▪ Manual operation of valves <p>d. Use of alternate components to implement a success path:</p> <ul style="list-style-type: none"> ▪ Appendix 28, "Aligning LPSI to Replace CS" |
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Event Description: Containment Spray Pump B Trips

| Time | Position | Applicant's Actions or Behavior |
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OP-902-009, Standard Appendices, Appendix 28-B**CRITICAL TASK****ESTABLISH CONTAINMENT TEMPERATURE AND PRESSURE CONTROL**

This task is satisfied by aligning Low Pressure Safety Injection Pump B to replace Containment Spray Pump B in accordance with Appendix 28 of OP-902-009, Standard Appendices prior to exiting OP-902-009 Appendix 28.

This task becomes applicable following the initiation of a Containment Spray Actuation Signal.

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| | SRO | 1.1 Obtain TSC concurrence prior to performing this evolution. |
| | BOP | 1.2 Verify LPSI Pump B control switch in "OFF." (CRITICAL) |
| | BOP | 1.3 Verify Containment Spray Pump B control switch in "OFF." |
| | BOP | 1.4 Place SI-129B, LPSI FLOW CONTROL VALVE to "AUTO." (Key 146) (CRITICAL) |
| | BOP | 1.5 Place SI-IFIC-0306, LPSI FLOW CONTROLLERS HEADER 1A/1B in "MAN." (CRITICAL) |
| | BOP | 1.6 Adjust SI-IFIC-0306, LPSI FLOW CONTROLLERS HEADER 1A/1B to 0% output. (CRITICAL) |
| | BOP | 1.7 Verify the following valves Closed: (CRITICAL) <ul style="list-style-type: none"> ▪ SI-415B, LPSI SHUTDOWN TEMP CONTROL valve (Key 147) ▪ SI-138B, LPSI FLOW CONTROL COLD LEG 1B ▪ SI-139B, LPSI FLOWCONTROL COLD LEG 1A |
| | BOP | 1.8 Open SI-125B/SI-412B, SHDN HX B ISOL valves. (Key 145) (CRITICAL) |
| | BOP | 1.9 Verify CS-125B, CNTMT SPRAY HEADER B ISOL valve open. (CRITICAL) |
| | BOP | 1.10 Start LPSI Pump B. (CRITICAL) |
| | BOP | 1.11 Verify Containment Spray Header B flow. |

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Event Description: Containment Spray Pump B Trips

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
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| <p>Examiner Note</p> <p>This event is complete after the BOP has established Containment Spray flow in accordance with OP-902-009, Standard appendices, Appendix 28</p> <p>OR</p> <p>At Lead Examiner's Discretion</p> | | |
|--|--|--|