Waterford 3

2012 NRC Exam

JOB PERFORMANCE MEASURE

A1

Calculate Shutdown Margin with a Stuck CEA

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Calculate Shutdown Margin with a stuck CEA.

Task Standard: Applicant calculates Shutdown Margin in accordance with OP-903-090, Shutdown Margin. The results must conform to the answer key and conclude that reactor power is greater than the allowed power level.

References: OP-903-090, Shutdown Margin
Plant Data Book
COLR

Time Critical: No Validation Time: 15 mins.

K/A 2.1.25, Ability to interpret reference materials, such as graphs, curves, tables, etc. Importance Rating 3.9 RO

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-903-090, Shutdown Margin
Plant Data Book
COLR

Description:
The applicant will be required to calculate Shutdown Margin with 1 mechanically bound CEA. The results will indicate that Shutdown Margin is NOT met and Emergency Boration is required.

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 colored Applicant Cue Sheet, and then give the cue sheet to the applicant.)

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

Do not use Simulator data for this JPM

INITIAL CONDITIONS:

- Core burnup is 335 EFPD.
- T_{COLD} is 543.5 °F.
- Power is 35%.
- Power is being held due to a Chemistry hold.
- Regulating Group P CEAs are being used for ASI control as xenon builds in.
- CEA 24 failed to withdraw or insert on the last move.
- I&C has completed troubleshooting and there are no problems associated with CEDMCS.
- The Shift Manager has concluded that CEA 24 is mechanically bound.

INITIATING CUES:

The CRS directs you to perform OP-903-090, Shutdown Margin, section 7.3.

7.3.1 If an Untrippable CEA Condition exists and the other CEAs are not inserted, then determine Shutdown Margin and record on Attachment 10.3 as follows:

TASK ELEMENT 1	STANDARD
NOTE (1) Use 541°F when using PDB Figure 1.5.7. (2) When using graphs and tables in the Plant Data Book (PDB), to obtain the necessary data, it may be necessary and is acceptable to interpolate (approximate between data points or curves). However, extrapolation (approximation outside of the bounds of the data or curves) should not be used.	Note reviewed.
Comment: Use Figure 1.5.7.3 for MOC.	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
7.3.1.1 Using current Cycle Burnup and 541 °F temperature, determine Net Worth Worst Pair Stuck out (WPSO) from Figure 1.5.7.	5.3 – 5.4
Comment: Refer to A1 Key. Use Figure 1.5.7.3 for MOC.	**Critical** **SAT / UNSAT**

TASK ELEMENT 3	STANDARD
7.3.1.2 Determine Shutdown Margin required by COLR.	5.15
Comment: Refer to A1 Key.	**Critical** **SAT / UNSAT**

TASK ELEMENT 4	STANDARD
7.3.1.3 Subtract Step 7.3.1.2 from Step 7.3.1.1 to determine Shutdown Margin Allowed Power Defect %ΔK/K.	0.15 – 0.25
Comment: Refer to A1 Key.	**Critical** **SAT / UNSAT**

TASK ELEMENT 5	STANDARD
7.3.1.4 Record current Reactor Power on Attachment 10.3.	Data recorded.

Comment:	**SAT / UNSAT**

TASK ELEMENT 6	STANDARD
7.3.1.5 Using result from step 7.3.1.3 and Power Defect vs. Power Level, Figure 1.2.1, Determine Shutdown Margin Allowed Power Level.	10% - 18%
Comment: Refer to A1 Key.	**Critical** **SAT / UNSAT**

TASK ELEMENT 7	STANDARD
7.3.1.6 Verify Shutdown Margin greater than or equal to that required by the COLR by verifying that current power level is less than or equal to the Shutdown Margin Allowed Power Level.	Shutdown Margin is not met.
Comment: Refer to A1 Key.	**Critical** **SAT / UNSAT**

TASK ELEMENT 8	STANDARD
7.3.2 If Shutdown Margin does not meet the requirements of Technical Specifications, then Commence Emergency Boration and go to OP-901-103, Emergency Boration.	Communicate step to examiner.
Comment:	**SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

There is no Simulator setup for this JPM

Waterford 3

2012 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
TS 3.9.1
COLR

Time Critical: No Validation Time: 20 mins.

K/A 2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation. Importance Rating 4.3 RO

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-010-006, Outage Operations
COLR
TS 3.9.1

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 PMU 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 colored Applicant Cue Sheet, and then give the cue sheet to the applicant.)

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

Do not use Simulator data for this JPM

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 PMU 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.

TASK ELEMENT 1	STANDARD
Note: (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. (2) This calculation is only valid for water additions while the Refuel Cavity Water Level is $\geq$ 20' MSL. (3) This calculation includes a 50% margin.	Note reviewed.
	SAT / UNSAT

9.24.1 Record the following:

TASK ELEMENT 2	STANDARD
▪ Final Refuel Cavity Water Level (Lf):	
Comment: Refer to A2 Key.	**SAT / UNSAT**

TASK ELEMENT 3	STANDARD
▪ Initial Refuel Cavity Boron Concentration (Ci)	
Comment: Refer to A2 Key.	**SAT / UNSAT**

TASK ELEMENT 4	STANDARD
▪ Refueling Minimum Boron Concentration (Cf)	2050 ppm
Comment: Refer to A2 Key. The applicant will determine that 2050 ppm is the most restrictive requirement per TS 3.9.1.	**Critical** **SAT / UNSAT**

TASK ELEMENT 5	STANDARD
9.24.2 Calculate the amount of pure water that may be added to the Refuel Cavity (Vw) using the following formula: Vw = (6954 gal/ft x Lf – 79,161 gal) x (1- Cf/Ci) Vw = [(6954x___ ft) – 79,161]x [1-(___ppm/___ppm)] Vw=____gallons	1402 to 1476 gallons
Comment: 73827 x .019139 = 1413 gallons	**Critical** **SAT / UNSAT**

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
Comment: Refer to A1 Key.	**Critical** **SAT / UNSAT**

TASK ELEMENT 7	STANDARD
9.24.4 SM/CRS designate the allowable amount of pure water to add to the Refuel Cavity by specifying an amount that is ≤ amount specified in Step 9.24.3. SM/CRS designated allowable pure water limit to add to cavity:	less than or equal to value calculated in step 9.24.2
Comment: Refer to A1 Key. 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.	**Critical** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

There is no Simulator setup for this JPM

Waterford 3

2012 RO NRC Exam

JOB PERFORMANCE MEASURE

A3

Determine Acceptability of Containment Temperature In Accordance With OP-903-001

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Determine Acceptability of Containment Temperature In Accordance With OP-903-001

Task Standard: Determines Containment Average Temperature does not meet acceptance criteria with instrument error accounted for and determines Tech Spec 3.6.1.5 needs to be entered.

References: OP-903-001
TS 3.6.1.5
TS Bases 3/4.6

Validation Time: 20 minutes Time Critical: No

K/A 2.2.12, Knowledge of surveillance procedures. Importance Rating 3.7 RO

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

- OP-903-001, Attachment 11.1 MODES 1-4 Technical Specification Surveillance Logs
- OP-903-001, Attachment 11.20 MODES 1-4 PMC Technical Specification Surveillance Logs (page 149)
- Waterford 3 Technical Specifications

Description:

This JPM requires the candidate to use Containment temperature readings from the PMC (provided on the cue sheet), calculate the average temperature using 3 of the 4 readings, and determine compliance with TS 3.6.1.5 and OP-903-001. Based on the readings of the 3 running CFC intake temperatures and tighter acceptance criteria of OP-903-001 (based on instrument error) TS 3.6.1.5 ACTION a must be complied with.

READ TO APPLICANT

DIRECTION 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.

Provide all answers on the material provided.

(Read the Initial Condition and Cues from the colored Applicant Cue Sheet, and then give the cue sheet and Page 149 of OP-903-001 to the applicant.)

APPLICANT CUE SHEET

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

INITIAL CONDITIONS:

- Reactor power is at 100%.
- I & C has just completed calibration of CFC Air Intake temperature loops.
- Containment Fan Coolers A, C, and D are operating.
- Primary Containment Average Air temperatures are as follows:
  - PID A51115, CFC A Air Inlet Temp reads 97°F.
  - PID A51119, CFC B Air Inlet Temp reads 100°F.
  - PID A51123, CFC C Air Inlet Temp reads 101°F.
  - PID A51127, CFC D Air Inlet Temp reads 98°F.

INITIATING CUES:

- The CRS requests that you determine compliance of Containment Average Temperature per OP-903-001.
- Document results and actions required, if any, on OP-903-001, Attachment 11.20, and return to the examiner.

Evaluator Note
The candidate will determine Containment Average Temperature using Containment Fan Cooler inlet temperatures from the PMC, Containment Fan Coolers running, and reactor power (all provided on the cue sheet)

TASK ELEMENT 1	STANDARD
Determines Containment Average Temperature	98.3°F -99.7°F
Comment: 1. The applicant will use the provided CFC temperatures and average the 3 running CFC temperatures (A, C and D). The average will be 98.7°F. Note: Averaging the 3 running CFC temperatures is preferred but not required. Any 3 can be used. The range given covers the various combinations that can be averaged.	**Critical** **SAT / UNSAT**

TASK ELEMENT 2	STANDARD
Determines Average Containment Temperature does **NOT** meet Acceptance Criteria.	Determines that 3.6.1.5 entry is required.
Comment: If the candidate just compares the temperature to the 3.6.1.5 LCO they will determine that no action is required and acceptance criteria is met. However, Tech Spec 3.6.1.5 does not take into account instrument uncertainties. and notes 2.0 – 2.3 of OP-903-001, Attachment 11.1 should be reviewed to determine acceptability of Containment Temperature.	**Critical** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

None.

Waterford 3

2012 NRC Exam

JOB PERFORMANCE MEASURE

A4

Gaseous Release Evaluation

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Meteorological conditions are evaluated for gaseous release from the GWM System.

Task Standard: Applicant concludes that a release is permitted. The conclusions must include the restrictions on wind speed, wind direction, and stability class.

References: OP-007-003, Gaseous Waste Management

Time Critical: No Validation Time: 10 mins.

K/A 2.3.11 Ability to control radiation releases Importance Rating 3.8

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-007-003, Gaseous Waste Management

Description:

The setting will be in the classroom for this JPM. The applicant will be provided information from the PMC for the applicable meteorological conditions. The data will be used to evaluate the flow chart in OP-007-003, Attachment 11.5.

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 this 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 colored Applicant Cue Sheet, and then give the cue sheet, OP-007-003 attachment 11.5, and the met data printout to the applicant.)

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- The plant is in Mode 1.
- Chemistry has requested a release of all 3 Gas Decay Tanks for planned maintenance.
- Environmental conditions are as displayed on the METDATA handout.

INITIATING CUES:

- The CRS directs you to complete an evaluation of meteorological conditions for the release in accordance with OP-007-003, Gaseous Waste Management.
- Document all information used and conclusions on OP-007-003, Attachment 11.5.

TASK ELEMENT 1	STANDARD
Evaluate 10 meter (33 foot) wind speed.	Concludes wind speed is 2.68 (or 2.75 from the B/U met tower) m/s and continues down through the flow chart.
Comment: The 199 foot reading (3.62 m/s) will conclude that there are no restrictions on the release without using the rest of the flowchart. The procedure directs using the 33 foot parameters.	**Critical** **SAT / UNSAT**

TASK ELEMENT 2	STANDARD
Evaluate 10 meter (33 foot) wind direction.	Concludes wind direction is 331.1(or 330.7 from the B/U met tower) deg and continues right through the flow chart.
Comment: The 199 foot reading (314.5 deg) will also continue right through the flow chart. The procedure directs using the 33 foot parameters.	**Critical** **SAT / UNSAT**

TASK ELEMENT 3	STANDARD
Evaluate Pasquill Stability Class.	Concludes ΔT is -0.77 °C or -0.78 °C, stability class C, and that the release is permitted. If using the B/U met tower, ΔT is -0.93 °C, stability class B, and that the release is permitted.
Comment:	**Critical** **SAT / UNSAT**

END OF TASK

Waterford 3

2012 NRC Exam

JOB PERFORMANCE MEASURE

A5

Review and Approve a Shutdown Margin with a Stuck CEA

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Review and Approve a Shutdown Margin with a stuck CEA.

Task Standard: Applicant reviews the completed Shutdown Margin in accordance with OP-903-090, Shutdown Margin. The applicant must identify that the incorrect Shutdown Margin was used and correct that error. The applicant must also identify that the plant is operating above the allowed power level and Emergency Boration is required.

References: OP-903-090, Shutdown Margin
Plant Data Book
COLR

Time Critical: No Validation Time: 20 mins.

K/A 2.1.25, Ability to interpret reference materials, such as graphs, curves, tables, etc. Importance Rating 4.2 SRO

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

_____

_____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-903-090, Shutdown Margin
Plant Data Book
COLR

Description:
The applicant will be required to review a completed Shutdown Margin with 1 mechanically bound CEA. The review will indicate that Shutdown Margin is not met and Emergency Boration is required.

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 colored Applicant Cue Sheet, and then give the cue sheet to the applicant.)

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

Do not use Simulator data for this JPM

INITIAL CONDITIONS:

- Core burnup is 335 EFPD.
- T_{COLD} is 543.5 °F.
- Power is 35%.
- Power is being held due to a Chemistry hold.
- Regulating Group P CEAs are being withdrawn for ASI control as xenon builds in.
- CEA 24 failed to withdraw or insert on the last move.
- I&C has completed troubleshooting and there are no problems associated with CEDMCS.
- The Shift Manager has concluded that CEA 24 is mechanically bound.

INITIATING CUES:

The STA has provided you with a completed OP-903-090, Shutdown Margin, for review.

Review and approve the completed surveillance or correct any errors and document any actions required on the worksheet given.

7.3.1 If an Untrippable CEA Condition exists and the other CEAs are not inserted, then determine Shutdown Margin and record on Attachment 10.3 as follows:

TASK ELEMENT 1	STANDARD
NOTE (1) Use 541°F when using PDB Figure 1.5.7. (2) When using graphs and tables in the Plant Data Book (PDB), to obtain the necessary data, it may be necessary and is acceptable to interpolate (approximate between data points or curves). However, extrapolation (approximation outside of the bounds of the data or curves) should not be used.	Note reviewed.
Comment: Use Figure 1.5.7.3 due to MOC.	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
7.3.1.1 Using current Cycle Burnup and 541 °F temperature, determine Net Worth Worst Pair Stuck out (WPSO) from Figure 1.5.7.	Recorded correctly on surveillance.
Comment: Use Figure 1.5.7.3 due to MOC.	**SAT / UNSAT**

TASK ELEMENT 3	STANDARD
7.3.1.2 Determine Shutdown Margin required by COLR.	5.15
Comment: Surveillance lists 4.6, the COLR Shutdown Margin for > 500 F with CEAs inserted.	**Critical** **SAT / UNSAT**

TASK ELEMENT 4	STANDARD
7.3.1.3 Subtract Step 7.3.1.2 from Step 7.3.1.1 to determine Shutdown Margin Allowed Power Defect %ΔK/K.	0.15 – 0.25
Comment: Surveillance lists .751 because of previous error.	**Critical** **SAT / UNSAT**

TASK ELEMENT 5	STANDARD
7.3.1.5 Using result from step 7.3.1.3 and Power Defect vs. Power Level, Figure 1.2.1, Determine Shutdown Margin Allowed Power Level.	10% - 18%

Comment: Surveillance lists 58%.	**Critical** **SAT / UNSAT**

TASK ELEMENT 7	STANDARD
7.3.1.6 Verify Shutdown Margin greater than or equal to that required by the COLR by verifying that current power level is less than or equal to the Shutdown Margin Allowed Power Level.	Shutdown Margin is not met.
Comment: Surveillance lists 58% allowed, which is greater than the current power level. Applicant must recognize that the actual limit is 10% - 18% which is below the current power level.	**Critical** **SAT / UNSAT**

TASK ELEMENT 8	STANDARD
7.3.2 If Shutdown Margin does not meet the requirements of Technical Specifications, then Commence Emergency Boration and go to OP-901-103, Emergency Boration.	Direct Emergency Boration.
Comment: If the candidate does not state Emergency Boration is required but states that Shutdown Margin is not met, then ask the candidate what actions are required for this condition, prior to the candidate leaving the area.	**Critical** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

There is no Simulator setup for this JPM

Waterford 3

2012 NRC Exam

JOB PERFORMANCE MEASURE

A6

Review 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 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
TS 3.9.1
COLR

Time Critical: No Validation Time: 15 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 SRO

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-010-006, Outage Operations
COLR

Description:
The applicant will be required to review 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 PMU 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 colored Applicant Cue sheet, and then give the cue sheet and student handout to the applicant.)

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

Do not use Simulator data for this JPM

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 PMU 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.

TASK ELEMENT 1	STANDARD
Note: (4) 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. (5) This calculation is only valid for water additions while the Refuel Cavity Water Level is $\geq$ 20' MSL. (6) This calculation includes a 50% margin.	Note reviewed.
	SAT / UNSAT

9.24.1 Record the following:

TASK ELEMENT 2	STANDARD
▪ Final Refuel Cavity Water Level (Lf):	value input verified
Comment: Refer to A6 Key.	**SAT / UNSAT**

TASK ELEMENT 3	STANDARD
▪ Initial Refuel Cavity Boron Concentration (Ci)	value input verified
Comment: Refer to A6 Key.	**SAT / UNSAT**

TASK ELEMENT 4	STANDARD
▪ Refueling Minimum Boron Concentration (Cf)	2050 ppm
Comment: Refer to A6 Key. The applicant will determine that 2050 ppm is the most restrictive requirement per TS 3.9.1. The attachment being reviewed has 1985 ppm entered as the refueling minimum boron concentration. 1985 ppm is the reactor engineering boron concentration to maintain Keff ≤ .95. TS 3.9.1 requires the most restrictive of 2050 ppm or the boron concentration to maintain Keff ≤ .95 as the refueling minimum boron concentration. In this case, the most restrictive boron concentration is 2050 ppm.	**Critical** **SAT / UNSAT**

TASK ELEMENT 5	STANDARD
9.24.2 Calculate the amount of pure water that may be added to the Refuel Cavity (Vw) using the following formula: Vw = (6954 gal/ft x Lf-79,161 gal) x (1- Cf/Ci) Vw = [(6954x___ ft) – 79,161]x [1-(___ppm/___ppm)] Vw=____gallons	1402 to 1476 gallons
Comment: The attachment being reviewed would have an error carried forward if 1985 ppm is used as the minimum required boron concentration.	**Critical** **SAT / UNSAT**

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
Comment: Refer to A6 Key. The attachment being reviewed would have an error carried forward if 1985 ppm is used as the minimum required boron concentration.	**Critical** **SAT / UNSAT**

TASK ELEMENT 7	STANDARD
9.24.4 SM/CRS designate the allowable amount of pure water to add to the Refuel Cavity by specifying an amount that is ≤ amount specified in Step 9.24.3. SM/CRS designated allowable pure water limit to add to cavity:	Less than or equal to the number calculated in step 9.24.2
Comment: Refer to A1 Key. The CRS may desire to limit the amount specified in step 9.24.3.	**Critical** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

There is no Simulator setup for this JPM

Waterford 3

2012 NRC Exam

JOB PERFORMANCE MEASURE

A7

Review of Containment Pressure Calculation

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Review of Containment pressure calculation

Task Standard: Reviews Containment pressure calculation in accordance with OP-903-001, Technical Specification Surveillance Logs.

References: OP-903-001, Technical Specification Surveillance Logs
Technical Specification 3.6.1.4

Time Critical: No Validation Time: 15 mins.

K/A 2.2.12 Knowledge of Surveillance procedures Importance Rating 4.1
SRO

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

1. OP-903-001, Technical Specification Surveillance Logs
2. Copy of Attachment 11.15, Containment Pressure Calculation (performed by the ATC)
3. Calculator

Description:

Applicant verifies Containment pressure calculation performed by the ATC.

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 colored Applicant Cue Sheet, and then give the cue sheet to the applicant.)

APPLICANT CUE SHEET

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

INITIAL CONDITIONS:

- Containment pressure reduction was secured during the previous shift.
- Containment Pressure is -5.4 INWC (PMC Point A51000).
- Barometric Pressure is reading is 29.44 INHG as indicated on the (PMC Point C48516).

INITIATING CUES:

- Verify the containment pressure calculation performed by the ATC using OP-903-001, Technical Specification Surveillance Logs and identify any TS actions required, if any.

TASK ELEMENT 1	STANDARD
11.15.1 Barometric Pressure as measured by PMC (PID C48516). If local reading used, then add 0.05 INHG to obtain a value equivalent to Met Tower PMC point. BP=_____ INHG 11.15.1.2 Record M&TE data on TS Logs Remarks and WR, if applicable	Verified 29.44 entered.
Comment: Applicant should not add .05 INHG because the PMC is operable. If he adds .05 INHG, the final value of this calculation will be greater than the TS limit.	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
11.15.2 Containment to Ambient Differential Pressure (PMC PID-A51000) C/A=_____INWC	Verified -5.4 entered
Comment: Value is from initial conditions	**SAT / UNSAT**

TASK ELEMENT 3	STANDARD
11.15.3 Convert Barometric Pressure (BP) from INHG to PSIA by performing the following: BP(PSIA) = [BP(INHG) x 0.4912 PSIA/INHG] BP(PSIA) = [_____ INHG x 0.4912 PSIA/INHG] BP(PSIA) = _____PSIA	Verified BP (PSIA) in the range of 14.46 to 14.461.
Comment: 14.46 is rounded from 14.460928.	**SAT / UNSAT**

TASK ELEMENT 4	STANDARD
11.15.4 Convert Containment to Ambient Differential pressure (C/A) from INWC to PSIA by performing the following: C/A(PSIA) = [CA(INWC) x 0.0361 PSIA/INWC] C/A(PSIA) = [_____ INWC x 0.0361 PSIA/INWC] C/A(PSIA) = _____PSIA	Recognize the wrong number inserted
Comment: -.195 is rounded from -.19494. The applicant should indentify that a positive number has been inserted and calculated for this step. The number is correct but the value should be negative. If this error is not identified, the final value of this calculation will be greater than the TS limit.	**Critical** **SAT / UNSAT**

TASK ELEMENT 5	STANDARD
11.15.5 Calculate Absolute Containment Internal Pressure (CP) by performing the following: CP(PSIA) = BP(PSIA) + C/A(PSIA) CP(PSIA) = _____ PSIA + _____ PSIA CP(PSIA) = _____PSIA	Recognized the error carried forward from the previous step. Corrected value should be 14.265 (14.26-14.27)
Comment: CP(PSIA) should be 14.265 when corrected. This number is less than TS.	**Critical** **SAT / UNSAT**

TASK ELEMENT 6	STANDARD
The applicant should identify the corrected value is less than the Technical Specification 3.6.14 limit for containment pressure (14.275 PSIA) and the actions for Technical Specification 3.6.1.4 are required.	Identified corrected value is less than 14.275 PSIA and TS 3.6.1.4 entry required
Comment:	**Critical** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

None

Waterford 3

2012 NRC Exam

JOB PERFORMANCE MEASURE

A8

Authorize Emergency Exposure
as the Emergency Coordinator

Candidate: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Authorize Emergency Exposure as the Emergency Director

Task Standard: Correctly determines that authorization is not appropriate

References: EP-002-030, Emergency Radiation Exposure Guidelines and Controls

Validation Time: 15 minutes Time Critical: No

K/A 2.3.4, Knowledge of radiation exposure limits under normal or emergency conditions. Importance Rating 3.7 SRO

.

Candidate: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

EP-002-030, Emergency Radiation Exposure Guidelines and Controls

DIRECTION TO CANDIDATE:

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 colored Applicant Cue Sheet, and then give the cue sheet to the applicant.)

CANDIDATE CUE SHEET

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

INITIAL CONDITONS:

You are the Emergency Coordinator. The following conditions exist:

- A stuck valve must be operated in a high radiation area with dose rates of 45 REM/Hour.
- The job will take 15 minutes.
- The only available person to do this task is Joe Tallard, SSN # 111-22-3333, Badge # 0101, with Operations.
- Radiation Protection has reported that they can take no action to reduce the dose rate.

INITIATING CUE:

Evaluate authorizing Emergency Exposure as Emergency Director.

Document all work and results on this sheet.

TASK ELEMENT	STANDARD
Emergency Director reviews EP-002-030, Emergency Exposure Guidelines & Controls, and authorizes emergency exposure if criteria is met.	Candidate determines that emergency exposure limit of 10 REM TEDE would be exceeded (actual calculation would be 11.25 REM TEDE) and does not authorize emergency exposure.
Comment: Candidate may state that he could authorize Emergency Exposure if the job could be split between two personnel.	**Critical** **SAT / UNSAT**

END OF TASK

Waterford 3

2012 NRC Exam

JOB PERFORMANCE MEASURE

A9

Determine Protective Action Recommendations

Candidate: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Determine protective action recommendations

Task Standard: Satisfactorily uses Attachment 7.2, Protective Action Guidelines Worksheet Release Occurring, to determine Protective Action Recommendations for the given conditions.

References: EP-002-052, Protective Action Guidelines

Validation Time: 15 minutes Time Critical: No

K/A 2.4.44, Knowledge of emergency plan protective action recommendations. Importance Rating 4.4 SRO

Candidate: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

EP-002-052, Protective Action Guidelines

DIRECTION TO CANDIDATE:

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 colored Applicant Cue Sheet, and then give the cue sheet and student handout to the applicant.)

CANDIDATE CUE SHEET

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

Provide all answers on the sheets provided.

INITIAL CONDITIONS:

- You are the Emergency Director.
- A release is in progress following a LOCA with a failed containment penetration.
- You declared a General Emergency.

The following data is available for protective action recommendations:

- Duration of release is unknown.
- Wind Direction from 75°
- The Field Teams have reported the following:
  - EAB TEDE = 890 mr/hr
  - EAB CDE Thyroid = 4800 mr/hr
  - 2 Mile TEDE = 501 mr/hr
  - 2 Mile CEDE Thyroid = 2485 mr/hr
  - 5 Mile TEDE = 98 mr/hr
  - 5 Mile CEDE Thyroid = 1410 mr/hr

INITIATING CUE:

Determine Protective Action Recommendations based on available data in accordance with EP-002-052, Protective Action Guidelines.

TASK ELEMENT	STANDARD
Determine Protective Action Recommendations based on available data in accordance with EP-002-052, Protective Action Guidelines.	Candidate should recommend evacuating areas A1, B1, C1, D1, and C2. Candidate should recommend sheltering all other protective response areas.
Comment: Candidate should multiply dose rate by 2 hours (requirement for releases of unknown duration) and determine areas to evacuate. All other areas should be sheltered.	**Critical** **SAT / UNSAT**

END OF TASK

Waterford 3

2012 NRC Exam

JOB PERFORMANCE MEASURE

S1

Securing Emergency Boration

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Secure Emergency Boration in accordance with step 7 of OP-901-103, Emergency Boration.

Task Standard: Applicant secured Emergency Boration and performed a flush of one standby charging pump per step 7 of OP-901-103 without tripping the running Charging Pump.

References: OP-901-103, Emergency Boration, revision 2

Alternate Path: No Time Critical: No Validation Time: 10 mins.

K/A 004 A4.07 Boration/Dilution Importance Rating 3.9/3.7
RO/SRO

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

_____

_____

_____

_____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-901-103, Emergency Boration

Description:

The applicant will perform step 7 of OP-901-103, securing Emergency Boration. This task secures Emergency Boration and aligns the suction source of the Charging Pumps to the Volume Control Tank. All manipulations occur at CP-4. 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.

DIRECTION 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.

INITIAL CONDITIONS:

- The plant is in Mode 3
- The plant has been shutdown for 3 days
- The plant is Emergency Borating due to an uncontrolled positive reactivity addition
- The uncontrolled positive reactivity addition has been terminated and Emergency Boration termination criteria are met
- The Standby Charging Pump Seal Packages have been running for 30 minutes 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

Evaluator Note
Cue the Simulator Operator to place the Simulator in RUN.

TASK ELEMENT 1	STANDARD
7. When Emergency Boration termination criteria (Step 6) are met, then secure Emergency Boration by performing the following:	Applicant continues on with the procedure.
Comment: 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 and verify valve opens	CVC-183 is open.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 3	STANDARD
7.2 Stop both Boric Acid Pumps.	Boric Acid Pumps are stopped.
Comment: BAM Pump B is the critical element.	**Critical** **SAT / UNSAT**

TASK ELEMENT 4	STANDARD
7.3 Verify the following valves closed: ▪ 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: BAM-133 will need to be closed. Other valves are not critical. because they are already in the correct position	**Critical** **SAT / UNSAT**

TASK ELEMENT 5	STANDARD
7.4 Open the following valves: ▪ BAM-126A Boric Acid Makeup Pump A Recirc Valve ▪ BAM-126B Boric Acid Makeup Pump B Recirc Valve	BAM-126A and B are open.
Comment: BAM-126B is the Critical Task because it is the only one that is closed.	**Critical** **SAT / UNSAT**

Evaluator Note

Inform the candidate that the CRS directs him to start Charging Pump AB 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: The candidate may use OP-002-005 to swap charging pumps. Task elements 7 through 20 are the steps in OP-002-005, Charging and Letdown System, for swapping charging pumps. Time compression used for operation of each charging pump. **EVALUATOR CUE:** After the applicant starts Charging Pump AB, cue the candidate that 5 minutes has elapsed.	**Critical** **SAT / UNSAT**

TASK ELEMENT 7	STANDARD
Procdure Note The Charging Pump Seal System should be operated for at least 30 minutes prior to starting the Charging Pump.	Reviewed the Note
Comment: The seal package has been running for 30 minutes as indicated in the initial conditions. **EVALUATOR CUE: If the candidate 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
6.2.1 At SM/CRS discretion, verify readiness for operation of each Charging Pump to be started as follows: • Verify crankcase oil level ≥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: 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. If packing cooling tank level continues to lower after makeup begins, then prior to tank level lowering below the bottom of the sight glass, Throttle Closed Charging Pump A(B, AB) Packing Cooling Sump Drain, CVC-704A(B, AB), as necessary to maintain packing cooling tank level visible but ≥1/2 in sightglass. D. After flushing the packing cooling tank for at least three minutes, then Close Charging Pump A(B, AB) Packing Cooling Sump Drain, CVC-704A(B, AB). E. Verify packing cooling tank water level ≥1/2 in sightglass.	Candidate communicates with the RCA to verify Charging Pump AB ready for a start.
Comment: **EVALUATOR CUE: When the candidate calls the RCA watch to perform step 6.1, inform the candidate that step 6.1 is complete and Charging Pump AB is ready for a start.**	**SAT / UNSAT**

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. If the first pump is secured shortly (within approximately one minute) after starting the second pump or PZR boron equalization is in progress, then this step is not necessary when swapping Charging pumps.	Note reviewed
Comment:	**SAT / UNSAT**

TASK ELEMENT 10	STANDARD
6.2.2 At SM/CRS discretion, if a Pressurizer Backup Heater Bank is operating, then secure the Pressurizer Backup Heater Bank by placing control switch in AUTO.	Step communicated with the CRS.
Comment: **EVALUATOR CUE: If asked, Inform the candidate that securing a pressurizer backup heater 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.	Charging Pump AB control switch in ON.

Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 13	STANDARD
6.2.4 Verify Seal Water Pump operating for the Charging Pump A(B)(AB) started and Place Seal Water Pump A(B)(AB) control switch in AUTO	Seal Water Pump AB control switch has been returned to auto.
Comment: **EVALUATOR CUE: If asked, inform the candidate that the seal water pump for Charging Pump AB is running.** **When the candidate directs the RCA watch to place the Seal Water Pump for Charging Pump AB to auto, inform him that the Seal Water Pump for Charging Pump AB is in auto.**	**SAT / UNSAT**

TASK ELEMENT 14	STANDARD
6.2.5 If Charging Pump A(B)(AB) started will remain in service as Standby Charging Pump(s), then go to Step 6.2.9.	Step reviewed
Comment:: Charging Pump AB will remain in service and Charging Pump B will be secured. Therefore, the applicant will continue to Step 6.2.6. **EVALUATOR CUE: If asked, inform the candidate that Charging Pump AB will be the lead pump.**	**SAT / UNSAT**

TASK ELEMENT 15	STANDARD
6.2.6 Secure desired Charging Pump A(B)(AB) by placing control switch(es) to OFF.	Charging Pumps A and B control switches are taken to OFF.
Comment:	**SAT / UNSAT**

TASK ELEMENT 16	STANDARD
Procedure Note If there is an Inoperable Charging Pump, then 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.	Note reviewed
Comment:	**SAT / UNSAT**

TASK ELEMENT 17	STANDARD
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. **TABLE 6.2.8** **PUMP IN LEAD** / **POSITION** B / AB - A A / B - AB AB / A - B	Selector switch should be selected to the AB as lead pump (A-B position)
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 18	STANDARD
6.2.9 Place control switch(es) for Standby Charging Pump A(B)(AB) to AUTO.	Charging Pumps A and B control switches are returned to auto.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 19	STANDARD
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. **TABLE 6.2.10** **ASSIGNED TO TRIP ON SIAS** / **POSITION** A / A AB / NORM B / B	Step reviewed
Comment:: The switch does not require manipulation since no Charging Pumps are out of service.	**SAT / UNSAT**

TASK ELEMENT 20	STANDARD
6.2.11 If a Pressurizer Backup Heater Bank was secured in step 6.2.2, then restore a Pressurizer Backup Heater Bank to operation by placing control switch to ON.	Step reviewed.
Comment:: No action required for this step since none of the heaters were taken to auto for task element 10.	**SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

1. Reset to IC-199
2. Verify Emergency Boration aligned per OP-901-103 using Boric Acid Pumps
3. There are no malfunctions or overrides for this JPM.

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- The plant is in Mode 3
- The plant has been shutdown for 3 days
- The plant is Emergency Borating due to an uncontrolled positive reactivity addition
- The uncontrolled positive reactivity addition has been terminated and Emergency Boration termination criteria are met
- The Standby Charging Pump Seal Packages have been running for 30 minutes 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

2012 NRC Exam

JOB PERFORMANCE MEASURE

S2

Hot and Cold Leg Safety Injection

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Hot and Cold Leg Safety Injection aligned for Trains A and B per OP-902-009, Appendix 15.

Task Standard: Applicant aligned Hot and Cold Leg Safety Injection in accordance with OP-902-009, Standard Appendices, Appendix 15.

References: OP-902-002, Loss of Coolant Accident Recovery, revision 14
OP-902-009, Standard Appendices, revision 307

Alternate Path: No Time Critical: No Validation Time: 15 mins.

K/A 006 A4.07, ECCS pumps and valves Importance Rating 4.4/4.4
RO/SRO

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-902-009, Standard Appendices, Appendix 15, Hot and Cold Leg Injection.

Description:

This JPM occurs during a Loss of Coolant Accident. The applicant will receive direction to align simultaneous Hot and Cold Leg Safety Injection. All manipulations will occur at CP-8.

Applicant must obtain keys for the valves manipulated in this JPM at the NPO Desk.

DIRECTION 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.

INITIAL CONDITIONS:

- A Loss of Coolant Accident occurred 2.5 hours ago
- The crew has entered OP-902-002, Loss of Coolant Accident Recovery
- The conditions exist that require alignment of hot and cold leg injection per step 47, Hot and Cold Leg Injection
- You are the BOP operator

INITIATING CUE:

- The Control Room Supervisor directs you to establish Hot and Cold Leg Injection in accordance with OP-902-009, Standard Appendices, Appendix 15

1.1 Establish simultaneous Hot and Cold leg injection for Train A by performing the following:

TASK ELEMENT 1	STANDARD
1.1.a Close SI-219A, HPSI HEADER ORIFICE BYPASS valve.	SI-219A is closed.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 2	STANDARD
1.1.b Open SI-502A, HOT LEG 1 INJECTION ISOLATION valve.	SI-502A is open.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 3	STANDARD
1.1.c Open SI-506A, HOT LEG 1 INJECTION FLOW CONTROL valve.	SI-506A is open.
Comment:	**Critical** **SAT / UNSAT**

1.2 Establish simultaneous Hot and Cold leg injection for Train B by performing the following:

TASK ELEMENT 4	STANDARD
1.2.a Close SI-219B, HPSI HEADER ORIFICE BYPASS valve.	SI-219B is closed.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 5	STANDARD
1.2.b Open SI-502B, HOT LEG 2 INJECTION ISOLATION valve.	SI-502B is open.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 6	STANDARD
1.2.c Open SI-506B, HOT LEG 2 INJECTION FLOW CONTROL valve.	SI-506B is open.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 7	STANDARD
1.3 WHEN hot and cold leg injection has been established, **THEN** adjust SI-506 A and SI-506 B to obtain the sum of **ALL** cold leg flows equal to the sum of the hot leg flows.	The sum of all cold leg flows is approximately equal to the sum of the hot leg flows.
Comment: Applicant can obtain Hot and Cold Leg flows from either the PMC, the meters on CP-8, or QSPDS. Due to the flow balance that is performed on these valves each outage flow balance between Hot and Cold Leg injection will be close. The candidate may not adjust flow. They should however, verify the flows.	**SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

Reset to IC-198
Place the Simulator in Run on the lead examiner's cue.

APPLICANT CUE SHEET

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

INITIAL CONDITIONS:

- A Loss of Coolant Accident occurred 2.5 hours ago
- The crew has entered OP-902-002, Loss of Coolant Accident Recovery
- The conditions exist that require alignment of hot and cold leg injection per step 47, Hot and Cold Leg Injection
- You are the BOP operator

INITIATING CUE:

- The Control Room Supervisor directs you to establish Hot and Cold Leg Injection in accordance with OP-902-009, Standard Appendices, Appendix 15

Waterford 3

2012 NRC Exam

JOB PERFORMANCE MEASURE

S3

OP-902-009, Restore Pressurizer Heater Control

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Perform OP-902-009 Appendix 25, Restore Pressurizer Heater Control.

Task Standard: Applicant completed OP-902-009 Appendix 25 and restored Pressurizer backup and proportional heaters to service.

References: OP-902-009 Appendix 25, revision 307

Alternate Path: No Time Critical: No Validation Time: 10 mins.

K/A 010 A4.02 Pzr Heaters Importance Rating 3.6, 3.4
RO/SRO

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-902-009 Appendix 25, Restore Pressurizer Heater Control, revision 307

Description:

The applicant will perform OP-902-009 Appendix 25, Restore Pressurizer Heater Control. This task restores Pressurizer Heaters to service following a SIAS. All manipulations occur at CP-1 and CP-2. If an applicant does not restore all Pressurizer heaters to service, then that applicant would fail this task.

DIRECTION 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.

INITIAL CONDITION:

- The plant is shutdown following an Inadvertent Safety Injection Actuation Signal.

INITIATING CUE:

- The CRS directs you to perform OP-902-009, Appendix 25, Restore Pressurizer Heater Control.

Evaluator Note
Cue the Simulator Operator to place the Simulator in RUN.

TASK ELEMENT 1	STANDARD
Procedure Note Pressurizer heaters can **NOT** be restored with a LOOP concurrent with a SIAS.	Note reviewed.
Comment: Only a SIAS will be initiated.	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
1.1 Verify pressurizer level is greater than 33%.	Level verified.
Comment:	**SAT / UNSAT**

TASK ELEMENT 3	STANDARD
1.2 Monitor EDG loading to ensure EDG does not exceed 4 MW.	Step reviewed
Comment: CP-1 The EDGs will be running but not connected to the safety busses. No LOOP has occurred.	**SAT / UNSAT**

TASK ELEMENT 4	STANDARD
1.3 Check SEQUENCER has timed out for each energized safety bus.	Verifies 200 Second Block illuminated for both Sequencers
Comment: CP-1	**SAT / UNSAT**

TASK ELEMENT 5	STANDARD
1.4 Close SST A32 FEEDER breaker.	A32 FEEDER breaker closed.
Comment: CP-1	**Critical** **SAT / UNSAT**

TASK ELEMENT 6	STANDARD
1.5 Close SST B32 FEEDER breaker.	B32 FEEDER breaker closed.
Comment: CP-1	**Critical** **SAT / UNSAT**

TASK ELEMENT 7	STANDARD
1.6 Place PROPORTIONAL HEATER BANKS control switches to "ON"	Both Proportional Heater Bank control switches taken to ON and Proportional Heaters are energized.
Comment: CP-2	**Critical** **SAT / UNSAT**

TASK ELEMENT 8	STANDARD
1.7 Momentarily place each BACKUP HEATER BANKS control switches to "OFF" and then to "AUTO."	All Backup Heater Bank control switches taken to OFF and then to AUTO or ON.
Comment: CP-2	**Critical** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

Reset to IC-197

Verify SIAS is initiated and both Sequencers are timed out.

There are no malfunctions or overrides for this JPM.

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITION:

- The plant is shutdown following an Inadvertent Safety Injection Actuation Signal.

INITIATING CUE:

- The CRS directs you to perform OP-902-009, Appendix 25, Restore Pressurizer Heater Control.

Waterford 3

2012 NRC Exam

JOB PERFORMANCE MEASURE

S4

Place Shutdown Cooling Train A in Service

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Place Shutdown Cooling Train A in Service

Task Standard: Applicant correctly performed the identified critical steps for placing Shutdown Cooling Train A in service in accordance with OP-009-005 and secured Low Pressure Safety Injection Pump A after SI-405A fails closed.

References: OP-009-005, Shutdown Cooling, revision 31
OP-901-131, Shutdown Cooling Malfunction, revision 302

Alternate Path: Yes Time Critical: No Validation Time: 20 mins.

K/A 005 A4.01, Controls and indication for RHR pumps Importance Rating 3.6 / 3.4 RO / SRO

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-009-005, Shutdown Cooling
OP-901-131, Shutdown Cooling Malfunction, revision 302

Description:

This task is performed at CP-8. The applicant must place Shutdown Cooling Train A in service. The fault in this task is that SI-405A, RC Loop 2 SDC Suction Inside Containment Isol, will fail closed, requiring the applicant to secure Low Pressure Safety Injection Pump A. The task can be stopped after LPSI Pump A is secured.

DIRECTION 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.

INITIAL CONDITIONS:

- The plant is in Mode 4
- Protected Train is A
- RCS temperature is 280 °F
- RCS pressure is 340 PSIA
- RCS boron concentration is 2027 ppm
- SDC Train A suction penetration piping has been manually vented
- Shutdown Cooling Train A has been placed in Standby in accordance with OP-009-005, Shutdown Cooling, section 5.3

INITIATING CUE:

- The CRS directs you to place Shutdown Cooling Train A in service in accordance with OP-009-005, Shutdown Cooling, Section 6.1

TASK ELEMENT 1	STANDARD
Procedure Caution: THE FOLLOWING SECTION HAS THE POTENTIAL TO AFFECT CORE REACTIVITY	Caution reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
Procedure Note: The Shutdown Cooling Train placed in service should be on the Protected Train.	Note reviewed.
Comment: Protected Train is A as given in initial conditions.	**SAT / UNSAT**

TASK ELEMENT 3	STANDARD
Procedure Caution: FOLLOWING A DESIGN BASIS TORNADO EVENT, DELAYING THE INITIATION OF SHUTDOWN COOLING (SDC) FOR UP TO 7 DAYS WILL BE REQUIRED TO ENSURE THE COMPONENT COOLING WATER SYSTEM IS CAPABLE OF REMOVING REACTOR COOLANT SYSTEM DECAY HEAT. THE ACTUAL DELAY TIME WILL DEPEND ON UHS DAMAGE AND AMBIENT TEMPERATURE AND WILL BE DETERMINED BY ENGINEERING. EMERGENCY FEEDWATER SUPPORTS DECAY HEAT REMOVAL UNTIL SDC CAN BE INITIATED.	Caution reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 4	STANDARD
6.1.1: Verify Shutdown Cooling Train A has been aligned to Standby condition in accordance with Section 5.3, Alignment of Shutdown Cooling Train A to Standby Condition.	Notes Section 5.3 is complete and continues in procedure.
Comment: Cue sheet lists this as complete.	**SAT / UNSAT**

TASK ELEMENT 5	STANDARD
6.1.2: Verify sufficient number of Dry Cooling Tower Fans running to accept increased heat load on CCW System.	Continues in procedure after cue.
Comment: **EVALUATOR CUE:** If asked, inform the candidate to leave the Dry Cooling Tower Fans in automatic and allow Auxiliary Component Cooling Water to pick up the heat load.	**SAT / UNSAT**

TASK ELEMENT 6	STANDARD
Procedure Caution: CC-963A IS REQUIRED TO BE MAINTAINED OPEN WHILE IN MODE 4 TO PRESERVE THE DESIGN TEMPERATURE BASIS OF PIPING AND ASSOCIATED COMPONENTS AT THE CCW OUTLET OF SHUTDOWN COOLING HEAT EXCHANGER A. WITH CC-963A OPEN, FLOW THROUGH SHUTDOWN COOLING HEAT EXCHANGER A WILL BE MAINTAINED ABOVE 2305 GPM.	Caution reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 7	STANDARD
6.1.3: Place Shutdown HX A CCW Flow Control, CC-963A, control switch to Open.	CC-963 A is open.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 8	STANDARD
Procedure Caution: (1) The following Reactor Coolant System limits shall be met for Shutdown Cooling Entry: • RCS temperature limit: < 350 °F • RCS pressure limit: < 392 psia • If Containment harsh environment conditions (>200°F) have been exceeded then RCS pressure limit: <358 Psia (2) If Containment Spray Header A Isolation, CS-125 A, is open while Shutdown Cooling Train A is operating, then Containment Spray A riser may fill and possibly spray water into Containment, due to leakage past Containment Spray Pump A discharge stop check, CS-117A.	Caution reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 9	STANDARD
Procedure Caution: To minimize the effect of air introduction to a LPSI pump, the piping between SI-405A AND SI-407A should be placed in-service with one of the following conditions:	Caution reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 10	STANDARD
6.1.4: Verify RC Loop 2 SDC suction piping meets one of the following conditions: ▪ The SDC Train is placed in-service with RCS pressure ≥ 100 PSIA by PMC indication (PIDs A12203, A12204, A12222) or ≥ 110 PSIA by board indication (RC-IPI0103,-0104,-0105,-0106). or ▪ The SDC Train's suction penetration has been manually vented. or ▪ The SDC Train was previously in-service since the unit has been shutdown.	One of the conditions is verified. Cue sheet lists SDC Train A suction penetration has been manually vented.
Comment:	**SAT / UNSAT**

TASK ELEMENT 11	STANDARD
6.1.5: Unlock and Open RC Loop 2 SDC Suction Outside Containment Isol, SI-407A.	SI-407 A is open.
Comment: Key 133 required.	**Critical** **SAT / UNSAT**

TASK ELEMENT 12	STANDARD
6.1.6: Notify Radiation Protection Department that Shutdown Cooling Train A is being placed in service.	Call is made.
Comment:	**SAT / UNSAT**

TASK ELEMENT 13	STANDARD
6.1.7: Start LPSI Pump A.	LPSI Pump A is started.
Comment: Annunciator LPSI Pump A Flow Lost (Cabinet M, F-3) is expected. It will clear when the applicant raises flow > 2900 gpm.	**Critical** **SAT / UNSAT**

TASK ELEMENT 14	STANDARD
6.1.8: Raise Shutdown Cooling flow by Manually adjusting LPSI Header Flow controller 2A/2B, SI-IFIC-0307, output until Shutdown Cooling Header A Flow indicates 4100 GPM, as indicated by RC Loop 2 Shdn Line Flow Indicator, SI-IFI-1307-A1.	Flow is raised to ~ 4100 GPM.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 15	STANDARD
6.1.9: Adjust LPSI Header Flow Controller 2A/2B, SI-IFIC-0307, setpoint potentiometer to 73%, and place controller to AUTO.	Setpoint potentiometer is ~ 73%, and controller is in AUTO
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 16	STANDARD
6.1.10: Verify LPSI Header Flow Controller 2A/2B, SI-IFIC-0307, is maintaining 4100 GPM Shutdown Cooling Header A flow, as indicated by RC Loop 2 Shdn Line Flow Indicator, SI-IFI-1307-A1.	Flow is verified.
Comment:	**SAT / UNSAT**

TASK ELEMENT 17	STANDARD
Procedure note: If a sample was drawn prior to shutdown and no interim shutdown has occurred where SDC was placed in service and boron concentration could have been reduced, then sampling is not required.	Note reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 18	STANDARD
6.1.11: At SM/CRS discretion, direct Chemistry Department to sample Shutdown Cooling Train A for boron concentration. 6.1.11.1 When Chemical Analysis results indicate that Shutdown Cooling Train A boron concentration is greater than Reactor Coolant boron concentration or ≥2050 ppm (required for Mode 6), then proceed to next step.	Determines that boron concentration meets the requirement.
Comment: **EVALUATOR CUE:** When requested, inform the applicant that Shutdown Cooling Train A boron concentration is 2060 ppm. RCS boron concentration is in the initial conditions and is 2027 ppm.	**SAT / UNSAT**

TASK ELEMENT 19	STANDARD
Procedure Note: Shutdown Cooling Train A requires one operable Low Pressure Safety Injection Flow Control Valve for the train to be operable.	Note reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 20	STANDARD
Procedure Caution: The Reactor Coolant System shall not exceed the 100 °F per hour cooldown rate of Technical Specification 3.4.8.1.	Caution reviewed.
Comment: **EVALUATOR CUE:** If asked, inform the applicant that the CRS will evaluate Tech Specs.	**SAT / UNSAT**

6.1.12 Raise Shutdown Cooling Train A temperature to within 100 °F of Reactor Coolant Hot temperature as follows:

TASK ELEMENT 21	STANDARD
6.1.12.1: Open the following valves: • SI-139A LPSI Header to RC Loop 2A Flow Control • SI-138A LPSI Header to RC Loop 2B Flow Control	SI-139 A and SI-138 A are open.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 22	STANDARD
6.1.12.2: Throttle Closed RC Loop 2 Shdn Cooling Warmup, SI-135A, until one of the following is within 100°F of Shutdown Cooling Train A temperature, as indicated by LPSI Pump A Discharge Header Temperature Indicator, SI-ITI-0351X: ▪ Hot Leg 2 temperature, as indicated by RC Loop 2 Hot Leg Temperature Indicator, RC-ITI-0122-HA or ▪ Hot Leg 1 temperature, as indicated by RC Loop 1 Hot Leg Temperature Indicator, RC-ITI-0122-HB	Temperature is within 100 °F
Comment: SI-135 A is a large gate valve with a very long stroke.	**Critical** **SAT / UNSAT**

TASK ELEMENT 23	STANDARD
6.1.12.3: Close RC Loop 2 Shdn Cooling Warmup, SI-135 A.	SI-135 A is closed
Comment:	**Critical** **SAT / UNSAT**

Evaluator Note
Coordinate with the simulator operator to initiate trigger 1 to close SI-405 A five seconds after SI-135A closes.

Evaluator Note
The following step represents the alternate path portion of the JPM.

TASK ELEMENT 24	STANDARD
Secure LPSI Pump A	LPSI Pump A is off.
Comment: This is an immediate operator action in accordance with OP-901-131, Shutdown Cooling Malfunction, section D.1.	**Critical** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

Reset to IC-195

Verify the following Malfunctions:

- SI23A for SI-405A on Trigger 1

Coordinate with the examiner so that when SI-135 A is fully closed at step 6.1.11.3 for 5 seconds, initiate event Trigger 1 to close SI-405A. (Use Extreme View to monitor SI-135A position)

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- The plant is in Mode 4
- Protected Train is A
- RCS temperature is 280 °F
- RCS pressure is 340 PSIA
- RCS boron concentration is 2027 ppm
- SDC Train A suction penetration piping has been manually vented
- Shutdown Cooling Train A has been placed in Standby in accordance with OP-009-005, Shutdown Cooling, section 5.3

INITIATING CUE:

- The CRS directs you to place Shutdown Cooling Train A in service in accordance with OP-009-005, Shutdown Cooling, Section 6.1

Waterford 3

2012 NRC Exam

JOB PERFORMANCE MEASURE

S5

Balance of Plant Operator Immediate Operator Actions on Control Room Evacuation

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Perform balance of plant operator's immediate operator action on Control Room evacuation with fire conditions.

Task Standard: Applicant performed immediate operator actions for BOP position for a fire in the Control Room in accordance with OP-901-502, Evacuation of Control Room and Subsequent Plant Shutdown. Applicant manually tripped the turbine due the turbine failing to trip on a Reactor trip. Applicant placed Atmospheric Dump Valve 2 in manual and lowered output to zero due to Atmospheric Dump Valve 2 spuriously opening.

References: OP-901-502, Evacuation of Control Room and Subsequent Plant Shutdown, Revision 22

Alternate Path: Yes Time Critical: No Validation Time: 5 mins.

K/A 039 A4.01 Main Steam Supply Valves Importance Rating 2.9 / 2.8
RO / SRO

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

_____

_____

Examiner: _____ Date: _____
Signature

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Tools/Equipment/Procedures Needed:

None

Description:

The applicant will be cued that there is a fire in CP-33. The CRS will direct him to carry out his immediate operator actions as BOP operator. The main turbine will not trip when the reactor is tripped. The applicant will be required to manually trip the main turbine using the turbine trip buttons. Atmospheric Dump Valve 2 will spuriously open requiring Atmospheric Dump Valve 2 controller to be placed in manual and output lowered to zero. The task will end when the applicant obtains a key ring and communicates his intention to proceed to the RAB +35 Relay room.

DIRECTION 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.

INITIAL CONDITIONS:

- The plant is at 100% power
- A fire has started in CP-33
- The CRS has entered OP-901-502, Evacuation of Control Room and Subsequent Plant Shutdown
- The At-The-Controls Operator will perform his immediate operator actions
- You are the Balance of Plant Operator

INITIATING CUE:

- The CRS directs you to perform the BOP immediate operator actions for OP-901-502, Evacuation of Control Room and Subsequent Plant Shutdown.

Evaluator Note
Cue the Simulator Operator to place the Simulator in RUN and initiate Trigger 1.

Evaluator Note
The Alternate Path becomes applicable when the applicant addresses the turbine not tripping on a Reactor Trip.

TASK ELEMENT 1	STANDARD
2.1 Verify Turbine trip: • Governor valves Closed • Throttle valves Closed	Turbine tripped.
Comment: The applicant will trip the turbine using the trip buttons at CP-1	**Critical** **SAT / UNSAT**

TASK ELEMENT 2	STANDARD
2.2 Verify Generator trip: • Exciter Field Breaker Tripped • Generator Breaker A Tripped • Generator Breaker B Tripped	Verification complete.
Comment:	**SAT / UNSAT**

TASK ELEMENT 3	STANDARD
2.3 RESET Moisture Separator Reheater controls.	RESET pushbutton depressed and Temperature Control Valves are closed.
Comment:	**Critical** **SAT / UNSAT**

2.4 IF evacuating the Control Room due to fire, THEN perform the following:

Evaluator Note
The second Alternate Path becomes applicable when the applicant addresses MS-116A SG 1 Atmospheric Dump spuriously opening.

TASK ELEMENT 4	STANDARD
2.4.1 IF EITHER of the following valves has spuriously Opened, THEN place the applicable controller(s) in MANUAL AND lower the output to zero: ▪ MS-116A SG 1 Atmospheric Dump ▪ MS-116B SG 2 Atmospheric Dump **(critical path)**	MS-116A verified operating properly. MS-116B controller in Manual and output lowered to zero.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 5	STANDARD
2.4.2 Close the following valves: ▪ MS-124A Main Steam Isol Valve #1 ▪ MS-124B Main Steam Isol Valve #2	MS-124A & MS-124B are closed.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 6	STANDARD
2.5 Obtain Operations Security Key Ring AND proceed to RAB +35 Relay Room.	Keys obtained.
Comment: The examinee should obtain a Key Locker key from the Key locker on left side of the Control Room Desk and simulate getting key from the locker in the Shift Manager's Office represented by the photo posted in the SM office.	**SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

Reset to IC-196

1. Set Trigger 1 to actuate on Rx Tripped
2. Verify the following Malfunctions:
    - RP03 – ACTIVE
    - MS23B – 0 PSIG with a 10 Second Ramp on Trigger 1

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- The plant is at 100% power
- A fire has started in CP-33
- The CRS has entered OP-901-502, Evacuation of Control Room and Subsequent Plant Shutdown
- The At-The-Controls Operator will perform his immediate operator actions
- You are the Balance of Plant Operator

INITIATING CUE:

- The CRS directs you to perform the BOP immediate operator actions for OP-901-502, Evacuation of Control Room and Subsequent Plant Shutdown.

Waterford 3

2012 NRC Exam

JOB PERFORMANCE MEASURE

S6

Perform OP-903-037, Containment Cooling Fans Operability Check

Candidate: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Perform OP-903-037, Containment Cooling Fans Operability Check

Task Standard: Candidate correctly completed the identified critical tasks of OP-903-037, Containment Cooling Fans Operability Check.

References: OP-903-037, Containment Cooling Fans Operability Check, revision 5
OP-008-003, Containment Cooling System, revision 301

Alternate Path: No Time Critical: No Validation Time: 15 mins.

K/A 022 A4.01 CCS Fans Importance Rating 3.6/3.6
RO/SRO

Candidate: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-903-037, Containment Cooling Fans Operability Check, revision 5
OP-008-003, Containment Cooling System, revision 301

Description:
This task is performed at CP-18. The candidate must perform surveillance OP-903-037, which will require logging differential pressure for the 3 running fans. The candidate will then have to secure a running Containment Cooling Fan and start Containment Cooling Fan D, at which time the data for CCS Fan D can be recorded. The candidate should then leave the CCS Fans in an alignment with A, B, and D running, as specified in OP-903-037.

READ TO CANDIDATE

DIRECTION TO CANDIDATE:

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.

INITIAL CONDITIONS:

- Plant is in Mode 3

INITIATING CUES:

- The CRS directs you to perform OP-903-037, Containment Cooling Fans Operability Check.
- Align the final Containment Fan Cooler configuration for the month of October.

TASK ELEMENT 1	STANDARD
7.1 Record differential pressure (DP) and CCW flow rate for operating CFC units on Attachment 10.1, CFC Data Sheet.	Values are recorded on Att. 1.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 2	STANDARD
Procedure Note: Attachment 10.2, Run Time Equalization Schedule Sheet, should be referenced in determining which CFC operating unit(s) is secured.	Determine correct alignment for the month of October.
Comment:	**SAT / UNSAT**

TASK ELEMENT 3	STANDARD
Procedure Caution: To prevent vibration alarms, and damage to containment cooling unit duct work, limit configuration to only three (3) of four (4) units operating at a time.	Caution reviewed
Comment:	**SAT / UNSAT**

TASK ELEMENT 4	STANDARD
7.2 Adjust CFC operating unit configuration to operate idle CFC unit(s).	CCS Fan C is off and CCS Fan D is running.
Comment: Evaluator: This is written for the candidate to secure CCS Fan C, which is the most reasonable fan for him to stop. It is acceptable for the candidate to secure CCS Fan A or B at this point. This would require the candidate to maneuver fans later in the task to leave fans A, B, and D running. The applicant will use OP-008-003 to first secure a CCS fan and then to start a CCS fan. Task elements 5-6 are for securing a CCS fan. Task elements 7-14 are for starting a CCS fan.	**SAT / UNSAT**

7.1 Securing Containment Fan Coolers

TASK ELEMENT 5	STANDARD
7.1 1 Stop desired Containment Fan Coolers (CFC), from CP-18, by placing Fan Cooler A(B)(C)(D) control switch CCS-0003 A(B)(C)(D) to Stop.	One CCS fan is secured
	Critical **SAT / UNSAT**

TASK ELEMENT 6	STANDARD
7.1 2 Verify at CP-18, that Component Cooling Water Inlet and Outlet Valves for all secured Containment Fan Coolers are Closed. CFC — VALVES A — Inlet — CC-808A Outlet — CC-822A B — Inlet — CC-807B Outlet — CC-823B C — Inlet — CC-807A Outlet — CC-823A D — Inlet — CC-808B Outlet — CC-822B	Inlet and Outlet valves closed
	SAT / UNSAT

6.1 Starting Containment Fan Coolers

TASK ELEMENT 7	STANDARD
Procedure Note Normal Containment Cooling System Configuration in modes 1-4 is three (3) Containment Fan Coolers operating and one (1) in standby.	Note reviewed
	SAT / UNSAT

TASK ELEMENT 8	STANDARD
Procedure Caution TO PREVENT VIBRATION ALARMS AND DAMAGE TO CONTAINMENT COOLING UNIT DUCT WORK, LIMIT CONFIGURATION TO ONLY THREE (3) OF FOUR (4) CONTAINMENT FAN COOLERS OPERATING AT ONE TIME WHEN IN FAST SPEED.	Caution reviewed.
	SAT / UNSAT

TASK ELEMENT 9	STANDARD
6.1.1 Start desired Containment Fan Coolers (CFC), from CP-18, by placing Fan Cooler A(B)(C)(D) control switch CCS-0003 A(B)(C)(D) to Start/ Fast.	CCS fan started.
	Critical **SAT / UNSAT**

TASK ELEMENT 10			STANDARD
6.1.2 Verify at CP-18 that the Component Cooling Water Inlet and Outlet Valves Open for the in-service coolers:			
CFC	VALVES		
A	Inlet	CC-808A	Inlet And Outlet Valves open.
	Outlet	CC-822A	
B	Inlet	CC-807B	
	Outlet	CC-823B	
C	Inlet	CC-807A	
	Outlet	CC-823A	
D	Inlet	CC-808B	
	Outlet	CC-822B	
			SAT / UNSAT

TASK ELEMENT 11	STANDARD
Procedure Note If Containment Fan Coolers are being started with slow speed jumpers installed for Containment cooling with Temporary Chilled Water, then steps 6.1.3 and 6.1.4 are not applicable.	Note reviewed.
	SAT / UNSAT

TASK ELEMENT 12	STANDARD
6.1.3 Check in-service Containment Fan Coolers A (B, C, D) differential pressures within expected range of 5.0 INWC to 8.0 INWC, as indicated on CCS-IDPR-5154A(B).	Verified proper differential pressure.
	SAT / UNSAT

TASK ELEMENT 13	STANDARD
6.1.4 Check Component Cooling Water flow is ≥ 625 gpm as indicated on CC-IFI-7570A(B).	Verified proper flow.
	SAT / UNSAT

TASK ELEMENT 14	STANDARD
7.4 When CFC unit(s) have operated for ≥ 15 minutes, then record CFC unit(s) differential pressure for unit(s) started in Step 2, on Attachment 10.1, CFC Data Sheet.	Attachment 10.1 data updated for differential pressure.
Perform Time Compression and state that the fan has been running for > 15 minutes.	**Critical** **SAT / UNSAT**

TASK ELEMENT 15	STANDARD
7.5 Verify all four CFC units were operated and data recorded on Attachment 10.1, CFC Data Sheet.	Attachment 10.1 data updated for all CCS Fans.
Note: Only 2 fans will be operated. One will be secured and the non-running fan will be started.	**Critical** **SAT / UNSAT**

TASK ELEMENT 16	STANDARD
7.6 Verify each CFC Unit CCW flow rate is ≥ 625 GPM	Satisfactory flow rates verified.

	SAT / UNSAT

TASK ELEMENT 17	STANDARD
7.7 Refer to Attachment 10.2, Run Time Equalization Schedule Sheet, to obtain CFC unit alignment for the upcoming month.	Determine that CFC A, B and D to be left running.
	SAT / UNSAT

TASK ELEMENT 18	STANDARD
7.8 Verify that CFC units are aligned as required on Attachment 10.1, CFC Data Sheet.	CFC A, B and D running.
	SAT / UNSAT

TASK ELEMENT 19	STANDARD
Attachment 10.1 of OP-903-037: Steps 10.1.1 and 10.1.2 completed and initialed. The “performed by” line signed.	Steps 10.1.1 and 10.1.2 completed and initialed. The “performed by” line signed.
	SAT / UNSAT

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

Reset to IC-199

Verify CFC A, B, and C are running initially
There are no malfunctions or overrides for this JPM.

CANDIDATE CUE SHEET

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

INITIAL CONDITION:

- Plant is in Mode 3

INITIATING CUES:

- The CRS directs you to perform OP-903-037, Containment Cooling Fans Operability Check.
- Align the final Containment Fan Cooler configuration for the month of October.

Waterford 3

2012 NRC Exam

JOB PERFORMANCE MEASURE

S7

Energize 4.16 KV Safety Bus from Offsite Power following a Station Blackout

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Energize 4.16 KV Safety Bus from Offsite Power following a Station Blackout.

Task Standard: The candidate restored power to the 1A and 2A busses from offsite power and then energized the 4.16 KV Safety Bus (3A bus) from offsite power

References: OP-902-009, Standard Appendices, Attachment 12-A: 6.9 KV and 4.16 KV Nonsafety Bus Restoration, revision 307

OP-902-009 Standard Appendices, Attachment 12-B: Energize 4.16 KV Safety Bus from Offsite Power, revision 307

Alternate Path: No Time Critical: No Validation Time: 15 mins.

K/A 062 A4.01, All breakers (including available switchyard) Importance Rating 3.3 / 3.1 RO / SRO

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-902-009, Standard Appendices, Attachment 12-A: 6.9 KV and 4.16 KV Nonsafety Bus Restoration, revision 307

OP-902-009 Standard Appendices, Attachment 12-B: Energize 4.16 KV Safety Bus from Offsite Power, revision 307

Description:

The JPM begins with the plant in a station blackout. The applicant will restore power to the 3A Safety Bus from offsite using OP-902-009, Standard Appendices, Attachments 12-A and 12-B. Actions for this task take place at CP-1 and CP-8. **(This JPM is a site specific priority as an operator action for preventing core damage)**

DIRECTION 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.

INITIAL CONDITIONS:

- The plant is performing actions in OP-902-005, Station Blackout.
- Power to the Offsite Grid has been restored.
- Lockout relay 86STA handswitch on 7KV-ESWGR-1A-3 has been reset.
- The station blackout has been occurring for 30 minutes. All time critical actions required by OP-902-005, Station Blackout, have been completed.

INITIATING CUE:

The CRS directs you to energize the A1 and A2 busses from offsite power and then energize the 3A bus in accordance with OP-902-009, Standard Appendices, Attachments 12A and 12B.

Evaluator Note
When Applicant is ready, cue the simulator operator to place the simulator in RUN. Task element 1-4 are applicable to OP-902-009 Appendix 12-A, 6.9 KV and 4.16 KV Nonsafety Bus Restoration

1.1 **IF** offsite power is available **AND** 6.9 KV and 4.16 KV nonsafety buses A1 and A2 are deenergized, **THEN** energize the 6.9 KV and 4.16 KV nonsafety buses as follows:

TASK ELEMENT 1	STANDARD
a. Locally reset lockout relay 86STA handswitch on 7KV-ESWGR-1A-3.	local relay reset
Comment: The 86STA Lockout Relay has been RESET as indicated in the initial conditions. **EVALUATOR CUE:** If asked, inform the candidate that the 86STA Lockout Relay has been RESET.	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
b. Verify SUT A DISCONNECT closed.	disconnect closed
Comment: Indication is in the control room on CP-1.	**Critical** **SAT / UNSAT**

TASK ELEMENT 3	STANDARD
c. Verify loads have stripped from SWGR A1 and SWGR A2.	loads verified stripped
Comment: Verified in the field. **EVALUATOR CUE:** After the examinee requests verification from the Auxiliary Operator, cue the examinee that all loads have stripped from Busses A1 and A2.	**SAT / UNSAT**

TASK ELEMENT 4	STANDARD
d. Place BUS A TRANSFER switch to “SUT”.	Switch taken to SUT.
Comment: Switch on CP-1	**Critical** **SAT / UNSAT**

TASK ELEMENT 5	STANDARD
e. Locally reset lockout relays: ▪ 86A1/HR on 7KV-ESWGR-1A-2 ▪ 86A2/HR on 4KV-ESWGR-2A-2	relays reset
Comment: Relays are reset in the field. **EVALUATOR CUE:** After the examinee requests the Auxiliary Operator reset the relays, cue the examinee that the 86A1/HR and 86A2/HR relays are reset.	**SAT / UNSAT**

Evaluator Note
The following steps are applicable to OP-902-009, Appendix 12B, Energize 4.16KV Safety Bus from Offsite Power.

TASK ELEMENT 6	STANDARD
1.1 **IF** containment pressure is less than 17.7 PSIA, **THEN** verify **BOTH** CS pump control switches are in "OFF".	Both CS Pump control switches are in OFF
Comment: Control switches are on CP-8.	**Critical** **SAT / UNSAT**

TASK ELEMENT 7	STANDARD
1.2 **IF** CCW flow to the RCP seals has been interrupted for greater than 10 minutes, **THEN** close the following valves: ▪ CC 641, COMPONENT COOLING WATER RCP INLET OUTSIDE ISOL ▪ CC 710, COMPONENT COOLING WATER RCP OUTLET INSIDE ISOL ▪ CC 713, COMPONENT COOLING WATER RCP OUTLET OUTSIDE ISOL	Required valves closed
Comment: Control switches on CP-8.	**Critical** **SAT / UNSAT**

TASK ELEMENT 8	STANDARD
1.3 **IF** DC Loads have been stripped per Appendix 7 **THEN** Open the following breakers prior to AC power restoration to 4.16 KV Safety 3 buses: ▪ EGF-EBKR-312A-3F, EG A Fuel Oil Transfer Pump ▪ EGF-EBKR-312B-3F, EG B Fuel Oil Transfer Pump	Both breakers are open.
Comment: Performed in the field. **EVALUATOR CUE:** After the examinee communicates the task to the Auxiliary Operator, cue the examinee that both breakers are open.	**SAT / UNSAT**

1.4 **IF** 4.16KV nonsafety bus A2 energized **AND** the 4.16 KV safety bus A3 is deenergized, **THEN** perform the following:

TASK ELEMENT 9	STANDARD
a. Verify BUS A3S TO A2 TIE BKR Open	Verifies BUS A2 TO A3S TIE BKR is open.
Comment: Breaker switch and indication are on CP-1.	**SAT / UNSAT**

TASK ELEMENT 10	STANDARD
b. Close BUS A2 TO A3S TIE BKR	BUS A2 TO A3S TIE BKR is closed.
Comment: Breaker switch is on CP-1.	**Critical** **SAT / UNSAT**

TASK ELEMENT 11	STANDARD
c. Close BUS A3S TO A2 TIE BKR	BUS A3S TO A2 TIE BKR is closed.
Comment: Breaker switches are on CP-1. **EVALUATOR CUE:** After the BUS A3S TO A2 TIE BKR is closed, cue the examinee that the task is complete.	**Critical** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

1. Reset to IC-200.
2. Place Simulator in RUN and allow PMC initiation.
3. After PMC has completed initialization acknowledge all annunciators and place the Simulator in FREEZE.
4. Place the Simulator in RUN on the lead examiner's cue.

Initial IC Setup

1. Reset to a MODE 3 IC.
2. Insert Malfunctions ED01A-D to ACTIVE.
3. Insert Malfunctions EG10A and EG10B to ACTIVE.
4. Insert Malfunction ED02C to ACTIVE.
5. Place Simulator in RUN.
6. Verify all Malfunctions are ACTIVE and the Simulator indicates Station Blackout conditions with SUT A isolated.
7. Remove Malfunctions ED01A-D and ED02C.
8. Set Remotes EDR01, EDR02, EDR50, and EDR51 to CLOSE.
9. Set Remotes EDR59A SWGR on Trigger 1.
10. Set Remote EDR59B to SWGR on Trigger 2.
11. Acknowledge Annunciators.
12. Place Simulator in Freeze.
13. Snap to the desired IC using current exam passwords for read and write protection.

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- The plant is performing actions in OP-902-005, Station Blackout.
- Power to the Offsite Grid has been restored.
- Lockout relay 86STA handswitch on 7KV-ESWGR-1A-3 has been reset.
- The station blackout has been occurring for 30 minutes. All time critical actions required by OP-902-005, Station Blackout, have been completed.

INITIATING CUE:

The CRS directs you to energize the A1 and A2 busses from offsite power and then energize the 3A bus in accordance with OP-902-009, Standard Appendices, Attachments 12A and 12B.

Waterford 3

2012 NRC Exam

JOB PERFORMANCE MEASURE

S8

Reset Emergency Feedwater Actuation

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Reset Emergency Feedwater Actuation

Task Standard: The candidate reset the EFAS actuation in accordance with OP-902-009, Standard Appendices, Attachment 5-C.

References: OP-902-009, Standard Appendices, Attachment 5-C, EFAS Reset Procedure, Revision 307
OP-902-001, Reactor Trip Recovery, Revision 12

Alternate Path: No Time Critical: No Validation Time: 10 mins.

K/A 012 A4.04, Bistable, trips, reset and test switches Importance Rating 3.3 / 3.3
RO / SRO

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-902-009, Standard Appendices, Attachment 5-C, EFAS Reset Procedure, revision 307

Description:

The JPM begins after a Reactor trip on an Inadvertent Safety Injection. EFAS-1 and EFAS-2 are actuated. Steam Generator Levels are being controlled by Main Feedwater. The applicant will be directed to reset EFAS 1 and 2. Actions for this task take place at CP-7, CP-8 and CP-33.

DIRECTION 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.

INITIAL CONDITIONS:

- A reactor trip has occurred due to an inadvertent Safety Injection Actuation Signal
- The crew is implementing OP-902-001, Reactor Trip Recovery
- Emergency Feedwater is not required to maintain Steam Generator levels
- EFAS-1 has been manually initiated
- EFAS-2 has automatically initiated

INITIATING CUE:

The CRS directs you, to perform OP-902-009, Standard Appendices, Attachment 5-C, EFAS Reset Procedure, and reset EFAS 1 and 2.

Evaluator Note
When Applicant is ready, cue the simulator operator to place the simulator in RUN.

TASK ELEMENT 1	STANDARD
1.1 Verify steam generator level is being maintained or restored to 50% to 70% NR using MFW.	Levels verified.
Comment:	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
1.2. Verify EFAS-1 manual actuation switches in "NORM" position. (CP-7 and CP-8)	Switches returned to NORM.
Comment: EFAS-1 has been manually initiated. The EFAS-1 switches must be restored to NORM.	**Critical** **SAT / UNSAT**

TASK ELEMENT 3	STANDARD
1.3 Verify EFAS-2 manual actuation switches in "NORM" position. (CP-7 and CP-8)	Verify switches.
Comment:	**SAT / UNSAT**

TASK ELEMENT 4	STANDARD
1.4 Press **BOTH** EFAS-1 reset pushbuttons. (CP-33)	Pushbuttons depressed.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 5	STANDARD
1.5 Press **BOTH** EFAS-2 reset pushbuttons. (CP-33)	Pushbuttons depressed.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 6	STANDARD
1.6 Verify EFW Pump A is secured and place the control switch to normal. (mid position)	EFW Pump A secured and switch in mid position.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 7	STANDARD
1.7 Verify EFW Pump B is secured and place the control switch to normal (mid position)	EFW Pump B secured and switch in mid position.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 8	STANDARD
1.8 Verify MS-401A, EFW PUMP AB TURB STM SUPPLY SG 1 is closed.	MS-401A is closed.
Comment: Control switch must be taken to CLOSE and then to the mid position.	**Critical** **SAT / UNSAT**

TASK ELEMENT 9	STANDARD
1.9 Verify MS-401B, EFW PUMP AB TURB STM SUPPLY SG 2 is closed .	MS-401B is closed.
Comment: Control switch must be taken to CLOSE and then to the mid position.	**Critical** **SAT / UNSAT**

TASK ELEMENT 10	STANDARD
1.10 Verify EMERGENCY FEEDWATER FLOW control valves closed: ▪ EFW 223A, SG1 BACKUP ▪ EFW 224A, SG1 PRIMARY ▪ EFW 223B, SG2 BACKUP ▪ EFW 224B, SG2 PRIMARY	Valves are closed.
Comment: The applicant should use both controller output position and PMC indication to verify valves closed.	**SAT / UNSAT**

TASK ELEMENT 11	STANDARD
1.11 Place EMERGENCY FEEDWATER FLOW control valves in "AUTO." ▪ EFW 223A, SG1 BACKUP **(critical)** ▪ EFW 224A, SG1 PRIMARY **(critical)** ▪ EFW 223B, SG2 BACKUP ▪ EFW 224B, SG2 PRIMARY	Valves in AUTO.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 11	STANDARD
1.12 Close EMERGENCY FEEDWATER ISOLATION valves. ▪ EFW 229A, SG1 BACKUP ▪ EFW 228A, SG1 PRIMARY ▪ EFW 229B, SG2 BACKUP ▪ EFW 228B, SG2 PRIMARY	Valves closed.
Comment:	**Critical** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

Reset to IC-197

Verify SIAS, EFAS1, and EFAS2 are initiated

Place the Simulator in Run on the lead examiner's cue.

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- A reactor trip has occurred due to an inadvertent Safety Injection Actuation Signal
- The crew is implementing OP-902-001, Reactor Trip Recovery
- Emergency Feedwater is not required to maintain Steam Generator levels
- EFAS-1 has been manually initiated
- EFAS-2 has automatically initiated

INITIATING CUE:

The CRS directs you, to perform OP-902-009, Standard Appendices, Appendix 5-C, EFAS Reset Procedure, and reset EFAS 1 and 2.

Facility: Waterford 3 Scenario No.: 1 Op Test No.: 1

Examiners: _____ Operators: _____

Initial Conditions: Reactor power is 100%, EOC

Turnover:

Protected Train is B, AB Busses are aligned to Train B, HPSI Pump A is OOS, maintain 100% power

Event No.	Malf. No.	Event Type*	Event Description
1	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 Plant Protection System C trip bistables.
2	RC21A	I – All	Hot Leg 1 Temperature, RC-ITI-0111X, fails low affecting PZR level setpoint. OP-901-110, Pressurizer Level Control Malfunction.
3	RC08C	C – BOP C – SRO	Reactor Coolant Pump 2A Lower Seal fails. OP-901-130, Reactor Coolant Pump Malfunction.
4	H_H08	TS – SRO	Power Dependent Insertion Limit Alarm fails ON requiring Technical Specification actions.
5	FW35B	R – ATC N – BOP N – SRO	Feedwater Heater 5B tube leak from Condensate to heater shell causing isolation of the Low Pressure heater string. OP-901-221, Secondary System Transient and OP-901-212, Rapid Plant Power Reduction to 72% power.
6	RC09C	C – ATC C – SRO	Reactor Coolant Pump 2A Middle Seal fails, requiring a manual reactor trip, and securing of Reactor Coolant Pump 2A.
7	RC11A1	M – All	Pressurizer Code Safety, RC-317A, fails open. OP-902-002, Loss of Coolant Accident Recovery. All Reactor Coolant Pumps must be secured. (Critical Task 1)
8	SI02B	C – BOP C – SRO	High Pressure Safety Injection Pump B fails to AUTO start on the Safety Injection Actuation Signal requiring a manual start. (Critical Task 2)
9	RP09D	I-ATC I-BOP	RC-606, Control Bleedoff Containment Isolation and FP-601B, Fire Water B Containment Isolation fail to auto close.

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

The crew assumes the shift at 100% power with instructions to maintain 100% power. High Pressure Safety Injection Pump A is out of service and danger tagged, due to high pump bearing vibration during its quarterly IST. Since it occurred just prior to shift turnover and the AB bus is aligned to Train B, High Pressure Safety Injection Pump AB has not yet been aligned for service. The Work Management Center is working in that direction.

After taking the shift, 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, Loop 1 T_{hot} instrument, RC-ITI-0111X, fails low. This affects the Reactor Regulating System Tave calculation and the Pressurizer Level Setpoint. The SRO should enter OP-901-110, Pressurizer Level Control Malfunction and implement Section E2, Pressurizer Level Setpoint Malfunction. The crew should take manual control of Pressurizer Level, select the non-faulted T_{hot} instrument (Loop 2) in both Reactor Regulating System cabinets, verify normal setpoint is restored and restore Pressurizer Level Control to Auto after returning Pressurizer Level to setpoint.

After the crew addresses the T_{hot} instrument failure, Reactor Coolant Pump 2A Lower Seal fails. The crew should enter OP-901-130, Reactor Coolant Pump Malfunction and implement Section E1, Seal Failure.

After the crew is in Section E1 of OP-901-130 AND the BOP has adjusted Component Cooling Water Temperature, Annunciator H-8 on Panel H, Power Dependent Insertion Limit, fails ON. The crew should determine that no Control Element Assemblies are below the Transient Insertion Limits and declare the alarm inoperable. The SRO should review Technical Specification 3.1.3.6 and determine that the surveillance interval for Technical Specification Surveillance 4.1.3.6 has changed from every 12 hours to every 4 hours with the alarm inoperable.

Once the SRO has addressed Technical Specifications, a tube leak occurs in Feedwater Heater 5B, causing Condensate flow to isolate through Low Pressure Feedwater Heaters 5B and 6B. The crew should enter OP-901-221, Secondary System Transient, and implement Section E1, Loss of Feedwater Preheating. This also requires a power reduction to < 72% power using OP-901-212, Rapid Plant Power Reduction.

After the reactivity manipulation is satisfied, Reactor Coolant Pump 2A Middle Seal fails. The crew should trip the reactor, implement OP-902-000, Standard Post Trip Actions AND secure Reactor Coolant Pump 2A.

After Reactor Coolant Pump 2A is secured, Pressurizer Code Safety, RC-317A, fails open. The crew should return to diagnostics and diagnose to OP-902-002, Loss of Coolant Accident Recovery. The crew should secure an additional Reactor Coolant Pump in the opposite loop (preferably 1A) when RCS Pressure lowers to < 1621 PSIA and secure all Reactor Coolant Pumps when Reactor Coolant System pressure no longer supports operation as indicated by pump vibration alarms or within 3 minutes of the Containment Spray Actuation **(CRITICAL TASK 1)**.

When Safety Injection occurs, either manually or automatically, High Pressure Safety Injection Pump B fails to Auto Start. The BOP should manually start High Pressure Safety Injection Pump B **(CRITICAL TASK 2)**. RC-606, Controlled Bleedoff Containment Isolation and FP-601B, Fire Water B Containment Isolation fail to auto close on the Containment Isolation Actuation Signal. The ATC should close RC-606 and the BOP should close FP-601B.

The scenario can be terminated after the crew starts a cooldown or at the examiner's discretion.

CRITICAL TASKS

1. TRIP ANY RCP NOT SATISFYING RCP OPERATING LIMITS

This task is satisfied by securing all RCPs when implementing procedural step 8 OP-902-002 or within 3 minutes of loss of Component Cooling Water flow whichever occurs first. This task becomes applicable after either running Reactor Coolant Pump Vibration alarms actuate OR Containment Spray is initiated. The vibration 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.

2. ESTABLISH RCS INVENTORY CONTROL

This task is satisfied by starting High Pressure Safety Injection Pump B to establish Reactor Coolant System inventory control before exiting the step to verify Safety Injection Actuation Signal Actuation in OP-902-002 (Step 7). This task becomes applicable following the initiation of a Safety Injection Actuation Signal.

Scenario Quantitative Attributes

1. Total malfunctions (5–8)	9
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)	2

SCENARIO SETUP

A. Reset Simulator to IC-191.
B. Verify Scenario Malfunctions are loaded, as listed in the Scenario Timeline.
C. Verify the following Remotes and Overrides:
    1. SIR29, HPSI PUMP A – RACKOUT
    2. SIR24, SI-203A_SI-208A HPSI PUMP A SUCT/DISCH ISOL VLVS - CLOSE
D. Verify HPSI Pump A Control Switch (C/S) in OFF and place Danger Tag on C/S.
E. Ensure Protected Train B sign is placed in SM office window.
F. Verify EOOS is 8.7 Yellow
G. Ensure the Log Printer Toggle Switch on the rear of the printer is in the UP position.
H. Complete the simulator setup checklist.
I. Start Insight, open file PlantParameters.tis.

SIMULATOR BOOTH INSTRUCTIONS

Event 1 Steam Generator Pressure Instrument, SG-IPT-1013C, 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, report all S/G 1 Pressures read ~ 800 PSIA.

Event 2 Hot Leg 1 Temperature, RC-ITI-0111X, 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 2A 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 2A 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 Power Dependent Insertion Limit Alarm fails ON

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.

Event 5 Feedwater Heater 5B Tube Leak, Rapid Plant Power Reduction

1. On Lead Examiner's cue, initiate Event **Trigger 5**.
2. If called to verify Low Pressure Heater levels, verify levels using the PMC and report levels to the Control Room.
3. If called to verify position of the Normal and Alternate Control Valves, verify valve positions using the PMC and report the position of the valves to the Control Room.
4. If requested to monitor Polisher Vessel D/P and remove as necessary, acknowledge the report.
5. If Work Week Manager or PMM are called, inform the caller that a work package will be assembled.
6. 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.

Event 6 RCP 2A Middle Seal Fails

1. After the reactivity manipulation is satisfied and on lead examiner's cue, initiate Event **Trigger 6**.
2. If the Duty Engineering or RCP Engineer is called inform the caller that you will monitor RCP 2A for further degradation.
3. If the Work Week Manager or PMM are called, inform the caller that a work package will be assembled.

Event 7-9 Pressurizer Code Safety, RC-317A, Fails Open, High Pressure Safety Injection Pump B Fails To AUTO Start/RC-606 and FP-601B Fail to Auto Close

1. After the crew secures RCP 2A and on Lead Examiner's cue, initiate Event **Trigger 7**.
2. If the Duty Plant Manager is called, inform the caller that you will make the necessary calls.
3. If Chemistry is called to perform samples acknowledge the request.
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**

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SCENARIO TIMELINE

EVENT	KEY	DESCRIPTION	TRIGGER	DELAY HH:MM:SS	RAMP HH:MM:SS	FINAL
EVENT DESCRIPTION						
1	**SG04G**	**MS LINE IPT-1013C FAIL (0-100%)**	**1**	**00:00:00**	**00:00:00**	**0%**
SG 1 PRESSURE INSTRUMENT SG-IPT-1013C FAILS LOW						
2	**RC21A**	**RCS HOT LEG 1 CONTROL TT 111X FAILS (0-100%)**	**2**	**00:00:00**	**00:00:00**	**0%**
HOT LEG 1 TEMPERATURE FAILS LOW						
3	**RC08C**	**RCP 2A LOWER SEAL FAILURE (0-100%)**	**3**	**00:00:00**	**00:00:00**	**100%**
RCP 2A LOWER SEAL FAILS						
4	**H_H08**	**POWER DEPENDENT INSERTION LIMIT**	**4**	**00:00:00**	**00:00:00**	**FAIL ON**
POWER DEPENDENT INSERTION LIMIT ALARM FAILS ON						
5	**FW35B**	**LP FW HEATER 5B TUBE LEAK (100% = 10% OF TUBES)**	**5**	**00:00:00**	**00:00:30**	**15%**
FW HTR 5B TUBE LEAK FROM CONDENSATE TO HEATER SHELL, RAPID DOWN POWER TO < 72% POWER						
6	**RC09C**	**RCP 2A MIDDLE SEAL FAILURE (0-100%)**	**6**	**00:00:00**	**00:00:00**	**100%**
RCP 2A MIDDLE SEAL FAILS						
7	**RC11A1**	**CODE SAFETY RC-317A FAIL OPEN**	**7**	**00:00:00**	**00:00:00**	**ACTIVE**
PRESSURIZER CODE SAFETY, RC-317A, FAILS OPEN,						
8	**SI02B**	**HPSI PUMP B FAILS TO AUTO START**	**N/A**	**00:00:00**	**00:00:00**	**ACTIVE**
HIGH PRESSURE SAFETY INJECTION PUMP B FAILS TO AUTO START						
9	**RP09D**	**RELAY K202 FAILED, CIAS TRAINN B (CVC/RC/FP)**	**NA**	**00:00:00**	**00:00:00**	**ACTIVE**
RC-606, CONTROL BLEEDOFF CONTAINMENT ISOLATION AND FP-601B, FIRE WATER B CONTAINMENT ISOLATION FAIL TO AUTO CLOSE						

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 3.3.2 Technical Specification 3.3.3.5 Technical Specification 3.3.3.6
2	OP-901-110, Pressurizer Level Control Malfunction, Rev. 6 OP-901-501, PMC or Core Operating Limits Supervisory System Malfunction, Rev. 12
3	OP-901-130, Reactor Coolant Pump Malfunction, Rev. 7
4	OP-500-008, Annunciator Response Procedure, Control Room Panel H, Att. 4.78, Rev. 26 OP-901-501, PMC or Core Operating Limits Supervisory System Malfunction, Rev. 12 Technical Specification 3/4.1.3.6
5	OP-901-221, Secondary System Transient, Rev. 0 OP-901-212, Rapid Plant Power Reduction, Rev. 4
6	OP-901-130, Reactor Coolant Pump Malfunction, Rev. 7 OP-902-000, Standard Post Trip Actions, Rev. 13 OP-902-009, Standard Appendices, Rev. 307, Appendix 1, Diagnostic Flow Chart
7	OP-902-002, Loss of Coolant Accident Recovery Procedure, Rev. 14 OP-902-009, Standard Appendices, Rev. 307, Appendix 2, Figures OP-902-009, Standard Appendices, Rev. 307, Appendix 1, Diagnostic Flow Chart
8	OP-902-000, Standard Post Trip Actions, Rev. 13 OI-038-000, Emergency Operating Procedures Operations Expectation/Guidance, Rev. 5
9	OP-902-000, Standard Post Trip Actions, Rev. 13 OI-038-000, Emergency Operating Procedures Operations Expectation/Guidance, Rev. 5

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Event Description: SG 1 Pressure Instrument SG-IPT-1013C fails low.

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	Recognizes and reports indications of failed channel.
		Alarms:
		• RPS CHANNEL TRIP SG 1 PRESSURE LO (Cabinet K, E-15)
		• SG 1 PRESSURE LO PRETRIP A/C (Cabinet K, F-15)
		• RPS CHANNEL C TROUBLE (Cabinet K, G-18)
		• ESFAS CHANNEL TRIP PRESS SG 2 > SG 1 (Cabinet K, L-16)
		• PRESS SG 2 > SG 1 ESFAS PRETRIP A/C (Cabinet K, M-16)
		Indications:
		• 0 PSIA indicated on SG 1 Pressure Instrument SG-ILI-1013C on CP-8
		• SG 1 Pressure Instruments, SG-ILI-1013A, B, and D reading ~800 PSIA on CP-8
		• SG 1 Press LO Trip and Pretrip Bistable lights illuminated on PPS Channel C ROM on CP-7.
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	6.2.1 Refer to Attachment 11.11, PPS Bistable Bypass Chart to assist in determination of Trip Channels requiring placement in bypass. **Determines the following bistables are affected and need to be bypassed:** • **11 - LO SG-1 PRESS** • **19 - HI SG-1 ΔP** • **20 - HI SG-2 ΔP**
	SRO	Directs BOP to bypass the LO SG 1 Pressure, 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.
	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.

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Event Description: SG 1 Pressure Instrument SG-IPT-1013C fails low.

Time	Position	Applicant's Actions or Behavior
	BOP	11.10.1.3 Open key-locked portion of BCP in desired PPS Channel.
	NOTE	The crew should expect annunciator RPS CABINET CONDITION ABNORMAL (Cabinet L, B-1) to actuate when PPS Channel C door is opened.
	BOP	11.10.1.4 Depress Bypass push buttons for the desired Trip Channels
	NOTE	The crew should expect annunciator RPS BISTABLE BY-PASS (Cabinet K, B-18) to actuate when the first bistable is bypassed in PPS Channel C.
	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: • 3.3.1 action 2 • 3.3.2 actions 13 and 19 • 3.3.3.5 – no actions required • 3.3.3.6 – no actions required

Examiner Note

This event is complete after the BOP bypasses the associated Trip Bistables in PPS Channel C

Or

As directed by the Lead Evaluator

Op Test No.: NRC Scenario # 1 Event # 2 Page 142 of 289

Event Description: Hot Leg 1 Temperature fails low affecting PZR level setpoint

Time	Position	Applicant's Actions or Behavior
	ATC	Recognize and report indications of failed instrument.
		Alarms:
		• PRESSURIZER LEVEL HI/LO (Cabinet H, B-1)
		• PRESSURIZER LEVEL HI-HI (Cabinet H, A-1)
		• LETDOWN HX OUTLET PRESSURE HI (Cabinet G, B-1)
		• REACTOR COOLANT TAVG/TREF LO (Cabinet H, L-1)
		Indications
		• Mismatch between Charging (CVC-IFI-0212) AND Letdown (CVC-IFI-0202) flow indications. Letdown rises to maximum, with 1 charging pump running.
		• Deviation between actual level AND programmed level as indicated on Pressurizer level recorder (RC-ILR-0110). Pressurizer level is slowly lowering toward setpoint.
		• Deviation of setpoint on Pressurizer level controller (RC-ILIC-0110) from programmed level.
		• Pressurizer Backup Heaters energize.
		• Hot Leg Loop 1 RC-ITI-0111 reads < 525 °F on CP-2.
	SRO	May direct the ATC to take manual control of Pressurizer Level Controller, RC-ILIC-0110 and match Letdown flow and Charging flow prior to entering procedure.
	SRO	Enter and direct the implementation of OP-901-110, Pressurizer Level Control Malfunction.
OP-901-110, E0 - General Actions		
	N/A	1. Stop Turbine load changes.
	N/A	2. IF malfunction is due to failure of Letdown Flow Control valve, THEN GO TO OP-901-112, CHARGING/LETDOWN MALFUNCTION.
	N/A	3. IF malfunction is due to failure of Pressurizer Level Control Channel (incorrect readings on EITHER RC-ILI-0110X OR RC-ILI-0110Y), THEN GO TO Subsection E_1, Pressurizer Level Control Channel Malfunction.
	SRO	4. IF malfunction is due to failure of Pressurizer Level Setpoint (RC-ILIC-0110), THEN GO TO Subsection E_2, Pressurizer Level Setpoint Malfunction.

Op Test No.: NRC Scenario # 1 Event # 2 Page 143 of 289

Event Description: Hot Leg 1 Temperature fails low affecting PZR level setpoint

Time	Position	Applicant's Actions or Behavior
OP-901-110, E_2 - Pressurizer Level Setpoint Malfunction		
	ATC	1. Place Pressurizer Level Controller (RC-ILIC-0110) in MAN AND adjust OUTPUT to slowly adjust letdown flow to restore Pressurizer level.
	ATC	2. Verify normal indications on ALL Safety Measurement Channel Hot Leg AND Cold Leg temperature indicators.
	ATC	3. Determine affected channel(s) by checking Reactor Regulating System (RRS) Tavg recorders (RC-ITR-0111 AND RC-ITR-0121).
CAUTION **PRIOR TO SECURING ALL CHARGING PUMPS ENSURE LETDOWN IS ISOLATED. LETDOWN STOP VALVE (CVC-101) WILL AUTOMATICALLY CLOSE ON HIGH LETDOWN TEMPERATURE.**		
	ATC	4. Start OR stop Charging Pumps as necessary to maintain Pressurizer level above minimum level for operation in accordance with Attachment 1, Pressurizer Level Versus Tave Curve.
	N/A	5. IF unable to control Pressurizer level with Letdown in service, THEN perform the following: 5.1 Close Letdown Stop valve (CVC-101). 5.2 Prior to starting Charging Pump(s), complete Attachment 2, Charging Nozzle Thermal Cycling Evaluation Data. 5.3 Cycle Charging Pump(s) to maintain Pressurizer level above minimum level for operation in accordance with Attachment 1, Pressurizer Level Versus Tave Curve.
	N/A	6. IF malfunction is due to failure of Letdown Flow Controller (RC-IHIC-0110), THEN perform the following: 6.1 Place Letdown Flow Controller (RC-IHIC-0110) in MAN. 6.2 Maintain Pressurizer level above minimum level for operation in accordance with Attachment 1, Pressurizer Level Versus Tave Curve.
	N/A	7. IF backup Charging Pumps have started, THEN secure unnecessary Charging Pumps.
	ATC	8. IF Pressurizer Backup Heaters have energized, THEN place unnecessary BACKUP HEATER BANKS to OFF.

Op Test No.: NRC Scenario # 1 Event # 2 Page 144 of 289

Event Description: Hot Leg 1 Temperature fails low affecting PZR level setpoint

Time	Position	Applicant's Actions or Behavior
		NOTE (1) Selecting the non-faulted channel may cause automatic actions to occur if actual level is not at program level. (2) If a Tc or Th instrument fails, refer to OP-901-501, PMC or Core Operating Limit Supervisory System Malfunction, E2, Loss of COLSS (PMC Available).
	ATC	9. Check Reactor Regulating System (RRS) Hot Leg indicators (RC-ITI-0111-X AND RC-ITI-0121-X) for abnormal readings AND perform the following:
	BOP	9.1 IF RCS Temperature Loop 1 Hot Leg (RC-ITI-0111-X) indicates abnormally high OR low, THEN select LOOP 2 for TAVE LOOP SELECTOR on BOTH RRS local cabinets (CP-12A AND CP-12B).
	N/A	9.2 IF RCS Temperature Loop 2 Hot Leg (RC-ITI-0121-X) indicates abnormally high OR low, THEN select LOOP 1 for TAVE LOOP SELECTOR on BOTH RRS local cabinets (CP-12A AND CP-12B).
	N/A	10. Check Reactor Regulating System (RRS) Cold Leg indicators (RC-ITI-0111-Y AND RC-ITI-0121-Y) for abnormal readings AND perform the following: 10.1 IF RCS Temperature Loop 1 Cold Leg (RC-ITI-0111-Y) indicates abnormally high OR low, THEN perform EITHER of the following: Select presently non-selected position (ALT OR NORM) on TCOLD LOOP 1 selector switch located behind CP-2, Reactor Control (Preferred Method). OR Select LOOP 2 on BOTH RRS local cabinets (CP-12A AND CP-12B) 10.2 IF RCS Temperature Loop 2 Cold Leg (RC-ITI-0121-Y) indicates abnormally high OR low, THEN perform EITHER of the following: Select presently non-selected position (ALT OR NORM) on TCOLD LOOP 2 selector switch located behind CP-2, Reactor Control (Preferred Method). OR Select LOOP 1 on BOTH RRS local cabinets (CP-12A AND CP-12B).
	ATC	11. Verify setpoint on Pressurizer Level Controller (RC-ILIC-0110) returns to program setpoint in accordance with Attachment 1, Pressurizer Level Versus Tave Curve AND perform the following: 11.1 Slowly adjust Letdown Flow Controller (RC-IHIC-0110) OUTPUT to match PROCESS AND place in AUTO.

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Event Description: Hot Leg 1 Temperature fails low affecting PZR level setpoint

Time	Position	Applicant's Actions or Behavior
	N/A	11.2 Place desired backup Charging Pumps in AUTO.
	ATC	11.3 Place Pressurizer Level Controller (RC-ILIC-0110) in AUTO AND verify Pressurizer level being controlled at setpoint.
	ATC	11.4 Place desired Pressurizer BACKUP HEATER BANKS in AUTO.
	N/A	11.5 IF necessary, THEN reset BOTH PROPORTIONAL HEATER BANKS.
	N/A	12. IF setpoints from BOTH Reactor Regulating Systems are faulty, THEN place CP-31 switches 1 AND 2 on Cardframe 1, Slot 36, in DEFEAT AND perform the following: 12.2 Check RTGB light illuminates AND RRS light extinguishes on CP-2. 12.3 Adjust setpoint on Pressurizer Level Controller (RC-ILIC-0110) in accordance with Attachment 1, Pressurizer Level Versus Tave Curve. 12.4 Slowly adjust Letdown Flow Controller (RC-IHIC-0110) OUTPUT to match PROCESS AND place in AUTO. 12.5 Place desired backup Charging Pumps in AUTO. 12.6 Place Pressurizer Level Controller (RC-ILIC-0110) in AUTO AND verify Pressurizer level being controlled at setpoint. 12.7 Place desired Pressurizer BACKUP HEATER BANKS in AUTO. 12.8 IF necessary, THEN reset BOTH PROPORTIONAL HEATER BANKS.

Examiner Note

This event is complete when Pressurizer Level Controller is in AUTO

Or

As directed by the Lead Evaluator

Op Test No.: 1 Scenario # 1 Event # 3 Page 146 of 289

Event Description: RCP 2A Lower Seal fails

Time	Position	Applicant's Actions or Behavior
	ATC	Recognizes and reports indications of failed lower seal on RCP 2A
		Alarms:
		• RCP 2A Upper Seal Pressure (PMC)
		• RCP 2A Middle Seal Pressure (PMC)
		• RCP 2A CBO Flow (PMC)
		Indications:
		• RCP Controlled Bleedoff temperature slowly rising on CP-2
		• RCP 2A seal pressures outside of normal parameters on CP-2 and PMC
	SRO	Enters and Implements OP-901-130, Reactor Coolant Pump Malfunction
OP-901-130, Reactor Coolant Pump Malfunction, Section 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, Section 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): • 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.		
	SRO	1. Inform System Engineer of Reactor Coolant Pump Seal failure.

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Event Description: RCP 2A Lower Seal fails				

Time	Position	Applicant's Actions or Behavior
		CAUTION (1) CCW TEMPERATURES OF < 75°F COULD LEAD TO ESSENTIAL CHILLER TRIPS ON EVAPORATOR LOW REFRIGERANT PRESSURE. (2) CCW TEMPERATURE SHOULD BE CHANGED AT A RATE OF 10°F IN ONE HOUR TO PREVENT DEGREDATION 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: • 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.
		Examiner Note **This event is complete after Component Cooling Water Temperature is lowered** **OR** **As directed by the Lead Evaluator**

Op Test No.: NRC Scenario # 1 Event # 4 Page 148 of 289

Event Description: Power Dependent Insertion Limit Alarm fails ON

Time	Position	Applicant's Actions or Behavior
	ATC	Recognize and report indications of failed annunciator
		Alarms
		• POWER DEPENDENT INSERTION LIMIT (Cabinet H, H-8)
		Indications
		• No change in actual or indicated Rod Position (CEAC CRT, CEACs, CPCs)
		• Reactor Power stable (CP-2, CP-7, PMC)
		• PREPOWER DEPENDENT INSERTION LIMIT ALARM (Cabinet H, H-9) is not actuated
	SRO/ATC	Enter and direct the implementation of OP-500-008, Attachment 4.78, Power Dependent Insertion Limit.
OP-500-008, Annunciator Response Procedure Cabinet H, Att. 4.78, Power Dependent Insertion Limit		
	N/A	1. One or more CEA Regulating subgroups or Group P inserted below the Transient Insertion Limit 1.1 Refer to Technical Specification. 3.1.3.6.
NOTE Technical Specification 4.1.3.6 requires CEA group positions verification every 4 hours.		
	SRO	2. PDIL alarm inoperable 2.1 Refer to OP-901-501, PMC or Core Operating Limit Supervisory System Inoperable.
	SRO	2.2 Contact Electrical Maintenance.
	N/A	3. PMC/MUX hardware or software problem 3.1 Refer to OP-901-501, PMC or Core Operating Limit Supervisory System Inoperable. 3.2 Direct CS&S Maintenance Group to repair failed equipment.

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Event Description: Power Dependent Insertion Limit Alarm fails ON

Time	Position	Applicant's Actions or Behavior
	N/A	4. Possible dilution occurring 4.1 Inform SM/CRS. 4.2 Secure any dilution in progress. 4.3 Refer to OP-901-104, Inadvertent Positive Reactivity Addition.
	N/A	5. Failed instrument 5.1 Direct PMI to repair failed equipment.
	N/A	6. CEA/CEDMCS malfunction 6.1 Go to OP-901-102, CEA or CEMCS malfunction.
	SRO	Reviews Technical Specification 3.1.3.6 and 4.1.3.6 or OP-901-501 Section E2, Step 4 and determines Regulating Group and Group P CEA position must be verified every 4 hours and initiates a Technical Specification Addendum Log per OP-903-001 or OP-901-501, Attachment 4, Transient Insertion Limit Four-Hour Log.
	NOTE	Delete malfunction and report as Electrical Maintenance that the annunciator card associated with the Power Dependent Insertion Limit alarm was inoperable and has been replaced.

Examiner Note

This event is complete when the SRO determines TS Requirements

Or

As directed by the Lead Evaluator.

Op Test No.: NRC Scenario # 1 Event # 5 Page 150 of 289

Event Description: FW Heater 5B tube leak from Condensate to Heater Shell/ OP-901-212, Rapid Plant Down Power (to 72 %)

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize and report indications of isolation of 5B and 6B Feedwater Heaters.
		Alarms
		• Heater 5B Level Hi-Hi (Cabinet A, B-9)
		• Heater 5B Level Hi/Lo (Cabinet A, C-9)
		• Heater 5B Alt Drain Vlv Open (Cabinet A, D-9)
		• Numerous other heater level related alarms actuate as a result of cascading heater drains being affected
		Indications
		• Loss of 5B and 6B LP Feedwater Heater by closure of the following valves on CP-33: o CD-175B, Low Pressure Heater 6B Inlet Isolation o CD-189B, Low Pressure Heater 5B Outlet Isolation
	SRO	Enters and implements OP-901-221, Secondary System Transient.
OP-901-221, Secondary System Transient, Section E0, General Actions		
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.
	N/A	3. If an Atmospheric Dump Valve fails or begins to fail Open, then place the respective controller to MANUAL with minimum output.
	N/A	4. If a Steam Bypass Valve fails or begins to fail Open, then perform any of the following (in preferred order) to close the valve. • Place the respective Valve Mode Select switch to OFF. • Place the respective valve controller to MANUAL with minimum output.

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Event Description: FW Heater 5B tube leak from Condensate to Heater Shell/ OP-901-212, Rapid Plant Down Power (to 72 %)

Time	Position	Applicant's Actions or Behavior
	N/A	5. If an uncontrollable RCS cooldown exists, then perform the following: 5.1 Manually trip Reactor. 5.2 Commence Emergency Boration in accordance with OP-901-103, Emergency Boration. 5.3 If Steam Generator Pressures continue to lower following the trip, then initiate Main Steam Isolation (MSIS). 5.4 Go to OP-902-000, Standard Post Trip Actions.

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.

Transient	Initial Load Reduction	Rate
Two 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 ≥ 40%. Reference Attachment 3, COLSS Maneuvering Power Indications, for all other power levels.

Reactor Power	UFM in service	UFM not in service
≥ 95%	MSBSRAW (PMC PID C24631)	
< 95% and ≥ 40%	USBSRAW (PMC PID C24629)	FWBSRAW (PMC PID C24630)

	BOP	6. If Main Turbine is available, then adjust Turbine load as necessary to maintain the following: • Reactor Power ≤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

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Event Description: FW Heater 5B tube leak from Condensate to Heater Shell/ OP-901-212, Rapid Plant Down Power (to 72 %)

Time	Position	Applicant's Actions or Behavior
	N/A	7. If needed, then concurrently perform OP-901-212, Rapid Plant Down Power, until a power level is reached in which the plant can be stabilized.
	SRO	8. If a loss of Feedwater preheating occurs, then go to E_1, Loss of Feedwater Preheating.
OP-901-221, Secondary System Transient, Section E1, Loss of Feedwater Preheating		
	ATC	1. Verify the following: 1.1 Pressurizer Pressure Control System maintaining or restoring Pressurizer pressure to 2250 PSIA.
	ATC	1.2 Pressurizer Level Control System maintaining or restoring Pressurizer level to program level.
	BOP	1.3 Steam Generator levels being maintained or restored to 50% to 70% Narrow Range level.
	BOP	1.4 Steam Bypass Control System responding to maintain Steam Generator pressure.
		NOTE If the following valve(s) close on a Hi Hi Heater level, then the respective valve will stop movement when the associated Hi Hi Heater Level condition clears. Thereafter the valve(s) may be re-opened with SM/CRS permission. ES-109 — ES to HP Heaters #1 Isolation — Heater 1A(1B)(1C) Level Hi-Hi [Cabinet A G-2 (G-3) (G-4)] ES-205 — ES TO #2 Heaters Isolation — Heater 2A(2B)(2C) Level Hi-Hi [Cabinet A L-2 (L-3) (L-4)]
	SRO	2. If a Feedwater Heater has isolated, then refer to Attachment 1, and concurrently perform OP-901-212, Rapid Plant Down Power, until Generator Gross Load is less than the Power Limitation listed on Attachment 1, Feedwater Heater Power Limitations**. (Determines from Attachment 1 that power must be reduced to 893 MWe (72%) for loss of one LP Heater String)**
	SRO	Enters and implements OP-901-212, Rapid Plant Down Power, concurrently with OP-901-221.

Op Test No.: NRC	Scenario # 1	Event # 5	Page 153	of 289
Event Description:	FW Heater 5B tube leak from Condensate to Heater Shell/ OP-901-212, Rapid Plant Down Power (to 72 %)			

Time	Position	Applicant's Actions or Behavior
		OP-901-212, Rapid Plant Down Power
		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.
	ATC	1. Begin RCS Boration by one of the following methods:
	N/A	1.1 0 up to 170 EFPD: 1.1.1 Direct Boration Or 1.1.2 Emergency Boration using two Charging Pumps
	N/A	1.2 171 up to 340 EFPD: 1.2.1 Direct Boration Or 1.2.2. Emergency Boration using one Charging Pump
	SRO/ATC	1.3 ≥341 EFPD: 1.3.1 Direct Boration Or 1.3.2 Borate from the RWSP using one Charging Pump as follows: 1.3.2.1 Open RWSP to Charging Pumps Suction Isolation, CVC-507. 1.3.2.2 Close Volume Control Tank Outlet Isolation, CVC-183.

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Event Description: FW Heater 5B tube leak from Condensate to Heater Shell/ OP-901-212, Rapid Plant Down Power (to 72 %)

Time	Position	Applicant's Actions or Behavior
OP-002-005, Chemical and Volume Control System, Section 6.7, Direct Boration		
		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.
		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.

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Event Description: FW Heater 5B tube leak from Condensate to Heater Shell/ OP-901-212, Rapid Plant Down Power (to 72 %)

Time	Position	Applicant's Actions or Behavior
		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, then 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.
	N/A	6.7.10 If automatic control of Boric Acid flow is desired, then 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 or Open.
	ATC	6.7.12 Observe Boric Acid flow rate for proper indication.
	ATC	6.7.13 When Boric Acid Makeup Batch Counter has counted down to desired value, then 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.**
		NOTE Step 6.7.14 may be repeated as necessary to achieve desired total boron addition for plant conditions.

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Event Description: FW Heater 5B tube leak from Condensate to Heater Shell/ OP-901-212, Rapid Plant Down Power (to 72 %)

Time	Position	Applicant's Actions or Behavior
	ATC	6.7.14 If additional boric acid addition is required and with SM/CRS permission, then 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 or Open. 6.7.14.3 Observe Boric Acid flow rate for proper indication. 6.7.14.4 When Boric Acid Makeup Batch Counter has counted down to desired value, then 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 both Boric Acid Flow controller, BAM-IFIC-0210Y, output and 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.
	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 Down Power		
NOTE To prevent Pressurizer heater cutout, avoid operating with Pressurizer pressure near the heater cutout pressure of 2270 PSIA while on Boron Equalization. **CR-WF3-2012-01861]**		
	ATC	2. Perform Boron Equalization as follows: 2.1 Place available Pressurizer Pressure Backup Heater Control Switches to ON.
	ATC	2.2 Reduce Pressurizer Spray Valve Controller (RC-IHIC-0100) setpoint potentiometer to establish spray flow and maintain RCS pressure 2250 PSIA (2175 – 2265).

Op Test No.: NRC	Scenario # 1	Event # 5	Page 157	of 289
Event Description:	FW Heater 5B tube leak from Condensate to Heater Shell/ OP-901-212, Rapid Plant Down Power (to 72 %)			

Time	Position	Applicant's Actions or Behavior
		CAUTION 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 9.9, Axial Shape Control Guidelines.
	CREW	4. Notify the Load Dispatcher (Woodlands) that a rapid power reduction is in progress.
	CREW	5. Announce to Station Personnel over the Plant Paging System that a rapid plant power reduction is in progress.
	ATC/BOP	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.
	BOP	7.2 Set selected rate in Display Demand Window.
	BOP	7.3 Depress ENTER pushbutton.
	BOP	7.4 Depress REFERENCE pushbutton.
	BOP	7.5 Set desired load in Reference Demand Window.
	BOP	7.6 Depress ENTER pushbutton.
	BOP	7.7 Depress GO pushbutton.

Op Test No.: NRC	Scenario # 1	Event # 5	Page 158	of 289
Event Description:	FW Heater 5B tube leak from Condensate to Heater Shell/ OP-901-212, Rapid Plant Down Power (to 72 %)			

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.
		8. When Reactor Power consistently indicates less than 98% power, as indicated on PMC PID C24631 [MAIN STEAM RAW POWER (MSBSRAW)], or an alternate point provided by Reactor Engineering, then verify the value of C24648 [BSCAL SMOOTHING VAL. APPLD (DUMOUT17)] automatically changes to 1.
		9. If C24648 does not automatically change to 1, then inform Reactor Engineering and 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.
		Examiner Note **After the reactivity manipulation is satisfied, direct the Booth Operator to initiate Trigger 6.**
		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.
		11. When Condensate flow is <18,000 gpm, verify Gland Steam Condenser Bypass, CD-154, Closed (PMC PID D02404).
		12. Monitor Condensate Polisher differential pressure and remove Polishers from service to maintain system pressure in accordance with OP-003-031, Condensate Polisher/Backwash Treatment.
		13. When Reactor Power is approximately 70% or Heater Drain Pump flow is unstable, then remove Heater Drain Pumps from service by taking pump control switches to Stop.
		Examiner Note **This event is complete after the Reactivity Manipulation is satisfied** **OR** **At Lead Examiner's Discretion**

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Event Description: RCP 2A Middle Seal fails

Time	Position	Applicant's Actions or Behavior
	ATC	Recognizes and reports indications of failed lower seal on RCP 2A
		Alarms:
		• NONE
		Indications:
		• RCP Controlled Bleedoff temperature slowly rising on CP-2
		• RCP 2A Middle and Upper Seal pressures indicate approximately 2235 psig on CP-2 and PMC
	SRO	Returns to OP-901-130, Reactor Coolant Pump Malfunction, or orders a manual reactor trip based on previous review of the procedure.
OP-901-130, Reactor Coolant Pump Malfunction, Section E1, Seal Failure		
	ATC	3. IF TWO OR MORE seals fail in rapid succession, (within 12 hours) THEN perform the following: 3.1 Trip the Reactor
	ATC	3.2 Secure affected Reactor Coolant Pump.
	CREW	3.3 GO TO OP-902-000, STANDARD POST TRIP ACTIONS.
	SRO	Directs ATC and BOP to carry out Standard Post trip Actions.
Examiner Note **This event is complete after the Reactor is tripped and RCP 2A is secured** **OR** **As directed by the Lead Evaluator**		

Op Test No.: NRC Scenario # 1 Event # 7/8/9 Page 160 of 289

Event Description: Pressurizer Code Safety, RC-317A fails open, High Pressure Safety Injection Pump B fails to auto start on SIAS, RC-606 and FP-601B Fail to Auto Close

Time	Position	Applicant's Actions or Behavior
	ATC	Recognize and report indications of Loss of Coolant Accident.
		Alarms:
		• PRESSURIZER LEVEL HI/LO (Cabinet H, B-1)
		• PRESSURIZER LEVEL HI-HI (Cabinet H, A-1)
		• LETDOWN FLOW HI/LO (Cabinet G, C-1)
		• QUENCH TANK LEVEL HI/LO
		• QUENCH TANK PRESSURE HI
		Indications
		• Mismatch between Charging (CVC-IFI-0212) AND Letdown (CVC-IFI-0202) flow indications. Letdown rises to maximum, with 1 charging pump running
		• Deviation between actual level AND programmed level as indicated on Pressurizer level recorder (RC-ILR-0110). Pressurizer level slowly lowering toward setpoint
		• Deviation of setpoint on Pressurizer level controller (RC-ILIC-0110) from programmed level
		• Pressurizer Backup Heaters energize
OP-902-000, Standard Post Trip Actions		
	ATC	1. Determine **Reactivity Control** acceptance criteria are met: a. Check reactor power is dropping. b. Check startup rate is negative. c. Check less than **TWO** CEAs are **NOT** fully inserted.
	BOP	2. Determine **Maintenance of Vital Auxiliaries** acceptance criteria are met: a. Check the Main Turbine is tripped: • Governor valves closed • Throttle valves closed
	BOP	b. Check the Main Generator is tripped: • GENERATOR BREAKER A tripped • GENERATOR BREAKER B tripped • EXCITER FIELD BREAKER tripped

Op Test No.: NRC Scenario # 1 Event # 7/8/9 Page 161 of 289

Event Description: Pressurizer Code Safety, RC-317A fails open, High Pressure Safety Injection Pump B fails to auto start on SIAS, RC-606 and FP-601B Fail to Auto Close

Time	Position	Applicant's Actions or Behavior
	BOP	c. Check station loads are energized from offsite electrical power as follows: **Train A** • 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 **Train B** • 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. Determine **RCS Inventory Control** acceptance criteria are met: a. Check that **BOTH** the following conditions exist: • Pressurizer level is 7% to 60% • Pressurizer level is trending to 33% to 60% b. Check RCS subcooling is greater than or equal to 28ºF.
CRITICAL TASK **ESTABLISH RCS INVENTORY CONTROL** This task is satisfied by starting HPSI Pump B to establish RCS inventory control before exiting the step to verify SIAS Actuation flow in OP-902-002. This task becomes applicable following the initiation of Safety Injection Actuation.		
	ATC	4. Determine **RCS Pressure Control** acceptance criteria are met by checking that **BOTH** of the following conditions exist: • 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 # 7/8/9 Page 162 of 289

Event Description: Pressurizer Code Safety, RC-317A fails open, High Pressure Safety Injection Pump B fails to auto start on SIAS, RC-606 and FP-601B Fail to Auto Close

Time	Position	Applicant's Actions or Behavior
		4.2 **IF** pressurizer pressure is less than 1684 psia, **THEN** verify the following have initiated. • SIAS • CIAS
	BOP	Following initiation of Safety Injection Actuation Signal (auto or manual) start High Pressure Safety Injection Pump B. • Momentarily place HPSI Pump B C/S to START.
	ATC	4.3 **IF** pressurizer pressure is less than 1621 psia, **THEN** verify no more than two RCPs are operating
CRITICAL TASK **TRIP ANY RCP NOT SATISFYING RCP OPERATING LIMITS.** This task is satisfied by securing all RCPs This task becomes applicable after either running Reactor Coolant Pump Vibration alarms actuate OR within 3 of Containment Spray actuation. The time requirement of 3 minutes is based on the Reactor Coolant Pump operating limit of 3 minutes without CCW cooling.		
	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.
	ATC	5. Determine **Core Heat Removal** acceptance criteria are met: a. Check at least one RCP is operating. b. Check operating loop ΔT is less than 13ºF. c. Check RCS subcooling is greater than or equal to 28ºF.
	Note	The above step can be skipped if RCPs are secured.
	BOP	6. Determine **RCS Heat Removal** acceptance criteria are met: a. Check that at least one steam generator has **BOTH** of the following: • Steam generator level is 5% to 80% NR • Main Feedwater is available to restore level within 50%-70% NR.
	ATC	b. Check RCS TC is 530 ºF to 550 ºF
	BOP	c. Check steam generator pressure is 885 psia to 1040 psia.

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Event Description: Pressurizer Code Safety, RC-317A fails open, High Pressure Safety Injection Pump B fails to auto start on SIAS, RC-606 and FP-601B Fail to Auto Close

Time	Position	Applicant's Actions or Behavior
	BOP	d. Check Feedwater Control in Reactor Trip Override: • 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
	Note	If MSIS has occurred, the Feedwater Regulating valves will be closed and the Feedwater pumps will be coasting due to no steam supply.
	BOP	e. Reset moisture separator reheaters, and check the temperature control valves closed.
	ATC	7. Determine **Containment Isolation** acceptance criteria are met: a. Check containment pressure is less than 16.4 psia. b. Check NO containment area radiation monitor alarms OR unexplained rise in activity. c. Check NO steam plant activity monitor alarms OR unexplained rise in activity.
		a1. **IF** containment pressure is greater than or equal to 17.1 psia, **THEN** verify the following: • CIAS is initiated • SIAS is initiated • MSIS is initiated
	ATC	Closes RC-606, Controlled Bleedoff Inside Containment Isolation
	BOP	Closes FP-601B, Firewater to Containment Isolation
	BOP	8 Determine **Containment Temperature and Pressure Control** acceptance criteria are met: a. Check containment temperature is less than or equal to 120ºF. b. Check containment pressure is less than 16.4 psia.
	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.

Op Test No.: NRC Scenario # 1 Event # 7/8/9 Page 164 of 289

Event Description: Pressurizer Code Safety, RC-317A fails open, High Pressure Safety Injection Pump B fails to auto start on SIAS, RC-606 and FP-601B Fail to Auto Close

Time	Position	Applicant's Actions or Behavior
		CRITICAL TASK **TRIP ANY RCP NOT SATISFYING RCP OPERATING LIMITS.** This task is satisfied by securing all RCPs This task becomes applicable after either running Reactor Coolant Pump Vibration alarms actuate OR within 3 of Containment Spray actuation. The time requirement of 3 minutes is based on the Reactor Coolant Pump operating limit of 3 minutes without CCW cooling.
	ATC/BOP	8.3 **IF** containment pressure is greater than or equal to 17.7 psia, **THEN** verify **ALL** of the following: • CSAS is initiated • **ALL** available containment spray pumps are delivering flow greater than 1750 gpm • **ALL** RCPs are secured
	Note	The Reactor Coolant Pumps may have already been 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.
	SRO	10. **IF ANY** safety function acceptance criteria are **NOT** met, **OR ANY** contingency action was taken, **THEN** GO TO Appendix 1, "Diagnostic Flowchart. Proper use of chart will result in use of OP-902-002, Loss of Coolant Accident Recovery
	SRO	Enter and direct the implementation of OP-902-002, Loss of Coolant Accident Recovery.
	BOP	Secure AH-12 A or B on SRO direction after initiation of SIAS at CP-18.
	CREW	When Containment Temperature rises above 200 F, update crew on need to use bracketed parameters due to harsh environment in Containment.
OP-902-002, Loss of Coolant Accident Recovery		
	SRO	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.

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Event Description: Pressurizer Code Safety, RC-317A fails open, High Pressure Safety Injection Pump B fails to auto start on SIAS, RC-606 and FP-601B Fail to Auto Close

Time	Position	Applicant's Actions or Behavior
	CREW	2. Announce a Loss of Coolant Accident is in progress using the plant page.
	SRO	3. Advise the Shift Manager to REFER TO EP-001-001, "Recognition & Classification of Emergency Condition" and implement the Emergency Plan.
	N/A	4. **IF** power has been interrupted to either 3A or 3B safety buses, **THEN** perform Appendix 20, "Operation of DCT Sump Pumps".
	SRO	5. REFER TO Section 6.0, "Placekeeper" and record the time of the reactor trip.
	Note	The CRS will typically perform a brief at this point in the EOP. Brief should not be held until RCPs and HPSI Pump B are addressed.
	SRO	During brief in OP-902-002, should discuss necessary strategy of using Steam Generators to cool RCS.
	SRO/ATC	6. **IF** pressurizer pressure is less than 1684 psia, **THEN** check SIAS has initiated.
	SRO/BOP	7. **IF** SIAS has initiated, **THEN**: a Verify safety injection pumps have started. b. Check safety injection flow is within the following: • Appendix 2-E, "HPSI Flow Curve" • Appendix 2-F, "LPSI Flow Curve" c. Verify **ALL** available charging pumps are operating.
	ATC	8. **IF** pressurize r pressure is less than 1621 psia, **AND** SIAS is actuated, **THEN**: 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.
	ATC	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 382ºF **[384ºF]**, **THEN** verify no more than two RCPs are operating.

Op Test No.: NRC	Scenario # 1	Event # 7/8/9	Page 166	of 289
Event Description:	Pressurizer Code Safety, RC-317A fails open, High Pressure Safety Injection Pump B fails to auto start on SIAS, RC-606 and FP-601B Fail to Auto Close			

Time	Position	Applicant's Actions or Behavior
	BOP	10. Check a CCW pump is operating for each energized 4.16 KV safety bus.
	BOP/ATC	11. Isolate the LOCA: a. Verify the following letdown containment isolation valves are closed: • CVC 101, LETDOWN STOP VALVE • CVC 103, LETDOWN ISOL VALVE • CVC 109, LETDOWN ISOL VALVE b. Verify the following RCS sampling containment isolation valves are closed: **Train A** • PSL 107, HOT LEG • PSL 204, PZR SURGE • PSL 304, PZR STEAM **Train B** • PSL 105, HOT LEG • PSL 203, PZR SURGE • PSL 303, PZR ISOL VLV c. Check the following CCW Radiation Monitor AB indications: • Hi Alarm clear • No abnormal rise in radiation monitor reading.
	N/A	12. **IF** LOCA is outside of containment as indicated by **ANY** of the following: • Auxiliary building radiation monitor alarm • Unexplained rise in auxiliary building sump levels • Rising waste tank level **THEN**: a. Locate and isolate the leak. b. REFER TO Appendix 4-D, "CIAS Automatic Actions" and verify CIAS is actuated.

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Event Description: Pressurizer Code Safety, RC-317A fails open, High Pressure Safety Injection Pump B fails to auto start on SIAS, RC-606 and FP-601B Fail to Auto Close

Time	Position	Applicant's Actions or Behavior
	BOP	13. Place Hydrogen Analyzers in service by performing the following: **Train A** 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 PUMPS indicate ON. **Train B** 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 PUMPS indicate ON.
	ATC/BOP	14. **IF ANY** of the following conditions exist: • Containment pressure is greater than 17.1 psia • Containment area radiation monitors greater than the Hi Alarm **THEN**: a. Verify CIAS is initiated. b. Verify **ALL** available containment fan coolers operating in emergency mode
	SRO	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.
	ATC/BOP	15. **IF** containment pressure is greater than or equal to 17.7 psia, **THEN**: a. Verify CSAS is initiated. b. Verify **ALL** operating containment spray pumps are delivering flow greater than 1750 gpm.
	N/A	16. **IF** Condenser Vacuum is less than 14" Hg, **THEN**: a. Verify MSIVs are closed. b. Verify following steam generator blowdown isolation valves are closed: • 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)

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Event Description: Pressurizer Code Safety, RC-317A fails open, High Pressure Safety Injection Pump B fails to auto start on SIAS, RC-606 and FP-601B Fail to Auto Close

Time	Position	Applicant's Actions or Behavior
	BOP	17. Verify instrument air is available: a. Check **BOTH** of the following are operating: • TCW pump • CW pump b. Check instrument air pressure is greater than 95 psig. c. Check IA 909, CNTMT ISOLATION INSTRUMENT AIR valve is open.
	N/A	18. IF LOCA Condition Isolated GO TO step 53.

NOTE

The following RCS cooldown rates apply:
• Natural Circulation: RCS < 50°F/hr Pressurizer < 100°F/hr
• Forced Circulation: RCS < 100°F/hr Pressurizer < 200°F/hr

NOTE

The following forms may be required during the cooldown and depressurization:
• Appendix 3-A, "Pressurizer/RCS Cooldown Log"
• OP-010-004 Attachment 9.9, "Design Cycle Transient Logsheet"

	N/A	19. Cooldown the RCS to less than 350ºF TH or CET temperature using the steam bypass control valves.
	BOP/ATC	19.1 Cooldown the RCS to less than 350ºF TH or CET temperature using the atmospheric dump valves.

Examiner Note
This event is complete when an RCS cooldown has been initiated
Or
As directed by the Lead Evaluator

Facility: Waterford 3 Scenario No.: 2 Op Test No.: 1

Examiners: _____ Operators: _____

Initial Conditions: Reactor power is 60%, MOC

Turnover:

Protected Train is B, AB Bus is aligned to Train B, HPSI Pump A is OOS

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R – ATC N – BOP N – SRO	Lower power to 50% in accordance with OP-010-005, Plant Shutdown.
2	CV30A2	C – ATC C – SRO	Letdown Flow Control Valve, CVC-113A, fails closed requiring entry into OP-901-112, Charging or Letdown Malfunction.
3	CC01A	C – BOP C – SRO TS – SRO	Component Cooling Water Pump A trips requiring entry into OP-901-510, Component Cooling Water System Malfunction.
4	NI01H	I – BOP I – SRO TS – SRO	Channel D Excore Nuclear Instrument Safety Channel, ENI-IJI-0001D, middle detector fails low.
5	MS13A	M – All	Main Steam line break outside Containment, SG 1, OP-902-004, Excess Steam Demand Recovery. (Critical Task 1 and 2)
6	RP08G	C-BOP C-SRO	Main Feedwater Isolation Valve Steam Generator 1, FW-184A fails to AUTO close on MSIS.
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 ATC to secure all running Reactor Coolant Pumps. (Critical Task 3)

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

The crew assumes the shift at ~ 60% power with instructions to lower power to ~ 50% in accordance with OP-010-005, Plant Shutdown, and remove Main Feedwater Pump B from service. The plant is at 60% due to rising vibration on Main Feedwater Pump B at > 80% power. The System Engineer reports pump vibration monitoring indicates a possible impeller imbalance. High Pressure Safety Injection Pump A is out of service and danger tagged, due to high pump bearing vibration during its quarterly IST. Since it occurred just prior to shift turnover and the AB bus is aligned to Train B, High Pressure Safety Injection Pump AB has not yet been aligned for service. The Work Management Center is working in that direction.

After the reactivity manipulation is satisfied, the in-service letdown flow control valve, CVC-113A, fails closed. The SRO should enter OP-901-112, Charging or Letdown Malfunction and implement Section E2, Letdown Malfunction, and place the backup flow control valve, CVC-113B, in-service.

After the backup letdown flow control valve has been placed in service, Component Cooling Water Pump A trips on overcurrent. The SRO should enter OP-901-510, Component Cooling Water System Malfunction, and direct the start of Component Cooling Water Pump AB to replace Component Cooling Water Pump A. The SRO should enter Technical Specification 3.7.3, TRM 3.7.3, and cascading Technical Specifications per OP-100-014, Technical Specification and Technical Requirements Compliance.

After Component Cooling Water Pump AB is running and the SRO has reviewed Technical Specifications (or at examiner discretion), Channel D Safety Excore Nuclear Instrument Middle Detector fails low resulting in DNBR and LPD Trips on Plant Protection System Channel D and Startup Channel 1 energizes. The SRO should direct Startup Channel 1 be de-energized by placing the High Volts Selector switch in the Startup Channel 1 drawer to PRIMARY. The SRO should review Technical Specification 3.3.1 and Table 3.3-1 and determine that Action 2 should be entered for Functional Units of Linear Power, DNBR – Low, Local Power Density - High, and the Core Protection Calculator. The SRO should direct that at a minimum Linear Power, DNBR – Low, and Local Power Density – High trip bistables be bypassed in Channel D. Additionally the Logarithmic Power – High channel is also inoperable but the Technical Specification does not apply in MODE 1. However, the SRO may elect to place the Logarithmic Power – High Bistable in bypass as a conservative measure because this action would be applicable within 1 hour following a reactor trip or shutdown. The SRO should review OP-903-013, Monthly Channel Checks and Technical Specifications 3.3.3.5 and 3.3.3.6 and determine that Technical Specification 3.3.3.6, action 29 should be entered.

After the trip bistables in Plant Protection System Channel D are bypassed, a Main Steam line break outside Containment occurs on Main Steam Line 1, resulting in a reactor trip, Safety Injection Actuation Signal (SIAS), Containment Isolation Actuation Signal (CIAS) and Main Steam Isolation Signal (MSIS). FW-184A, Feedwater Isolation Valve A fails to close automatically on the MSIS requiring the BOP to manually close the valve. The SRO should diagnose to OP-902-004, Excess Steam Demand Recovery Procedure. The crew should take action to stabilize Reactor Coolant System temperature **(CRITICAL TASK 1**) and pressure **(CRITICAL TASK 2)** when Reactor Coolant System pressure **AND** Core Exit Thermocouple temperatures start to rise.

During the implementation of OP-902-004, CC-ILS-7013A, Component Cooling Water Surge Tank Level Switch fails low isolating Component Cooling Water to the Reactor Coolant Pumps. The ATC should secure all running Reactor Coolant Pumps within 3 minutes **(CRITICAL TASK 3)**. The SRO may refer to OP-901-510, Component Cooling Water System Malfunction, Attachment 1, CCW Surge Tank Level Switch Failures to verify the failed instrument.

The scenario can be terminated after the crew secures all running Reactor Coolant Pumps or at the lead examiner's discretion.

CRITICAL TASKS

3. ESTABLISH REACTOR COOLANT SYSTEM TEMPERATURE CONTROL

This task is satisfied by taking action to stabilize Reactor Coolant System temperature within the limits of the Reactor Coolant System Pressure/Temperature Limits curve using Atmospheric Dump Valve 2 and establishing EFW flow to Steam Generator 2. Action to address this task should prevent lifting a Pressurizer safety (2500 psia) or Steam Generator safety (1070 psig).

4. ESTABLISH REACTOR COOLANT SYSTEM PRESSURE CONTROL

This task is satisfied by taking action to stabilize RCS pressure within the limits of the Reactor Coolant System P/T curve and additionally maintain Reactor Coolant System pressure within 1500-1600 psid of the faulted steam generator. Action to address this task shall prevent lowering Subcooled Margin to < 28°F.

5. TRIP ANY REACTOR COOLANT PUMP NOT SATISFYING REACTOR COOLANT PUMP OPERATING LIMITS

This task is satisfied by securing all running Reactor Coolant Pumps within 3 minutes of loss of Component Cooling Water flow. This task becomes applicable after CC-ILS-7013A fails. The time requirement of 3 minutes is based on the Reactor Coolant Pump operating limit of 3 minutes without Component Cooling Water cooling.

Scenario Quantitative Attributes

8. Total malfunctions (5–8)	6
9. Malfunctions after EOP entry (1–2)	2
10. Abnormal events (2–4)	2
11. Major transients (1–2)	1
12. EOPs entered/requiring substantive actions (1–2)	1
13. EOP contingencies requiring substantive actions (0–2)	0
14. Critical tasks (2–3)	3

SCENARIO SETUP

J. Reset Simulator to IC-192.

K. Verify Scenario Malfunctions are loaded, as listed in the Scenario Timeline.

L. Verify the following Remotes and Overrides:

   1. SIR29, HPSI PUMP A – RACKOUT
   2. SIR24, SI-203A_SI-208A HPSI PUMP A SUCT/DISCH ISOL VLVS - CLOSE

M. Verify HPSI Pump A Control Switch (C/S) is in OFF and place Danger Tag on C/S.

N. Verify Startup Channel 1 High Volt Selector Switch is in ALTERNATE.

O. Ensure Protected Train B sign is placed in SM office window.

P. Verify EOOS is 8.7 Color Yellow with HPSI Pump A OOS.

Q. Ensure gloves are available for using the simulator ladder.

R. Complete the simulator setup checklist.

S. Start Insight, select file PlantParameters.tis.

SIMULATOR BOOTH INSTRUCTIONS

Event 1 Power Reduction to 50%

4. If contacted to place Feedwater Pump B Local Governor Control in manual, insert Remote FWR88 to MANUAL.

Event 2 Letdown Flow Control Valve, CVC-113A, Fails Closed

3. On Lead Examiner's cue, initiate Event **Trigger 1**.
4. If Work Week Manager or PMM are called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.
5. If contacted to place the alternate letdown flow control valve in service Run CAEP file **OP-901-112 Local Operator Actions\Placing Alternate LDFCV in Service.sch.**

Event 3 Component Cooling Water Pump A Trips

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

Event 4 Safety Channel D Excore Nuclear Instrument, ENI-IJI-0001D, Middle Detector Fails Low

7. On Lead Examiner's cue, initiate Event **Trigger 3**.
8. If Work Week Manager or PMI are called, inform the caller that a work package will be assembled.
9. If requested to verify Log Channel readings at LCP-43, report that Log Channel D is pegged low; all other channels are reading normally.

Event 5/6 Main Steam Line Break Outside Containment, SG 1/Main Feedwater Isolation Valve Fails to Auto Close

4. On Lead Examiner's cue, initiate Event **Trigger 4**.
5. If called as a Nuclear Auxiliary Operator to verify break location, inform the caller that a large amount of steam is issuing from the MSIV Area on the West Side of the RAB and it does not appear to be coming from a Secondary Safety or Atmospheric Dump Valve.
6. If Chemistry is called to perform samples acknowledge the request.

Event 7 Component Cooling Water Surge Tank Level Switch, CC-ILS-7013A, Fails Low

5. On Lead Examiner's cue, initiate Event **Trigger 5**.
6. **At the end of the scenario, before resetting, complete data collection by saving the file as 2012 Scenario 2-(start-end time).tid. Export to .csv file. Save the file into the folder for the appropriate crew.**

SCENARIO TIMELINE

EVENT	KEY	DESCRIPTION	TRIGGER	DELAY HH:MM:SS	RAMP HH:MM:SS	FINAL
EVENT DESCRIPTION						
1	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
DOWNPOWER FROM 60% TO 50%						
2	**CV30A2**	**LTDN FLOW CONTROL VALVE CVC-113A FAILS CLOSED**	**1**	**00:00:00**	**00:00:00**	**ACTIVE**
LETDOWN FLOW CONTROL VALVE, CVC-113A, FAILS CLOSED						
3	**CC01A**	**CCW PUMP A TRIP**	**2**	**00:00:00**	**00:00:00**	**ACTIVE**
COMPONENT COOLING WATER PUMP A TRIPS						
4	**NI01H**	**MIDDLE DETECTOR (D2) SAFETY CHANNEL D FAIL (0-100%)**	**3**	**00:00:00**	**00:00:00**	**0**
CHANNEL D EXCORE NUCLEAR INSTRUMENT SAFETY CHANNEL, ENI-IJI-0001D, MIDDLE DETECTOR FAILS LOW						
5	**MS13A**	**MS A BREAK OUTSIDE CNTMT BEFORE MSIV (0-100%)**	**4**	**00:00:00**	**00:03:00**	**10**
MAIN STEAM LINE BREAK OUTSIDE CONTAINMENT , SG 1						
6	**RP08G**	**RELAY K305 FAILED, MSIS TRAIN A (MS/FW)**	**N/A**	**00:00:00**	**00:00:00**	**ACTIVE**
MAIN FEEDWATER ISOLATION VALVE STEAM GENERATOR 1, FW-184A FAILS TO AUTO CLOSE ON MSIS						
7	**CC12E2**	**CCW SURGE TNK LVL 7013AS FAILS LO**	**5**	**00:00:00**	**00:00:00**	**ACTIVE**
COMPONENT COOLING WATER SURGE TANK LEVEL SWITCH, CC-ILS-7013A, FAILS LOW						

REFERENCES

Event	Procedures
1	OP-010-005, Plant Shutdown, Rev. 317 (Copy with applicable steps marked up through Step 9.1.16) OP-002-005, Chemical and Volume Control, Rev. 36, Section 6.7, Direct Boration OP-005-007, Main Turbine and Generator, Rev. 301, Section 6.2, Main Turbine and Generator Operation
2	OP-901-112, Charging or Letdown Malfunction, Rev. 4
3	OP-901-510, Component Cooling Water System Malfunction, Rev. 301 Technical Specification 3.7.3 Technical Requirement 3.7.3 OP-100-014, Technical Specification and Technical Requirement Compliance, Rev. 317
4	OP-009-007, Plant Protection System, Rev. 15 OP-903-013, Monthly Channel Checks, Rev. 16 Technical Specification 3.3.1 Technical Specification 3.3.3.5 Technical Specification 3.3.3.6
5	OP-901-103, Emergency Boration, Rev. 2 OP-902-000, Standard Post Trip Actions, Rev. 13 OP-902-004, Excess Steam Demand Recovery Procedure, Rev. 12 OP-902-009, Standard Appendices, Rev. 307, Appendix 1, Diagnostic Flow Chart, and Appendix 13, Stabilize RCS Temperature
6	OP-902-004, Excess Steam Demand Recovery Procedure, Rev. 12 OP-902-009, Standard Appendices, Rev. 307, Appendix 2, Figures
7	OP-901-510, Component Cooling Water System Malfunction, Rev. 301

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Event Description: Lower Power to 50% using OP-010-005

Time	Position	Applicant's Actions or Behavior
		OP-010-005,Attachment 9.1 Steps 9.1.1 – 9.1.6
		NOTE Power may be stabilized at SM/CRS discretion at any point during performance of this section. The Senior Line Manager for Plant Shutdown shall be the Operations Manager or designee, or a qualified Duty Plant Manager. Performance of an Infrequently Performed Test or Evolution (IPTE) Brief shall not preclude full compliance with any Technical Specification or procedurally required Plant Shutdown.
		CAUTION THE FOLLOWING SECTION HAS THE POTENTIAL TO AFFECT CORE REACTIVITY.
	N/A	9.1.1 If performing a planned Plant Shutdown involving power reduction of >30%, then the Operations Manager (OM) shall evaluate the use of IPTE controls in accordance with EN-OP-116, Infrequently Performed Tests or Evolutions. At the direction of the OM the following Infrequently Performed Test or Evolutions (IPTE) controls should be complied with:
	CREW	9.1.2 Prior to commencing power reduction, notify Load Dispatcher.
	CREW	9.1.3 Announce to Station Personnel that a power reduction is in progress over the Plant Paging System.
	CREW	9.1.4 Maintain Reactor Coolant System T_{cold} 536°F to 549°F during the downpower.
	N/A	9.1.5 Perform Boron Equalization in accordance with Attachment 9.13, Boron Equalization.
	NOTE	**Boron Equalization is already in progress from down power to 60%.**

Op Test No.: 1 Scenario # 2 Event # 1 Page 177 of 289

Event Description: Lower Power to 50% using OP-010-005

Time	Position	Applicant's Actions or Behavior

NOTE

(1) BSCAL is not a good indication of instantaneous power during power maneuvers. Additionally, once the smoothing factor is applied at approximately 98% MSBSRAW (PMC PID C24631), BSCAL becomes a time weighted average of power recorded over approximately 20 minutes. The following tables list COLSS calculated powers available during power maneuvering to monitor instantaneous power:

(2) During power ascension PMC PID C24649 COLSS ASCENDING PWR TRACK (DUMOUT 18) will automatically select and display the correct power indication. During power reduction PMC PID C24650 COLSS DESCENDING PWR TRACK (DUMOUT19) will automatically select and display the correct power indication.

UFM not in service	
Reactor Power ≥ 95%	MSBSRAW PMC PID C24631
Reactor Power <95% and ≥ 35%	FWBSRAW PMC PID C24630
Reactor Power <35%	BDELT PMC PID C24104
UFM in service	
Reactor Power ≥ 95%	MSBSRAW PMC PID C24631
Reactor Power <95% and ≥ 40%	USBSRAW PMC PID C24629
Reactor Power <40% and ≥ 35%	FWBSRAW PMC PID C24630
Reactor Power <35%	BDELT PMC PID C24104

	ATC	9.1.6 Begin Reactor Coolant System boration in accordance with OP-002-005, Chemical and Volume Control to reduce Reactor power.

OP-002-005, Chemical and Volume Control System, Section 6.7, Direct Boration

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.

Op Test No.: 1 Scenario # 2 Event # 1 Page 178 of 289

Event Description: Lower Power to 50% using OP-010-005

Time	Position	Applicant's Actions or Behavior
	ATC	6.7.1 Inform SM/CRS that this Section is being performed.

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.

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Event Description: Lower Power to 50% using OP-010-005

Time	Position	Applicant's Actions or Behavior
		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, then 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.
	N/A	6.7.10 If automatic control of Boric Acid flow is desired, then 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 or Open.
	ATC	6.7.12 Observe Boric Acid flow rate for proper indication.
	ATC	6.7.13 When Boric Acid Makeup Batch Counter has counted down to desired value, then 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.**
		NOTE 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 and with SM/CRS permission, then 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 or Open. 6.7.14.3 Observe Boric Acid flow rate for proper indication. 6.7.14.4 When Boric Acid Makeup Batch Counter has counted down to desired value, then verify Boric Acid Makeup Control Valve, BAM-141, Closed.

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Event Description: Lower Power to 50% using OP-010-005

Time	Position	Applicant's Actions or Behavior
	ATC	6.7.15 Verify Boric Acid Flow controller, BAM-IFIC-0210Y, in Manual.
	ATC	6.7.16 Verify both Boric Acid Flow controller, BAM-IFIC-0210Y, output and 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.
	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-010-005, Attachment 9.1 Step 9.1.7 -9.1.8		
CAUTION CONTROL RODS SHOULD NEVER BE WITHDRAWN OR MANUALLY INSERTED EXCEPT IN A DELIBERATE CAREFULLY CONTROLLED MANNER WHILE CLOSELY MONITORING THE REACTOR'S RESPONSE.		
	ATC	9.1.7 Maintain ASI using CEA Reg. Group 5, 6 or Group P Control Element Assemblies in accordance with Attachment 9.9, Axial Shape Control Guidelines. (Refer to T.S. 3.1.3.6).
	BOP	9.1.8 When Average Reactor Coolant Temperature (T_{avg}) begins to drop, then reduce Generator load to match T_{avg} and Reference Temperature (T_{ref}) in accordance with OP-005-007, Main Turbine and Generator.
OP-005-007, Main Turbine and Generator, Section 6.2		
	BOP	6.2.1 To change Load/Rate perform the following: 6.2.1.1 Depress LOAD/RATE MW/MIN pushbutton.
	BOP	6.2.1.2 Depress appropriate numerical pushbuttons for desired load rate.
	BOP	6.1.2.3 Depress ENTER pushbutton.

Op Test No.: 1 Scenario # 2 Event # 1 Page 181 of 289

Event Description: Lower Power to 50% using OP-010-005

Time	Position	Applicant's Actions or Behavior
		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: 6.2.2.1 Depress REF pushbutton.
	BOP	6.2.2.2 Depress appropriate numerical pushbuttons for desired MW load.
	BOP	6.2.2.3 Depress ENTER pushbutton.
	BOP	6.2.2.4 Depress GO pushbutton.
	BOP	6.2.2.5 Verify Turbine load change stops at the desired MW load.
OP-010-005,Attachment 9.1 Steps 9.1.16 – 9.1.17		
	SRO	9.1.16 Remove Polishers from service to maintain system pressure in accordance with OP-003-031, Condensate Polisher/Backwash Treatment.
	BOP	9.1.17 When Reactor power is approximately 55%, then remove one Main Feedwater Pump from service in accordance with OP-003-033, Main Feedwater.
Examiner Note **This event is complete when the Reactivity Manipulation is met.** **OR** **As directed by the Lead Evaluator.**		

Op Test No.: 1 Scenario # 2 Event # 2 Page 182 of 289

Event Description: Letdown Flow Control Valve, CVC-113A, fails closed

Time	Position	Applicant's Actions or Behavior
	ATC	Recognize and report indications of failed Letdown Flow Control Valve.
		Alarms:
		• Letdown Flow Hi/Lo (Cabinet G, C-1)
		• Letdown HX Outlet Pressure Lo (Cabinet G, B-2)
		Indications
		• Letdown flow goes to 0 gpm
		• CVC-113A indicates closed
		• Letdown Flow Control valve not responding to changes in controller output
		• Abnormal Charging AND Letdown flow mismatch.
		• Pressurizer level changing
	SRO	Enter and direct the implementation of OP-901-112, Charging or Letdown Malfunction.
OP-901-112, Section E0, General		
	BOP	1. Stop turbine load changes.
	N/A	2. IF malfunction is due to failure of the Pressurizer Level Control System, THEN go to OP-901-110, PRESSURIZER LEVEL CONTROL MALFUNCTION.
	N/A	3. IF a Charging Malfunction is indicated, THEN go to Subsection E1, Charging Malfunction.
	SRO	4. IF a Letdown Malfunction is indicated, THEN go to Subsection E2, Letdown Malfunction.
OP-901-112, Section E2, Letdown Malfunction		
	ATC	1. IF necessary, THEN maintain Pressurizer level by placing LETDOWN FLOW CONTROL VALVES controller (RC-IHIC-0110) in MAN, and control manually.
	NOTE	THE ATC may take manual control of the controller but the letdown valve will not respond.

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Event Description: Letdown Flow Control Valve, CVC-113A, fails closed

Time	Position	Applicant's Actions or Behavior
		NOTE If all Charging Pumps are secured, then LETDOWN STOP VALVE (CVC 101) will close on high REGEN HX TUBE OUTLET temperature if RCS is ≥ 470°F.
	ATC	2. Operate Charging Pumps as necessary to maintain Pressurizer level in accordance with Attachment 1, Pressurizer Level Versus Tave Curve.
	NOTE	This should not be applicable. If the crew delays taking action due to the failure, Pressurizer level will rise and they may choose to take action.
	SRO/ATC	3. IF Pressurizer level falls below the minimum level for operation of Attachment 1, THEN perform the following: 3.1. Trip the Reactor. 3.2. Manually initiate Safety Injection Actuation. 3.3. Go to OP-902-000, STANDARD POST TRIP ACTIONS.
	NOTE	This should not be applicable.
	N/A	4. IF a leak exists in Letdown System, THEN attempt to locate AND isolate leak.
	N/A	5. IF leak has been isolated, THEN re-establish Letdown in accordance with OP-002-005, CHEMICAL AND VOLUME CONTROL.
	ATC	6. IF the in service Letdown Flow Control valve (CVC 113A) OR (CVC 113B) is NOT controlling, THEN place standby Letdown Flow Control valve in service as follows:
		NOTE To minimize thermal transients in the system, Letdown and Charging flows should be started as close together as possible.
	ATC	6.1 IF restoring Letdown, THEN verify at least one charging pump in operation.
	ATC	6.2 IF necessary to maintain Letdown Backpressure, THEN Letdown Backpressure Controller (CVC-IPIC-0201) may be controlled in MAN.
	ATC	6.3 Place Letdown Flow Control Valve Selector switch to BOTH.
	SRO	6.4 Verify open standby Letdown Flow Cntrl Vlv A(B) Outlet Isolation (CVC 114A) OR (CVC 114B). **(Coordinates with NAO to perform)**

Op Test No.: 1 Scenario # 2 Event # 2 Page 184 of 289

Event Description: Letdown Flow Control Valve, CVC-113A, fails closed

Time	Position	Applicant's Actions or Behavior
	SRO	6.3 Slowly open standby Letdown Flow Control Valve Inlet Isolation (CVC 111A) OR (CVC 111B). **(Coordinates with NAO to perform)**
	SRO	6.4 Close in service Letdown Flow Cntrl Vlv A(B) Outlet Isolation (CVC 114A) OR (CVC 114B). **(Coordinates with NAO to perform)**
	ATC	6.5 Position Letdown Flow Control Valve Selector switch to select operable flow control valve placed in service.
	ATC	6.6 IF letdown is still in service and Letdown Flow Control valve operates properly, THEN place Letdown Flow Controller (RC-IHIC-0110) in AUTO.
	ATC	6.7 Close in service Letdown Flow Cntrl Vlv A(B) Outlet Isolation (CVC 114A) OR (CVC 114B).
	ATC	6.8 Position Letdown Flow Control Valve Selector switch to select operable flow control valve placed in service.
	ATC	6.9 IF letdown is still in service and Letdown Flow Control valve operates properly, THEN place Letdown Flow Controller (RC-IHIC-0110) in AUTO.

Examiner Note

This event is complete when Letdown Flow Control Valve is in Service

Or

As directed by the Lead Evaluator

Op Test No.: 1 Scenario # 2 Event # 3 Page 185 of 289

Event Description: Component Cooling Water Pump A trips

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize and report indications of tripped CCW Pump.
		Alarms:
		• CCW PUMP A TRIP/TROUBLE (Cabinet M, B-2)
		• RCP 1A CCW FLOW LO (Cabinet H, H-3)
		• RCP 1B CCW FLOW LO (Cabinet H, H-5)
		• RCP 2A CCW FLOW LO (Cabinet H, H-7)
		• RCP 2B CCW FLOW LO (Cabinet H, H-10)
		Indications
		• Amber trip/trouble light on CCW Pump A control switch
		• CCW System pressure abnormally low and dropping
		• CCW System and component flows abnormally low
	NOTE	Based on how long the crew takes to align CCW Pump AB, red RCP Low Flow alarms may come in on CP-2. This should be called out by the ATC.
	SRO	Enter and direct the implementation of OP-901-510, Component Cooling Water System Malfunction.
OP-901-510, Component Cooling Water System Malfunction, Section E0		
	N/A	1. IF ANY of the following occur, THEN GO TO Subsection E_1, System Leakage:
		CCW Surge Tank level dropping
		CCW Dry Cooling Towers isolated due to low CCW Surge Tank level
		CMU-226, WATER STORAGE MAKEUP CCW SURGE TANK, cycling frequently
		CCW header isolates due to low CCW Surge Tank level
		• Local observation of CCW leak reported to Control Room
		2. IF ANY of the following occur, THEN GO TO Subsection E_2, Loss of CCW Pump(s):
		CCW system OR component flows low
		• Amber trip/trouble light on CCW PUMP A(B)(AB) Control Switch

Op Test No.: 1 Scenario # 2 Event # 3 Page 186 of 289

Event Description: Component Cooling Water Pump A trips

Time	Position	Applicant's Actions or Behavior
		OP-901-510, Component Cooling Water System Malfunction, Section E2
		1. IF CCW is lost to in-service Shutdown Cooling train, THEN implement OP-901-131, SHUTDOWN COOLING MALFUNCTION, AND perform concurrently with this procedure.
	N/A	2. IF Component Cooling Water Pump AB has tripped, THEN Start standby CCW Pump.
		2.1 Place CCW ASSIGNMENT Switch to NORM Position.
	BOP	3. IF Component Cooling Water Pump A has tripped, THEN align CCW Pump AB for Operation as follows:
		3.1 Position CCW ASSIGNMENT switch to position A.
	BOP	3.2 Verify Open the following valves: • CC-126A/CC-114A CCW SUCT & DISCH HEADER TIE VALVES AB TO A • CC-127A/CC-115A CCW SUCT & DISCH HEADER TIE VALVES AB TO A
	BOP	3.3 Start CC-0001AB, Component Cooling Water Pump AB.
	SRO	3.4 Evaluate AB Electrical Bus alignment for Technical Specification Operability requirements.
		• With the AB Safety Bus aligned to Train B, credit cannot be taken for CCW Pump AB
		• The SRO should enter Tech Spec 3.7.3, TRM 3.7.3 and Cascading Tech Specs per OP-100-014.
		• This includes a 1 hour requirement to verify off site electrical power. The CRS should vocalize this requirement and assign the OP-903-066 surveillance to either the BOP or ATC operator. The BOP is preferred.
		• Cascading Tech Specs also includes a 2 hour requirement to verify components that rely on Train B safety power operable per 3.8.1.1.d.

Examiner Note

This event is complete when the SRO has addressed Technical Specifications

OR

As directed by the Lead Evaluator

Op Test No.: 1 Scenario # 2 Event # 4 Page 187 of 289

Event Description: Channel D ENI Safety Channel middle detector fails low

Time	Position	Applicant's Actions or Behavior
		Recognize and report indications of Log Channel Failure.
		Alarms (The first 3 alarms are power dependent and may not actuate)
		• RPS CHANNEL TRIP LOCAL PWR DENSITY HI (Cabinet K, A-11)
		• LOCAL POWER DENSITY HI PRETRIP B/D (Cabinet K, C-11)
		• RPS CHANNEL D TROUBLE (Cabinet K, H-18)
		• STARTUP CHANNEL 1 NEUTRON FLUX HI (Cabinet H, K-3)
		• RCS BORON CHNL 1 DILUTION HI (Cabinet G, L-3)
		Indications
		• Startup Channel 1 energized CP-2, RRS 1 Cabinet
		• Channel D Log Power Indicator on CP-7 failed low
		• Channel D Linear Power recorder reading low on CP-7
	SRO	Directs BOP to select High Volts Select Switch in Startup Channel 1 drawer to non-faulted channel (PRIMARY).
OP-500-008, Attachment 4.83, STARTUP CHANNEL 1 NEUTRON FLUX HI		
	BOP	1. Either failure of log channel governing $5.3X10^{-6}$% relay or failure of $5.3X10^{-6}$% relay. 1.1 If reactor power is > $5.3X10^{-6}$% then select Primary (Log Channel C) or Alternate (Log Channel D) as appropriate in Startup Channel 1 drawer to de-energize Startup Channel 1.
	N/A	1.2 If reactor power < $5.3X10^{-6}$% then allow continued operation of Startup Channel 1.
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	6.2.1 Refer to Attachment 11.11, PPS Bistable Bypass Chart to assist in determination of Trip Channels requiring placement in bypass. **Determines the following bistables are affected and need to be bypassed:** • **1 - HI LN POWER** • **2 - HI LOG POWER+** • **3 - HI LOCAL POWER** • **4 - LOW DNBR**

Op Test No.: 1 Scenario # 2 Event # 4 Page 188 of 289

Event Description: Channel D ENI Safety Channel middle detector fails low

Time	Position	Applicant's Actions or Behavior
	NOTE	+ Hi Log Power is not required to be bypassed in MODE 1. However, the failed detector supplies the Log Power Channel which is applicable in MODE 2 and below. If a reactor trip were to occur, action would be required to bypass the channel in one hour. It is normal practice to bypass the channel for this reason.
	SRO	Directs BOP to bypass the HI LN POWER, HI LOG POWER**+**, HI LOCAL POWER, and LOW 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.
	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.
	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: • 3.3.1 - Action 2 • 3.3.3.5 - No action required • 3.3.3.6.a - Action 29

Op Test No.: 1	Scenario # 2	Event # 4	Page 189 of 289
Event Description:	Channel D ENI Safety Channel middle detector fails low		

Time	Position	Applicant's Actions or Behavior

Examiner Note

This event is complete when the SRO has evaluated Technical Specifications and the PPS Trip Bistables are bypassed.

OR

As directed by the Lead Evaluator

Op Test No.: 1 Scenario # 2 Event # 5 / 6/ 7 Page 190 of 289

Event Description: Main Steam line break outside Containment, SG 1, FW-184A fails to AUTO close on MSIS/ CC-ILS-7013A fails low, isolating Component Cooling Water to the Reactor Coolant Pumps

Time	Position	Applicant's Actions or Behavior
	ATC / BOP	Recognize and report indications of a Main Steam Line Break.
		Alarms (The fifth annunciator may come in if not already in from the previous event)
		• EXCORE /CPC CHNL D POWER DEVIATION (Cabinet K, K-14)
		• EXCORE /CPC CHNL B POWER DEVIATION (Cabinet K, K-12)
		• EXCORE /CPC CHNL C POWER DEVIATION (Cabinet K, K-13)
		• EXCORE /CPC CHNL A POWER DEVIATION (Cabinet K, K-11)
		• LOCAL POWER DENSITY HI PRETRIP B/D (Cabinet K, C-11)
		Indications
		• Lowering Steam Generator Pressure CP-1, CP-8
		• Lowering Steam Generator Level CP-1, CP-8
		• Lowering Reactor Coolant System temperatures Tavg, Th, Tc CP-2, CP-7
		• Reactor Power Rising CP-2, CP-7
	SRO	Directs a manual reactor trip.
	Note	**The SRO may also direct a manual actuation of SIAS and CIAS. If not the SRO should direct Emergency Boration per OP-901-103, Emergency Boration due to the uncontrolled cooldown. The following steps are applicable after the reactor is tripped and the crew is performing Standard Post Trip Actions.**
OP-901-103, Emergency Boration		
		1. Place Makeup Mode selector switch to MANUAL.

Op Test No.: 1 Scenario # 2 Event # 5 / 6/ 7 Page 191 of 289

Event Description: Main Steam line break outside Containment, SG 1, FW-184A fails to AUTO close on MSIS/ CC-ILS-7013A fails low, isolating Component Cooling Water to the Reactor Coolant Pumps

Time	Position	Applicant's Actions or Behavior
		2. Align borated water source by performing one of the following (a. or b.): a. Initiate Emergency Boration using Boric Acid Pump as follows: • 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 or b. Initiate Emergency Boration using Gravity Feed as follows: • Open the following Boric Acid Makeup Gravity Feed valves: • BAM-113A Boric Acid Makeup Gravity Feed Valve A • BAM-113B Boric Acid Makeup Gravity Feed Valve B
		3. Close VCT Disch Valve, CVC-183.
		4. Verify at least one Charging Pump operating and Charging Header flow ≥40 GPM.
OP-902-000, Standard Post Trip Actions		
	ATC	1. Determine **Reactivity Control** acceptance criteria are met: a. Check reactor power is dropping. b. Check startup rate is negative. c. Check less than **TWO** CEAs are **NOT** fully inserted.
	BOP	2. Determine **Maintenance of Vital Auxiliaries** acceptance criteria are met: a. Check the Main Turbine is tripped: • Governor valves closed • Throttle valves closed
	BOP	b. Check the Main Generator is tripped: • GENERATOR BREAKER A tripped • GENERATOR BREAKER B tripped • EXCITER FIELD BREAKER tripped

Op Test No.: 1 Scenario # 2 Event # 5 / 6/ 7 Page 192 of 289

Event Description: Main Steam line break outside Containment, SG 1, FW-184A fails to AUTO close on MSIS/ CC-ILS-7013A fails low, isolating Component Cooling Water to the Reactor Coolant Pumps

Time	Position	Applicant's Actions or Behavior
	BOP	c. Check station loads are energized from offsite electrical power as follows: **Train A** • 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 **Train B** • 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. Determine **RCS Inventory Control** acceptance criteria are met: a. Check that **BOTH** the following conditions exist: • Pressurizer level is 7% to 60% • Pressurizer level is trending to 33% to 60% b. Check RCS subcooling is greater than or equal to 28ºF.
	NOTE	**This safety function may or may not be met, depending on the speed the crew is working Standard Post Trip Actions. Either way, there are no contingencies necessary for this step.**
	ATC	4. Determine **RCS Pressure Control** acceptance criteria are met by checking that **BOTH** of the following conditions exist: • Pressurizer pressure is 1750 psia to 2300 psia • Pressurizer pressure is trending to 2125 psia to 2275 psia
	SRO/ATC	4.2 **IF** pressurizer pressure is less than 1684 psia, **THEN** verify the following have initiated. • SIAS • CIAS
	ATC	If directed by SRO, initiate Safety Injection Actuation (SIAS), Main Steam Isolation (MSIS) and Containment Isolation Actuation (CIAS) at CP-7.

Op Test No.: 1 Scenario # 2 Event # 5 / 6/ 7 Page 193 of 289

Event Description: Main Steam line break outside Containment, SG 1, FW-184A fails to AUTO close on MSIS/ CC-ILS-7013A fails low, isolating Component Cooling Water to the Reactor Coolant Pumps

Time	Position	Applicant's Actions or Behavior
	ATC	4.3 **IF** pressurizer pressure is less than 1621 psia, **THEN** verify no more than two RCPs are operating
	ATC	5. Determine **Core Heat Removal** acceptance criteria are met: a. Check at least one RCP is operating. b. Check operating loop ΔT is less than 13ºF. c. Check RCS subcooling is greater than or equal to 28ºF.
	BOP	6. Determine **RCS Heat Removal** acceptance criteria are met: a. Check that at least one steam generator has **BOTH** of the following: • Steam generator level is 5% to 80% NR • Main Feedwater is available to restore level within 50%-70% NR.
	NOTE	The contingency for this step, since there will be a Main Steam Isolation Signal, is to verify Emergency Feedwater is available. This does not require a manual initiation of EFAS.
	ATC	b. Check RCS TC is 530 ºF to 550 ºF
	SRO	b2. **IF** RCS TC is less than 530 ºF, **THEN** perform the following: • **IF** RCS TC is being controlled by an ESD, **THEN** REFER TO Appendix 13, "Stabilize RCS Temperature" and stabilize RCS temperature using the least affected steam generator.
	NOTE	Appendix 13 directs steps to address PTS after Representative CET temperature and Pressurizer pressure have both started to rise. The steps are also contained in the excess steam demand recovery procedure.
	BOP	c. Check steam generator pressure is 885 psia to 1040 psia.
	BOP	c1. **IF** steam generator pressure is less than 885 psia, **THEN** perform **ALL** of the following: 1) Verify steam bypass valves are closed. 2) Verify ADVs are closed. c2. **IF** steam generator pressure is less than or equal to 666 psia, **THEN** verify MSIS is initiated.
	NOTE	When MSIS has initiated the BOP should verify that both MSIVs and both MFIVs, FW-184 A(B) close. FW-184A does not close automatically requiring BOP action to close FW-184A.

Op Test No.: 1 Scenario # 2 Event # 5 / 6/ 7 Page 194 of 289

Event Description: Main Steam line break outside Containment, SG 1, FW-184A fails to AUTO close on MSIS/ CC-ILS-7013A fails low, isolating Component Cooling Water to the Reactor Coolant Pumps

Time	Position	Applicant's Actions or Behavior
	BOP	d. Check Feedwater Control in Reactor Trip Override: • 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
	NOTE	With a MSIS, MAIN FW REG valves and STARTUP FW REG valves will be closed. Both MFW Pumps will be coasting down.
	BOP	e. Reset moisture separator reheaters, and check the temperature control valves closed.
	ATC	7. Determine **Containment Isolation** acceptance criteria are met: a. Check containment pressure is less than 16.4 psia. b. Check NO containment area radiation monitor alarms OR unexplained rise in activity. c. Check NO steam plant activity monitor alarms OR unexplained rise in activity.
	BOP	8 Determine **Containment Temperature and Pressure Control** acceptance criteria are met: a. Check containment temperature is less than or equal to 120ºF. b. Check 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. **"**Proper use of chart will result in use of OP-902-004, Excess Steam Demand Recovery
	BOP	Secure AH-12 A or B at CP-18 on SRO direction after initiation of SIAS.

Op Test No.: 1 Scenario # 2 Event # 5 / 6/ 7 Page 195 of 289

Event Description: Main Steam line break outside Containment, SG 1, FW-184A fails to AUTO close on MSIS/ CC-ILS-7013A fails low, isolating Component Cooling Water to the Reactor Coolant Pumps

Time	Position	Applicant's Actions or Behavior
	SRO	After Excess Steam Demand is identified, direct ATC and BOP to monitor for the trigger points for the need to stabilize Reactor Coolant System temperature. Critical parameters are Pressurizer pressure rising and Reactor Coolant System Representative CET temperature rising. Steps for stabilizing Reactor Coolant System temperature following an excess steam demand are contained in 2 procedures. • Appendix 13 is used if the critical parameters are both rising before the SRO has entered OP-902-004, Excess Steam Demand Recovery. • Step 16 of OP-902-004 is used if both parameters start rising after the crew has entered OP-902-004.
CRITICAL TASK **ESTABLISH REACTOR COOLANT SYSTEM TEMPERATURE CONTROL** **This task is satisfied by taking action to stabilize Reactor Coolant System temperature within the limits of the Reactor Coolant System Pressure/Temperature Limits curve using Atmospheric Dump Valve 2 and establishing EFW flow to Steam Generator 2. Action to address this task should prevent lifting a Pressurizer safety (2500 psia) or Steam Generator safety (1070 psig).**		
	BOP	When directed by the SRO to take action to stabilize Reactor Coolant System temperature:
		• Place the Atmospheric Dump Valve for Steam Generator 2 to manual and fully open Atmospheric Dump Valve 2.
		• Manually initiate Emergency Feedwater Actuation Signal for Steam Generator 2.
		• Place Emergency Feedwater Flow Control Valve to manual and commence feeding Steam Generator 2.
CRITICAL TASK **ESTABLISH REACTOR COOLANT SYSTEM PRESSURE CONTROL** **This task is satisfied by taking action to stabilize RCS pressure within the limits of the Reactor Coolant System P/T curve and additionally maintain Reactor Coolant System pressure within 1500-1600 psid of the faulted steam generator. Action to address this task shall prevent lowering Subcooled Margin to < 28°F.**		

Op Test No.: 1 Scenario # 2 Event # 5 / 6/ 7 Page 196 of 289

Event Description: Main Steam line break outside Containment, SG 1, FW-184A fails to AUTO close on MSIS/ CC-ILS-7013A fails low, isolating Component Cooling Water to the Reactor Coolant Pumps

Time	Position	Applicant's Actions or Behavior
	ATC	When directed by the SRO to take action to stabilize Reactor Coolant System temperature:
		• **IF** Reactor Coolant System pressure is ≥ 1500 psia, **THEN** stabilize Reactor Coolant System pressure at a value not to exceed 1600 psid between the Reactor Coolant System and the lowest SG pressure.
		• **IF** Reactor Coolant System pressure is < 1500 psia, **THEN** stabilize Reactor Coolant System pressure at > HPSI shutoff head (1500-1600 psia).
Examiner Note **Direct Simulator Operator to initiate Trigger 5**		
CRITICAL TASK **TRIP ANY RCP NOT SATISFYING RCP OPERATING LIMITS** **This task is satisfied by securing all RCPs within 3 minutes of loss of CCW flow. This task becomes applicable after CC-ILS-7013A fails. The time requirement of 3 minutes is based on the RCP operating limit of 3 minutes without CCW cooling.**		
	BOP	Reports that the A to AB CCW Loop Isolations have closed. Reports RCP 1A, 2A, 1B, and 2B CCW Lost alarms on CP-18
	ATC	Momentarily places running Reactor Coolant Pump control switches on CP-2 to STOP and verifies the RCP secures.
Examiner Note **This scenario is complete after Reactor Coolant System temperature and pressure have been stabilized and all RCPs are secured** **OR** **As directed by the Lead Evaluator.**		

Facility: Waterford Scenario No.: 3 Op Test No.: 1

Examiners: _____ Operators: _____

Initial Conditions: ~ 4% Reactor Power, MOC

Turnover:

Protected Train is B, AB Bus is aligned to Train B, Raise power to ~ 10% to roll the Main Turbine

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 10% to roll the Main Turbine in accordance with OP-010-003, Plant Startup and OP-010-004, Power Operations.
2	CH08E1	I – BOP I – SRO TS – SRO	Plant Protection System Channel D Containment Pressure (CIAS), CB-IPI-6701SMD, fails high requiring Technical Specification entry and bypass of channel trip bistables.
3	CV01B	C – ATC C – SRO TS – SRO	Charging Pump B trips on overcurrent requiring implementation of OP-901-112, Charging or Letdown Malfunction.
4	FW20A2	C – BOP C – SRO	Startup Feedwater Regulating Valve 1 fails closed requiring implementation of OP-901-201, Feedwater Control Malfunction
5	RC23A L_L10 L_M10	M – All	Large RCS Cold Leg break requiring implementation of OP-902-000, Standard Post Trip Actions and OP-902-002, Loss of Coolant Accident Recovery Procedure.
6	RP05A3 RP05B3 RP05C3 RP05D3	I – ATC I – SRO	Containment Spray fails to AUTO Actuate requiring manual actuation. (Critical Task 1 and 2)
7	MS11B	M – All	Main Steam Line 2 Break Inside Containment requiring entry into OP-902-008, Functional Recovery Procedure.
8	CS01A	C – BOP C – SRO	Containment Spray Pump A trips requiring action to close CS-125A.

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

The crew assumes the shift at ~ 4% power with instructions to raise power to 10% to roll the Main Turbine. 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 and/or dilution in accordance with OP-010-003, Plant Startup and OP-010-004, Power Operations.

After the reactivity manipulation has been satisfied, CB-IPI-6701SMD, Containment Pressure (CIAS) fails high. The SRO should review Technical Specifications 3.3.1 and 3.3.2. Per Table 3.3-1 under Containment Pressure – High (Functional Unit 6) the SRO should enter Technical Specification 3.3.1 action 2. Per Table 3.3-3 under Functional Units 1b (Safety Injection, Containment Pressure-High), 3b (Containment Isolation, Containment Pressure-High), and 4c (Main Steam Line Isolation, Containment Pressure High) the SRO should enter Tech 3.3.2 action 13. The SRO should direct the BOP to bypass the Containment Pressure High (RPS) and Containment Pressure High (ESF) trip bistables in PPS Channel D within 1 hour. The BOP should bypass the trip bistables in accordance with OP-009-007, Plant Protection System.

After the trip bistables have been placed in bypass, 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 Charging and Letdown are re-established, FW-166A, Startup Feedwater Regulating Valve 1 fails closed. The SRO should direct the BOP to match Feed and Steam Flows to SG 1 by manually throttling open FW-173A, Feedwater Regulating Valve 1. The SRO should implement OP-901-201, Steam Generator Level Control Malfunction, Attachment 1, General Actions.

After the BOP has control of SG 1 level, an RCS leak occurs on RCS Cold Leg 1A that progresses rapidly to a Large Break Loss of Coolant Accident. A Seismic Event Annunciator will come in at the time of the break. When Containment Pressure exceeds the Containment Spray (CSAS) setpoint, Containment Spray fails to actuate. The ATC should manually initiate Containment Spray **(CRITICAL TASK 1**) and secure any running Reactor Coolant Pumps **(CRITICAL TASK 2)**. The SRO should implement OP-902-000, Standard Post Trip Actions and diagnose to OP-902-002, Loss of Coolant Accident Recovery Procedure.

After the crew diagnoses to OP-902-002, Main Steam Line 2 breaks inside Containment. Containment Spray Pump A will trip on overcurrent. The SRO should either go to OP-902-009 Appendix 1, Diagnostics Flowchart and diagnose to OP-902-008, Functional Recovery OR go directly to the procedure based on two events in progress per OP-100-017, Emergency Operating Procedures Implementation Guide. When the SRO performs prioritization Containment Isolation (CI-1) should be the highest priority**. (CRITICAL TASK 3)**

The scenario can be terminated after the CRS has performed prioritization of Safety Functions and implements the first success path or at the lead examiner's discretion.

CRITICAL TASKS

6. ESTABLISH CONTAINMENT TEMPERATURE AND PRESSURE CONTROL

This task is satisfied by manually initiating Containment Spray Actuation Signal prior to exiting OP-902-000, Standard Post Trip Actions or Containment pressure exceeds 44 PSIG. This task becomes applicable after Containment Pressure rises above 17.7 PSIA. OP-902-000, Standard Post Trip Actions, directs this activity to satisfy the Containment Pressure and Temperature Control safety function.

7. TRIP ANY RCP NOT SATISFYING RCP OPERATING LIMITS

This task is satisfied by securing all RCPs within 3 minutes of loss of Component Cooling Water flow. This task becomes applicable after Containment Spray is initiated. The time requirement of 3 minutes is based on the Reactor Coolant Pump operating limit of 3 minutes without Component Cooling Water cooling.

8. ESTABLISH CONTAINMENT ISOLATION

This task is satisfied by prioritizing CI-1 as Priority 1 after performing Step 11 of OP-902-008, Functional Recovery. This task becomes applicable after the Main Steam Line Break occurs.

Scenario Quantitative Attributes

15. Total malfunctions (5–8)	7
16. Malfunctions after EOP entry (1–2)	3
17. Abnormal events (2–4)	2
18. Major transients (1–2)	2
19. EOPs entered/requiring substantive actions (1–2)	1
20. EOP contingencies requiring substantive actions (0–2)	1
21. Critical tasks (2–3)	3

SCENARIO SETUP

T. Reset Simulator to IC-193.
U. Verify Scenario Malfunctions are loaded, as listed in the Scenario Timeline.
V. Ensure Protected Train B sign is placed in SM office window.
W. Verify PMC is set to MODE 2.
X. Verify EOOS is 10.0 Green
Y. Complete the simulator setup checklist.
Z. Start Insight, select file PlantParameters.tis.

SIMULATOR BOOTH INSTRUCTIONS

Event 1 Raise Power To 10% To Roll The Main Turbine

5. If requested to verify a charging pump is ready for a start acknowledge the request but do not report back that the charging pump is ready for a start until after event 3 is triggered.

Event 2 Containment Pressure PPS Channel D (CIAS) CB-IPI-6701SMD Fails High

6. On Lead Examiner's cue, initiate Event **Trigger 1**.
7. 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 Charging Pump B Trips On Instantaneous Overcurrent

5. On Lead Examiner's cue, initiate Event **Trigger 2**.
6. If Work Week Manager or PME are called, inform the caller that a work package will be assembled.
7. If called as an NAO to investigate the trip at the breaker, report overcurrent flags on all 3 phases.
8. If called as an NAO to investigate the trip at the pump, report that the paint on the motor is discolored and there is a strong odor of burnt insulation, but no fire.

Event 4 Startup Feedwater Regulating Valve 1 Fails Closed

10. On Lead Examiner's cue, initiate Event **Trigger 3**.
11. If Work Week Manager or PMM are called, inform the caller that a work package will be assembled.

Event 5/6 Large RCS Cold Leg break), Containment Spray Fails to AUTO Actuate

7. On Lead Examiner's cue, initiate Event **Trigger 4**.
8. If the Duty Plant Manager is called, inform the caller that you will make the necessary calls.
9. If Chemistry is called to perform samples acknowledge the request.

Event 7/8 Main Steam Line 2 Break Inside Containment/Containment Spray Pump A Trips

7. On Lead Examiner's cue, initiate Event **Trigger 5**.
8. If the Duty Plant Manager is called, inform the caller that you will make the necessary calls.
9. If Chemistry is called to perform samples acknowledge the request.
10. If called as an NAO to investigate the trip at the breaker, report overcurrent flags on all 3 phases.
11. If called as an NAO to investigate the trip at the pump, report that the paint on the motor is discolored and there is a strong odor of burnt insulation, but no fire.
12. **At the end of the scenario, before resetting, complete data collection by saving the file as 2012 Scenario 3-(start-end time).tid. Export to .csv file. Save the file into the folder for the appropriate crew.**

SCENARIO TIMELINE

EVENT	KEY	DESCRIPTION	TRIGGER	DELAY HH:MM:SS	RAMP HH:MM:SS	FINAL
EVENT DESCRIPTION						
1	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
RAISE POWER TO 20% TO ROLL THE MAIN TURBINE						
2	**CH08E1**	**CNTMT PRESS TRANSMITTER 6701 SMD FAILS HI**	**1**	**00:00:00**	**00:00:00**	**ACTIVE**
CONTAINMENT PRESSURE PPS CHANNEL D (CIAS) CB-IPI-6701SMD FAILS HIGH						
3	**CV01B**	**CHARGING PUMP B TRIPPED**	**2**	**00:00:00**	**00:00:00**	**ACTIVE**
CHARGING PUMP B TRIPS ON INSTANTANEOUS OVERCURRENT						
4	**FW20A2**	**SU FW REG. VALVE A FAILS CLOSED**	**3**	**00:00:00**	**00:00:00**	**ACTIVE**
STARTUP FEEDWATER REGULATING VALVE 1 FAILS CLOSED						
5	**RC23A**	**RCS COLD LEG 1A RUPTURE**	**4**	**00:02:00**	**00:00:00**	**14%**
LARGE RCS COLD LEG BREAK						
5	**L_L10**	**SEISMIC RECORDERS IN OPERATION (Delete after 30 Seconds)**	**4**	**00:00:00**	**00:00:00**	**FAIL_ON**
LARGE RCS COLD LEG BREAK						
5	**L_M10**	**SEISMIC EVENT**	**4**	**00:00:00**	**00:00:00**	**FAIL_ON**
LARGE RCS COLD LEG BREAK						
6	**RP05A3**	**FAILS TO TRIP CH A HI-HI CONT. PRESS (CSAS)**	**N/A**	**00:00:00**	**00:00:00**	**ACTIVE**
CONTAINMENT SPRAY FAILS TO AUTO ACTUATE						
6	**RP05B3**	**FAILS TO TRIP CH B HI-HI CONT. PRESS (CSAS)**	**N/A**	**00:00:00**	**00:00:00**	**ACTIVE**
CONTAINMENT SPRAY FAILS TO AUTO ACTUATE						
6	**RP05C3**	**FAILS TO TRIP CH C HI-HI CONT. PRESS (CSAS)**	**N/A**	**00:00:00**	**00:00:00**	**ACTIVE**
CONTAINMENT SPRAY FAILS TO AUTO ACTUATE						
6	**RP05D3**	**FAILS TO TRIP CH D HI-HI CONT. PRESS (CSAS)**	**N/A**	**00:00:00**	**00:00:00**	**ACTIVE**
CONTAINMENT SPRAY FAILS TO AUTO ACTUATE						

EVENT	KEY	DESCRIPTION	TRIGGER	DELAY HH:MM:SS	RAMP HH:MM:SS	FINAL
EVENT DESCRIPTION						
7	**MS11B**	**MS LINE B BREAK INSIDE CNTMT (0-100% = 40 IN)**	**5**	**00:00:00**	**00:00:00**	**10**
MAIN STEAM LINE 2 BREAK INSIDE CONTAINMENT						
8	**CS01A**	**LOSS OF CONTAINMENT SPRAY PUMP A**	**5**	**00:00:00**	**00:00:00**	**ACTIVE**
CONTAINMENT SPRAY PUMP A TRIPS						

REFERENCES

Event	Procedures
1	OP-010-003, Plant Startup, Rev. 324 (Copy marked up through Step 9.4.61) OP-010-004, Power Operations, Rev. 315 OP-002-005, Chemical and Volume Control, Rev. 37
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-901-112, Charging or Letdown Malfunction, Rev. 4 Technical Specification 3.1.2.4 Technical Requirement 3.1.2.4
4	OP-901-201, Steam Generator Level Control Malfunction, Rev. 5
5	OP-902-000, Standard Post Trip Actions, Rev. 13 OP-902-002, Loss of Coolant Accident Recovery Procedure, Rev. 14 OP-902-009, Standard Appendices, Rev. 307, Appendix 1, Diagnostic Flow Chart, and Appendix 2, Figures
6	OP-902-000, Standard Post Trip Actions, Rev. 13 OI-038-000, Emergency Operating Procedures Operations Expectation/Guidance, Rev. 5
7	OP-902-008, Functional Recovery Procedure, Rev. 18 OP-902-009, Standard Appendices, Rev. 307, Appendix 1, Diagnostic Flow Chart, and Appendix 2, Figures

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Event Description: Raise power to 10% to roll the Main Turbine

Time	Position	Applicant's Actions or Behavior
OP-003-035, Auxiliary Feedwater, Section, 7.0		
	SRO	Directs the BOP to secure the Auxiliary Feedwater Pump in accordance with OP-003-035, Auxiliary Feedwater.
	BOP	7.1.1 Secure Auxiliary Feedwater Pump.
	BOP	7.1.2 Place Auxiliary Feedwater Controller, FW-IFIC-8202, in Manual (MAN).
	BOP	7.1.2.1 Set controller to minimum setting.
	BOP	7.1.3 Open Auxiliary Feedwater Pump Discharge Pressure Cntrl, AFW-125.
OP-010-003, Plant Startup, Attachment 9.4		
	ATC	9.4.62 Raise Reactor power to ~ 6% Calibrated Nuclear Power (PID 171) by CEA withdrawal or boron dilution.
	ATC	Commences adding PMU per reactivity plan per OP-002-005, Chemical and Volume Control.
OP-002-005, Section 6.9, VCT Makeup Using the Dilute Makeup Mode		
CAUTION THIS SECTION AFFECTS REACTIVITY. THIS EVOLUTION SHOULD BE CROSS-CHECKED AND COMPLETED PRIOR TO LEAVING CP-4.		
		6.9.1 Inform SM/CRS that this Section is being performed.

Op Test No.: 1 Scenario # 3 Event # 1 Page 206 of 289

Event Description: Raise power to 10% to roll the Main Turbine

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 (≥340 EFPD)
		6.9.2 At SM/CRS discretion, calculate volume of Primary Makeup water to be added on Attachment 11.7, Calculation of Primary Makeup Water Volume for Direct Dilution or VCT Dilute Makeup Mode.
		6.9.3 Set Primary Makeup Water Batch Counter to volume of Primary Makeup water desired.
		6.9.4 Place Makeup Mode selector switch to DILUTE.
		6.9.5 Open VCT Makeup Valve, CVC-510.
		NOTE The Dilution Flow Totalizer will <u>not</u> register below 5 GPM. The Dilution Flow Totalizer is most accurate at >10 GPM.
		CAUTION DILUTION <u>SHALL</u> <u>IMMEDIATELY</u> BE STOPPED IF PRE-POWER DEPENDENT INSERTION LIMIT (H-9, CABINET H) ALARM IS INITIATED <u>OR</u> ANY UNEXPECTED REACTIVITY CHANGE OCCURS.
		6.9.6 <u>If</u> manual control of Primary Makeup Water flow is desired, <u>then</u> perform the following: 6.9.6.1 Verify Primary Makeup Water Flow controller, PMU-IFIC-0210X, in Manual. 6.9.6.2 Adjust Primary Makeup Water Flow controller, PMU-IFIC-0210X, output to > 5 GPM flow rate.

Op Test No.: 1 Scenario # 3 Event # 1 Page 207 of 289

Event Description: Raise power to 10% to roll the Main Turbine

Time	Position	Applicant's Actions or Behavior
	N/A	6.9.7 If automatic control of Primary Makeup Water flow is desired, then perform the following: 6.9.7.1 Place Primary Makeup Water Flow controller, PMU-IFIC-0210X, in Auto. 6.9.7.2 Adjust Primary Makeup Water Flow controller, PMU-IFIC-0210X, setpoint potentiometer to > 5 GPM flow rate.
		6.9.8 Verify Primary Makeup Water Control Valve, PMU-144, Intermediate or Open
		6.9.9 Observe Primary Makeup water flow rate for proper indication
		6.9.10 Operate VCT Inlet/Bypass to Holdup Tanks, CVC-169 Control Switch to BMS/Auto positions as necessary to maintain VCT pressure and level within normal operating bands.
		6.9.11 When Primary Makeup Water Batch Counter has counted down to desired value, then verify Primary Makeup Water Control Valve, PMU-144, Closed.
NOTE Step 6.9.12 may be repeated as necessary to achieve desired total Primary Makeup Water addition for plant conditions.		
		6.9.12 If additional Primary Makeup Water addition is required and with SM/CRS permission, then perform the following: 6.9.12.1 Reset Primary Makeup Water Batch Counter. 6.9.12.2 Verify Primary Makeup Water Control Valve, PMU-144, Intermediate or Open. 6.9.12.3 Observe Primary Makeup water flow rate for proper indication. 6.9.12.4 When Primary Makeup Water Batch Counter has counted down to desired value, then verify Primary Makeup Water Control Valve, PMU-144, Closed.
OP-010-003, Plant Startup, Attachment 9.4		
		9.4.62.1 Set Plant Monitoring Computer to Mode 1 in accordance with OP-004-012, Plant Computer System.
		9.4.63 At ~ 6% power, verify CPCs are calculating PQASI (PID 266).
		9.4.64 As directed by SM/CRS, initiate ASI control in accordance with Attachment 9.13, Axial Shape Control Guidelines.

Op Test No.: 1 Scenario # 3 Event # 1 Page 208 of 289

Event Description: Raise power to 10% to roll the Main Turbine

Time	Position	Applicant's Actions or Behavior
		9.4.65 If PQASI is outside the band of -0.48 to +0.48, then limit Reactor power to maintain CPC Total Raw Flux, DKSUM (PID 272) <43 on the most limiting channel.
CAUTION IF CPC TOTAL RAW FLUX, DKSUM (PID 272) IS GREATER THAN 51, AND PQASI (PID 266) EXCEEDS THE BAND OF -0.5 TO +0.5, THEN A CPC AUX TRIP WILL OCCUR.		
		9.4.66 If PQASI is within the band of -0.48 to +0.48, then continue power increase to ~10%.
Examiner Note **This event is complete after the Reactivity Manipulation is satisfied** **OR** **As directed by the Lead Evaluator**		

Op Test No.: 1 Scenario # 3 Event # 2 Page 209 of 289

Event Description: Containment Pressure PPS Channel D (CIAS), CB-IPI-6701SMD, fails high

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	Recognizes and reports indications of failed channel.
		Alarms:
		• RPS CHANNEL TRIP CNTMT PRESSURE HI (Cabinet K, A-17)
		• CNTMT PRESSURE HI PRETRIP B/D (Cabinet K, C-17)
		• RPS CHANNEL D TROUBLE (Cabinet K, H-18)
		• ESFAS CHANNEL TRIP CNTMT PRESSURE HI (Cabinet K, L-17)
		• CNTMT PRESSURE HI ESFAS PRETRIP B/D (Cabinet K, N-17)
		Indications:
		• PPS Channel D Containment Pressure (CIAS), CB-IPI-6701SMD failed high on CP-7
		• All other Containment Pressure instruments reading normal on CP-7
		• Pretrip and Trip Bistable Lights illuminated for Containment Pressure HI CNT PRESS (RPS and ESF) on Channel D CP-7 ROM.
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	6.2.1 Refer to Attachment 11.11, PPS Bistable Bypass Chart to assist in determination of Trip Channels requiring placement in bypass. **Determines the following bistables are affected and need to be bypassed:** • **13 - HI CNT PRESS (RPS)** • **16 - HI CNT PRESS (SIAS/CIAS/MSIS)**
	SRO	Directs BOP to bypass the HI CNT PRESS (RPS) and HI CNT PRESS (SIAS/CIAS/MSIS) 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.
	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 13 and 16 in Step 11.10.1.4 table)**

Op Test No.: 1	Scenario # 3	Event # 2	Page 210	of 289
Event Description:	Containment Pressure PPS Channel D (CIAS), CB-IPI-6701SMD, fails high			

Time	Position	Applicant's Actions or Behavior
	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: • 3.3.1 action 2 • 3.3.2 actions 13 • 3.3.3.5 – no actions required • 3.3.3.6 – no actions required

Examiner Note

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

OR

As directed by the Lead Evaluator

Op Test No.: 1 Scenario # 3 Event # 3 Page 211 of 289

Event Description: Charging Pump B trips on Instantaneous Overcurrent

Time	Position	Applicant's Actions or Behavior
	Note	All controls for the Charging manipulations are on CP-4
	ATC	Recognize and report indications of Charging Pump B trip.
		Alarms:
		• Charging Pump B Trip/Trouble (Cabinet G, B-6)
		• Charging Pumps Header Flow Lo (Cabinet G, H-5)
		Indications:
		• Charging flow and Charging Header pressure drop
		• Charging Pump B control switch indicates stop
		• REGEN HX TUBE OUTLET temperature (CVC-ITI-0221) rising
Examiner Note **There are steps in off normal OP-901-112, Charging or Letdown Malfunction, to manually start a standby Charging Pump after verifying a suction path. It is acceptable for the SRO to direct this action prior to entering OP-901-112 to avoid isolating the Charging and Letdown system on high temperature.** **If this is directed, the SRO should still enter OP-901-112 even after a Charging Pump is running.**		
	SRO	Enters and directs the implementation of OP-901-112, Charging or Letdown Malfunction.
OP-901-112, Charging or Letdown Malfunction		
	SRO	1. Stop turbine load changes.
	N/A	2. IF malfunction is due to failure of the Pressurizer Level Control System, THEN go to OP-901-110, PRESSURIZER LEVEL CONTROL MALFUNCTION
	SRO	3. IF a Charging Malfunction is indicated, THEN go to Subsection E_1, Charging Malfunction.
		SRO should evaluate E_0 and go to sub-section E_1.
NOTE If all Charging Pumps are secured, then LETDOWN STOP VALVE (CVC 101) will close on high REGEN HX TUBE OUTLET temperature if RCS is ≥470°F.		

Op Test No.: 1 Scenario # 3 Event # 3 Page 212 of 289

Event Description: Charging Pump B trips on Instantaneous Overcurrent

Time	Position	Applicant's Actions or Behavior
		This condition is applicable to the plant conditions. Regen Heat Exchanger temperature will rise to the 470 °F setpoint. Time is available for the crew to take action prior to isolation.
		CAUTION THE REACTOR COOLANT SYSTEM WILL BE BORATED IF A CHARGING PUMP IS STARTED WITH THE RWSP AS THE MAKEUP WATER SOURCE.
	ATC	1. IF Charging Pumps have tripped, THEN perform the following:
		1.1 Verify open EITHER VCT DISCH VALVE (CVC 183) OR RWSP TO CHARGING PUMP (CVC 507). 1.2 IF Letdown has NOT isolated, THEN attempt to restart Charging Pump(s). 1.3 IF the Charging Pump can NOT be restarted, THEN verify closed LETDOWN STOP VALVE (CVC 101). 1.4 IF the reason for the Charging pump trip is corrected AND Pressurizer level is in normal operating band, THEN place Charging and Letdown in service in accordance with Attachment 2
		• The ATC operator should verify a Charging Pump suction path via CVC-183 prior to starting another Charging Pump. Either Charging Pump A or AB can be started. This action is typically directed by the SRO.
		• If the crew does not start another Charging Pump prior to Letdown isolating at 470 °F, then the crew should re-establish Charging and Letdown in accordance with Attachment 2.
	SRO	2. IF normal Charging flow can NOT be established AND Pressurizer level falls below minimum Pressurizer level for operation in accordance with Attachment 1, Pressurizer Level Versus Tave Curve, THEN perform the following:
		This step should not be applicable due to the duration of the malfunction.
	CREW	3. IF the PMC is available, THEN display PMC Group CVCS and monitor Charging System parameters to determine cause of Charging malfunction.
		This data can be retrieved by any member of the crew. PMC point D39704, CVCS CHG PMP MTR B OVLD TRIP and D39702, CVCS CHG PMP MTR B TRP/TRBL will provide indication of the electrical failure of Charging Pump B.
	SRO	Evaluates Tech Spec and TRM 3.1.2.4 and enters both. Tech Spec 3.1.2.4 can be exited by aligning Charging Pump AB to replace B for SIAS. The SRO should remain in TRM 3.1.2.4 after this operation.

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Event Description: Charging Pump B trips on Instantaneous Overcurrent

Time	Position	Applicant's Actions or Behavior
	ATC	Align Charging Pump AB to replace B on SIAS by aligning the Pump AB Assignment switch to the B position on CP-4.
	SRO	Exit Tech Spec 3.1.2.4. Crew must remain in TRM 3.1.2.4.

Examiner Note

This event is complete after Charging Pump AB is aligned to replace Charging Pump B

Or

As directed by the Lead Evaluator

Op Test No.: 1 Scenario # 3 Event # 4 Page 214 of 289

Event Description: Startup Feedwater Regulating Valve 1 fails closed

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize and report indications of Startup Feedwater Reg Valve failure.
		Alarms:
		• Steam Generator 1 Steam/FW Flow Signal Dev (Cabinet F, T-17)
		• Steam Generator 2 Steam/FW Flow Signal Dev (Cabinet F, U-17)
		Indications:
		• Steam Generator 1 Level Lowering (SG-ILR1-1105 and 1111)
		• Deviation between steam flow AND feedwater flow on SG 2
	SRO	Directs BOP to match Feedwater flow and Steam flow on Steam Generator 1 and restore level to 50-70% NR.
	BOP	Adjusts Main Feed Reg Valve 1 to Match Feedwater Flow and Steam Flow.
	SRO	Enters and directs the implementation of OP-901-201, Steam Generator Level Malfunction
OP-901-201, Steam Generator Level Malfunction, E0, General		
	N/A	1. If Steam Generator level is < 41% NR and there is no Feedwater flow to the Steam Generator, then perform the following: 1.1 Trip the Reactor. 1.2 Go to OP-902-000, Standard Post Trip Actions
	SRO	2. Go to Attachment 1, General Actions.
OP-901-201, Steam Generator Level Malfunction, Attachment 1, General Actions		
	SRO	Did a Reactor Trip occur? **NO - Continues though flowchart**

Op Test No.: 1 Scenario # 3 Event # 4 Page 215 of 289

Event Description: Startup Feedwater Regulating Valve 1 fails closed

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	Observe the affected Steam Generator FWCS controllers **AND** note **ANY** controllers that are behaving erratically. **Steam Generator 1** FW IFIC 1111 , S/G 1 FWCS Master Controller FW IHIC 1111 , S/G 1 Main FRV Controller FW IHIC 1105 , S/G 1 S / U FRV Controller FW IHIC 1107 , SGFP A Speed Controller **Steam Generator 2** FW IFIC 1121 , S/G 2 FWCS Master Controller FW IHIC 1121 , S/G 2 Main FRV Controller FW IHIC 1106 , S/G 2 S / U FRV Controller FW IHIC 1108 , SGFP B Speed Controller
	NOTE	**Should determine that no controllers are malfunctioning.**
	N/A	Place appropriate controllers for the affected FWCS in manual **AND** establish control of S/G level. **(controllers in MANUAL prior to the event)**
	SRO/BOP	Is the output of the affected FWCS Master Controller behaving erratically?
		• No
	SRO/BOP	**Verify** SGFP Discharge pressure for BOTH SGFP ' s is matched **AND** is greater than S / G pressures.
		The BOP should verify the running FW Pump Discharge pressure is greater than Steam Generator Pressure. Only one FW pump is running at this time.
	SRO	Stop turbine load changes except to match Tave and Tref.
		May be applicable if the crew has recommenced the power ascension. Otherwise this is N/A.
	SRO/BOP	Review the following guidelines **AND** restore S /G level to 50-70% NR: 1. **IF** one SGFP Speed controller is in auto, **THEN** use its output to help set the SGFP Speed controller that is in manual. 2. Momentary taps on the raise **AND** lower buttons of the Main Feedwater Reg Valve Controller have a noticeable impact on associated Steam Generator level. 3. Use the Startup Feedwater Reg Valve Controller to control Steam Generator level at low power levels. 4. Use indications on the unaffected FWCS controllers to help set affected FWCS controllers.
		Only 2 apples in this case

Op Test No.: 1	Scenario # 3	Event # 4	Page 216	of 289
Event Description:	Startup Feedwater Regulating Valve 1 fails closed			

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	Check the following Control Channel indicators to determine if a Control Channel has failed: (See Note 3) • FW IFR 1111, Steam Generator 1 Feedwater Flow (green pen) • FW IFR 1011, Steam Generator 1 Steam Flow (red pen) • FW IFR 1121, Steam Generator 2 Feedwater Flow (green pen) • FW IFR 1021, Steam Generator 2 Steam Flow (red pen) • SG ILR1111, Steam Generator 1 Downcomer Level (green pen) • SG ILR1105, Steam Generator 1 Downcomer Level (red pen) • SG ILR1121, Steam Generator 2 Downcomer Level (green pen) • SG ILR1106, Steam Generator 2 Downcomer Level (red pen)
	Note	Should determine no failed instruments.
	SRO	Control Channel level deviation of > 7%?
		• **NO**
	N/A	Verify applicable controllers shifted to manual per automatic actions.
	Note	The Main Feed Reg Valve B, Startup Feed Reg Valve B, and Main Feedwater Pump B were already in manual.
	SRO/BOP	Determine **AND** correct the cause of the malfunction.
		• BOP should note that Startup Feedwater Reg Valve 1 is not responding to controller output.
		• The SRO should discuss with the BOP necessary contingency actions necessary due to controlling Feedwater Reg Valve 1 in MANUAL

Examiner Note

This event is complete after the SRO has completed the flowchart and Steam Generator 1 level is being controlled

OR

As directed by the Lead Evaluator.

Op Test No.: 1 Scenario # 3 Event # 5 Page 217 of 289

Event Description: Large RCS Cold Leg Break/CSAS Fails to Auto Actuate

Time	Position	Applicant's Actions or Behavior
	ATC	Recognize and report indications of Loss of Coolant Accident.
		Alarms:
		• Pressurizer Pressure Hi/Lo (Cabinet H, E-1)
		• Pressurizer Level Hi/Lo (Cabinet H, B-1)
		• Containment Pressure Hi/Lo (Cabinet M, H-4, Cabinet N, H-14)
		• Containment Water Leakage Hi (Cabinet N, L-20)
		• Containment Water Leakage Hi-Hi (Cabinet N, K-20)
		Indications:
		• RCS pressure dropping (CP-7, CP-2)
		• Pressurizer level lowering (CP-2, CP-8, QSPDS 1)
		• Backup Charging Pump starts (CP-4)
		• Letdown flow goes to minimum (CP-4)
	SRO	Directs ATC and BOP to carry out Standard Post trip Actions.
OP-902-000, Standard Post Trip Actions		
	ATC	1. Determine **Reactivity Control** acceptance criteria are met: a. Check reactor power is dropping. b. Check startup rate is negative. c. Check less than **TWO** CEAs are **NOT** fully inserted.
	BOP	2. Determine **Maintenance of Vital Auxiliaries** acceptance criteria are met: a. Check the Main Turbine is tripped: • Governor valves closed • Throttle valves closed
	BOP	b. Check the Main Generator is tripped: • GENERATOR BREAKER A tripped • GENERATOR BREAKER B tripped • EXCITER FIELD BREAKER tripped

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Event Description: Large RCS Cold Leg Break/CSAS Fails to Auto Actuate

Time	Position	Applicant's Actions or Behavior
	BOP	c. Check station loads are energized from offsite electrical power as follows: **Train A** • 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 **Train B** • 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. Determine **RCS Inventory Control** acceptance criteria are met: a. Check that **BOTH** the following conditions exist: • Pressurizer level is 7% to 60% • Pressurizer level is trending to 33% to 60% b. Check RCS subcooling is greater than or equal to 28ºF.
	Note	This will not be met due to the LOCA
	ATC	4. Determine **RCS Pressure Control** acceptance criteria are met by checking that **BOTH** of the following conditions exist: • Pressurizer pressure is 1750 psia to 2300 psia • Pressurizer pressure is trending to 2125 psia to 2275 psia
		4.2 **IF** pressurizer pressure is less than 1684 psia, **THEN** verify the following have initiated. • SIAS • CIAS
		4.3 **IF** pressurizer pressure is less than 1621 psia, **THEN** verify no more than two RCPs are operating
		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.

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Event Description: Large RCS Cold Leg Break/CSAS Fails to Auto Actuate

Time	Position	Applicant's Actions or Behavior
	ATC	5. Determine **Core Heat Removal** acceptance criteria are met: a. Check at least one RCP is operating. b. Check operating loop ΔT is less than 13ºF. c. Check RCS subcooling is greater than or equal to 28ºF.
	Note	If Reactor All Coolant Pumps are secured, this step can be skipped.
	BOP	6. Determine **RCS Heat Removal** acceptance criteria are met: a. Check that at least one steam generator has **BOTH** of the following: • Steam generator level is 5% to 80% NR • Main Feedwater is available to restore level within 50%-70% NR.
	Note	Main Feedwater will be isolated on MSIS
		a2. Verify Emergency Feedwater is available to restore level in at least one steam generator within 50%-70% NR **[60-80% NR]**.
	ATC	b. Check RCS TC is 530 ºF to 550 ºF
	BOP	c. Check steam generator pressure is 885 psia to 1040 psia.
	BOP	d. Check Feedwater Control in Reactor Trip Override: • 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
	Note	After MSIS Feedwater pumps will be coasting down and feedwater control valves will be closed.
	BOP	e. Reset moisture separator reheaters, and check the temperature control valves closed.
	ATC	7. Determine **Containment Isolation** acceptance criteria are met: a. Check containment pressure is less than 16.4 psia. b. Check NO containment area radiation monitor alarms OR unexplained rise in activity. c. Check NO steam plant activity monitor alarms OR unexplained rise in activity.
	Note	Won't be met because of Containment Pressure and activity

Op Test No.: 1 Scenario # 3 Event # 5 Page 220 of 289

Event Description: Large RCS Cold Leg Break/CSAS Fails to Auto Actuate

Time	Position	Applicant's Actions or Behavior
		a1. **IF** containment pressure is greater than or equal to 17.1 psia, **THEN** verify the following: • CIAS is initiated • SIAS is initiated • MSIS is initiated
	BOP	8 Determine **Containment Temperature and Pressure Control** acceptance criteria are met: a. Check containment temperature is less than or equal to 120ºF. lsutgr-4 b. Check containment pressure is less than 16.4 psia.
		8.1 Verify at least three containment fan coolers are operating.
		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.
CRITICAL TASK **ESTABLISH CONTAINMENT TEMPERATURE AND PRESSURE CONTROL** This task is satisfied by manually initiating Containment Spray Actuation Signal prior to exiting OP-902-000, Standard Post Trip Actions or Containment pressure exceeds 44 PSIG. This task becomes applicable after Containment Pressure rises above 17.7 PSIA.		
CRITICAL TASK **TRIP ANY RCP NOT SATISFYING RCP OPERATING LIMITS** This task is satisfied by securing all RCPs within 3 minutes of loss of Component Cooling Water flow. This task becomes applicable after Containment Spray is initiated. The time requirement of 3 minutes is based on the Reactor Coolant Pump operating limit of 3 minutes without Component Cooling Water cooling.		
		8.3 **IF** containment pressure is greater than or equal to 17.7 psia, **THEN** verify **ALL** of the following: • CSAS is initiated • **ALL** available containment spray pumps are delivering flow greater than 1750 gpm • **ALL** RCPs are secured

Op Test No.: 1 Scenario # 3 Event # 5 Page 221 of 289

Event Description: Large RCS Cold Leg Break/CSAS Fails to Auto Actuate

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. • Proper use of chart will result in use of OP-902-002, Loss of cooling Accident Recovery.
OP-902-002, Loss of Coolant Accident Recovery		
	SRO	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.
	CREW	2. Announce a Loss of Coolant Accident is in progress using the plant page.
	SRO	3. Advise the Shift Manager to REFER TO EP-001-001, "Recognition & Classification of Emergency Condition" and implement the Emergency Plan.
	N/A	4. **IF** power has been interrupted to either 3A or 3B safety buses, **THEN** perform Appendix 20, "Operation of DCT Sump Pumps".
	SRO	5. REFER TO Section 6.0, "Placekeeper" and record the time of the reactor trip.
Examiner Note **This event is complete after the SRO enters OP-902-002** **Or** **As directed by the Lead Evaluator.**		

Op Test No.: 1 Scenario # 3 Event # 6 Page 222 of 289

Event Description: Main Steam Line 2 Break Inside Containment/Containment Spray Pump A Trips/OP-902-008

Time	Position	Applicant's Actions or Behavior
	BOP	Recognizes and reports indication of Main Steam Line Break on SG 2
		Alarms
		• SG 2 Pressure Lo Pretrip and Trip Alarms on CP-2
		• SG 2 Level Lo Pretrip and Trip Alarms
		•
		Indications
		• SG 2 Pressure lowering on CP-8 and CP-1 indicators
		• SG 2 Level lowering on CP-8 and CP-1 indicators
	SRO	Recognize two events in progress and either goes directly to OP-902-008, Functional Recovery, or returns to the diagnostics flowchart and diagnoses into OP-902-008.
OP-902-008, Functional Recovery		
	CREW	1. Announce that the Functional Recovery Procedure is in progress using the plant page.
	SRO	2 Advise the Shift Manager to REFER TO EP-001-001, "Recognition & Classification of Emergency Condition" and implement the Emergency Plan.
	SRO	3 REFER TO the "Placekeeper" and record the time of the reactor trip.
	N/A	4. **IF** pressurizer pressure is less than 1621 psia, **AND** SIAS is actuated, **THEN** 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.
	N/A	5. **IF** RCPs are operating, **THEN**: a. **IF** a CSAS is initiated, **THEN** stop ALL RCPs. b. Verify CCW available to RCPs. c. **IF** RCS TC is less than 382ºF [384ºF], **THEN** verify no more than two RCPs are operating.

Op Test No.: 1 Scenario # 3 Event # 6 Page 223 of 289

Event Description: Main Steam Line 2 Break Inside Containment/Containment Spray Pump A Trips/OP-902-008

Time	Position	Applicant's Actions or Behavior
		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.
	SRO	6. Direct Chemistry to sample **BOTH** steam generators for activity and boron.
	N/A	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:
	N/A	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:
	N/A	9. **IF** power has been interrupted to either 3A or 3B safety buses, **THEN** perform Appendix 20, "Operation of DCT Sump Pumps".
	BOP	10. Place Hydrogen Analyzers in service as follows:
		Train A
		a. Place Train A H2 ANALYZER CNTMT ISOL VALVE keyswitch to OPEN.
		b. Place H2 ANALYZER A POWER to ON.
		c. Check H2 ANALYZER A Pumps indicate ON.
		Train B
		a. Place Train B H2 ANALYZER CNTMT ISOL VALVE keyswitch to OPEN.
		b. Place H2 ANALYZER B POWER to ON.
		c. Check H2 ANALYZER B Pumps indicate ON.
		CRITICAL TASK **ESTABLISH CONTAINMENT ISOLATION** This task is satisfied by prioritizing CI-1 as Priority 1 after performing Step 11 of OP-902-008, Functional Recovery This task becomes applicable after the Main Steam Line Break occurs.

Op Test No.: 1 Scenario # 3 Event # 6 Page 224 of 289

Event Description: Main Steam Line 2 Break Inside Containment/Containment Spray Pump A Trips/OP-902-008

Time	Position	Applicant's Actions or Behavior
	SRO	11. Identify success paths to be used and prioritize Safety Functions. SRO should determine priorities and paths as follows on the Safety Function Tracking Sheet: (Priorities may vary depending on time parameters checked; however, Priority1 should be CI-1) • Reactivity Control, RC-1 = 5 • Maintenance of Vital Auxiliaries (DC), MVA-DC-1 = 6 • Maintenance of Vital Auxiliaries (AC), MVA-AC-1 = 7 • RCS Inventory Control, IC-2 = 2 • RCS Pressure Control, PC-2 = 8 • RCS and Core Heat Removal, HR-2 = 3 • Containment Isolation, CI-1 = 1 **(CRITICAL)** Containment Temperature and Pressure Control, CTPC-2 = 4
	Note	The SRO may choose to two address safety functions in parallel
CONTAINMENT ISOLATION, CI-1		
	SRO/BOP	1. **IF ANY** of the following conditions exist: • 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 **THEN** perform **BOTH** of the following: a. Verify CIAS is initiated. b. Verify that an isolation valve is closed for each containment penetration required to be closed. b1. **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. b2. **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.
	N/A	2. **IF** a SGTR is indicated by **ANY** of the following:
	SRO/ATC	3. Check the following CCW Radiation Monitor AB indications: • Hi Alarm clear • No abnormal rise in radiation monitor reading

Op Test No.: 1	Scenario # 3	Event # 6	Page 225 of 289
Event Description:	Main Steam Line 2 Break Inside Containment/Containment Spray Pump A Trips/OP-902-008		

Time	Position	Applicant's Actions or Behavior
		4. Check CI-1, Automatic/Manual Isolation is satisfied by **ANY** of the following: **Condition 1** 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. b. Containment pressure is less than 17.1 psia. c. **NO** Containment area radiation monitor alarms or unexplained rise. d. **IF** SGTR diagnosed, **THEN** steam generator pressure less than 1000 psia **[960 psia] AND NOT** steaming via ADV. **Condition 2** 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. b. Each containment penetration required to be closed for current plant conditions has an isolation valve closed. c. **IF** SGTR diagnosed, **THEN** steam generator pressure less than 1000 psia **[960 psia] AND NOT** steaming via ADV.

Examiner Note

This event is complete after SRO prioritizes Safety Functions and implements highest priority path

Or

As directed by the Lead Evaluator.

Facility: Waterford 3 Scenario No.: 4 Op Test No.: 1

Examiners: _____ Operators: _____

Initial Conditions: ~ 100% Reactor Power, BOC

Turnover:

Protected Train is B, AB Bus is aligned to Train B, HPSI Pump A is OOS

Event No.	Malf. No.	Event Type*	Event Description
1	SG05B	I – BOP I – SRO	Steam Generator 2 Level Control Transmitter, SG-ILT-1106, fails low requiring implementation of OP-901-201, Steam Generator Level Control Malfunction.
2	RC15A1	I – ATC I – SRO TS – SRO	Pressurizer Level Control Channel Level Transmitter, RC-ILT-0110X, fails high requiring implementation of OP-901-110, Pressurizer Level Control Malfunction.
3	SG01B	TS – SRO	Steam Generator 2 develops a tube leak requiring implementation of OP-901-202, Steam Generator Tube Leakage.
4	N/A	R – ATC N – BOP N – SRO	Steam Generator 2 tube leakage requires implementation of OP-901-212, Rapid Plant Power Reduction.
5	IA03D IAR28	C – ATC C – SRO	Instrument Air Leak requiring implementation of OP-901-511, Instrument Air Malfunction and a manual reactor trip. After the reactor trip the leak is located and isolated.
6	SG01B	M – All	Primary to Secondary Leakage in Steam Generator 2 rises to greater than Charging Pump Capacity (Steam Generator Tube Rupture) **(Critical Task 2 and 3)**
7	ED02D EG08B	C – BOP C – SRO	A Startup Transformer B fault occurs, causing loss of power to the B3 bus which powers the only OPERABLE HPSI Pump. Emergency Diesel Generator B fails to AUTO start requiring operator action to re-energize the B3 bus. **(Critical Task 1)**
8	SI02B	C – BOP C – SRO	High Pressure Safety Injection Pump B fails to auto start requiring action to start the HPSI Pump. **(Critical Task 1)**

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

The crew assumes the shift at 100% power with instructions to maintain 100% power. High Pressure Safety Injection Pump A is out of service and danger tagged, due to high pump bearing vibration during its quarterly IST. Since it occurred just prior to shift turnover and the AB bus is aligned to Train B, High Pressure Safety Injection Pump AB has not yet been aligned for service. The Work Management Center is working in that direction.

After taking the shift, Steam Generator 2 Level Control Transmitter, SG-ILT-1106 fails low. The SRO should direct the BOP to match feedwater and steam flow using Feedwater Regulating Valve 2, FW-173B and stabilize SG 2 level 50-70% Narrow Range. The SRO should enter OP-901-201, Steam Generator Level Control Malfunction and implement Attachment 1, General Actions.

After the crew has restored Steam Generator 2 to between 50 and 70% Narrow Range, Pressurizer Level Control Channel Level Transmitter, RC-ILT-0110X, fails high. The SRO should enter OP-901-110, Pressurizer Level Control Malfunction and implement Section E1. The crew should take manual control of the Pressurizer Level Controller and/or operate Charging Pumps to restore Pressurizer level, swap control to the Channel Y level channel, and return the Pressurizer Level Controller back to AUTO. The SRO should review Technical Specifications 3.3.3.5 and 3.3.3.6 and OP-903-013, Monthly Channel Checks. The SRO should determine that TS 3.3.3.6 requirements are met, but enter TS 3.3.3.5 Action a.

After Pressurizer Level Control is in AUTO, Steam Generator 2 develops a tube leak at ~ 11 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. 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, an Instrument Air leak occurs. The SRO should implement OP-901-511, Instrument Air Malfunction. SA-125, Station Air to Instrument Air cross-connect valve, fails to open at set pressure and Instrument Air Header Pressure drops to less than 65 psig. The SRO should order a manual reactor trip and the crew should perform the actions of OP-902-000, Standard Post Trip Actions. If a leak location investigation is initiated, the leak will be found and isolated. If an operator is sent to SA-125 the operator will be able to open the valve by adjusting the local controller. Neither of these actions will be performed prior to reaching the reactor trip criteria of OP-901-511.

After the SRO has entered OP-902-007, Steam Generator Tube Rupture Recovery, Primary to Secondary leakage rises to greater than Charging Pump capacity. The SRO should order a manual actuation of Safety Injection and Containment Isolation. After Safety Injection is actuated, Startup Transformer B fails and Emergency Diesel Generator B fails to AUTO start. Additionally, when power is restored High Pressure Safety Injection Pump B fails to auto start. The BOP should perform a manual start of Emergency Diesel Generator B, verify that the Emergency Diesel Generator automatically loads, and manually start High Pressure Safety Injection Pump B **(CRITICAL TASK 1)**. The crew should start a rapid cooldown of the Reactor Coolant System to less than 520°F T-hot. Since MS-319A is out of service due to the IA line rupture the BOP should select an alternate Steam Bypass Valve to perform the cooldown. The crew should also depressurize the Reactor Coolant System to prevent lifting secondary safety valves on Steam Generator 2 **(CRITICAL TASK 2)**, and isolate Steam Generator 2 **(CRITICAL TASK 3)**.

The scenario can be terminated after Steam Generator 2 is isolated or at the lead examiner's discretion.

CRITICAL TASKS

9. ESTABLISH RCS INVENTORY CONTROL

This task applies upon loss of power to the B3 bus. This task is satisfied by the crew taking action to start and load Emergency Diesel Generator B and manually start High Pressure Safety Injection Pump B.

10. PREVENT OPENING MAIN STEAM SAFETY VALVES.

This task is satisfied by the crew taking action to maintain Steam Generator 2 pressure below the lowest secondary safety valve setpoint by taking action to reduce RCS pressure to < 1085 psia.

11. ISOLATE RUPTURED STEAM GENERATOR

This task is satisfied by isolating Steam Generator 2 in accordance with OP-902-007, Steam Generator Tube Rupture Recovery, Step 17 after RCS T_{HOT} is reduced below 520°F.

Scenario Quantitative Attributes

22. Total malfunctions (5–8)	7
23. Malfunctions after EOP entry (1–2)	2
24. Abnormal events (2–4)	4
25. Major transients (1–2)	1
26. EOPs entered/requiring substantive actions (1–2)	1
27. EOP contingencies requiring substantive actions (0–2)	0
28. Critical tasks (2–3)	3

SCENARIO SETUP

AA. Reset Simulator to IC-194.

BB. Verify Scenario Malfunctions are loaded, as listed in the Scenario Timeline.

CC. Verify the following Remotes and Overrides:

1. SIR29, HPSI PUMP A – RACKOUT
2. SIR24, SI-203A_SI-208A HPSI PUMP A SUCT/DISCH ISOL VLVS - CLOSE

DD. Verify HPSI Pump A Control Switch (C/S) in OFF and place Danger Tag on C/S.

EE. Ensure Event Trigger 6 is set up as below to initiate when Safety Injection is actuated:

1. ((RP_ESFASIAS == 1) I (RP_ESFBSIAS == 1))

FF. Ensure Protected Train B sign is placed in SM office window.

GG. Verify EOOS is 8.7 Yellow.

HH. Complete the simulator setup checklist.

II. Start Insight, select file PlantParameters.tis.

SIMULATOR BOOTH INSTRUCTIONS

Event 1 Steam Generator 2 Level Control Transmitter, SG-ILT-1106, fails low

6. On Lead Examiner's cue, initiate Event **Trigger 1**.
7. 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 Pressurizer Level Control Channel Level Transmitter, RC-ILT-0110X, Fails High

8. On Lead Examiner's cue, initiate Event **Trigger 2**.
9. 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 3/4 Steam Generator 2 Tube Leak, OP-901-212, Rapid Plant Power Reduction

9. On Lead Examiner's cue, initiate Event **Trigger 3**.
10. If Chemistry is called to sample the Steam Generators for activity, acknowledge and wait 30 minutes and report leakage into Steam Generator 2 is ~ 11 GPM.
11. 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.
12. If requested to verify BD-1162, position locally, report that BD-1162 is closed.
13. 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.
14. 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.
15. If called as DPM or Duty OPS Manager acknowledge the communication and in form the caller that you will make your required communications per OI-035-000, Attachment 1.
16. If notified as Load Dispatcher (Woodlands) acknowledge the communications and inform the caller that the grid will remain stable with available backup generation.
17. If requested to remove polisher vessels from service, inform the caller that you will monitor Polisher D/P and remove vessels as necessary.

Event 5 Instrument Air Leak

10. On Lead Examiner's cue, initiate Event **Trigger 4**.
11. If the Work Week Manager or PMM are called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.
12. If the caller requests PMM assistance locating the leak inform the caller that 2 PMM persons will be provided to support leak location as soon as possible.
13. If requested to open the bypass valve around the SA to IA Cross-Connect Valve, wait until the reactor trip has occurred and set Remote IAR23 to OPEN and report that SA-127 is open.
14. If Operators are dispatched to locate the Instrument Air Leak, wait until after the reactor trip and report to the Control Room that the leak is on the Supply line to Steam Bypass Valve, MS-319A and can be isolated by closing IA-4916.
15. If directed to isolate the leak, set Remote IAR17 to CLOSED, LO-01A09A04DS1-1is set to ON, DI-01A09S08-1 is set to OFF, and delete Malfunction IA03D. Report to the Control Room that the leak is isolated.

Event 6/7 **Primary to Secondary Leakage in Steam Generator 2 Rises to Greater Than Charging Pump Capacity, Startup Transformer B Fault, Emergency Diesel Generator B and HPSI Pump B Fail To AUTO Start**

13. On Lead Examiner's cue, initiate Event **Trigger 5**.
14. When Safety Injection is actuated, ensure Event **Trigger 6** goes active.
15. If the Duty Plant Manager or Duty OPS Manager is called, inform the caller that you will make the necessary calls in accordance with, OI-035-000.
16. If Chemistry is called to perform samples acknowledge the request.
17. **At the end of the scenario, before resetting, end data collection and save the file as 2012 Scenario4-(start-end time).tid. Export to .csv file. Save the file into the folder for the appropriate crew**

SCENARIO TIMELINE

EVENT	KEY	DESCRIPTION	TRIGGER	DELAY HH:MM:SS	RAMP HH:MM:SS	FINAL
EVENT DESCRIPTION						
1	**SG05B**	**SG LEVEL ILT-1106 FAILS (0-100%)**	**1**	**00:00:00**	**00:01:00**	**0**
STEAM GENERATOR 2 LEVEL CONTROL TRANSMITTER, SG-ILT-1106 FAILS LOW						
2	**RC15A1**	**PZR CONTROL LT 0110X FAILS HI**	**2**	**00:00:00**	**00:00:00**	**ACTIVE**
PRESSURIZER LEVEL CONTROL CHANNEL LEVEL TRANSMITTER, RC-ILT-0110X FAILS HIGH						
3/4	**SG01B**	**SG2 TUBE LEAK (100% = 3200 GPM)**	**3**	**00:00:00**	**00:00:00**	**0.35**
STEAM GENERATOR 1 TUBE LEAK, OP-901-212, RAPID PLANT POWER REDUCTION						
5	**IA03D**	**RUPTURE AIRLINE TO STM BYPASS VLV MS-319A**	**4**	**00:00:00**	**00:00:00**	**100**
INSTRUMENT AIR LEAK						
5	**IAR28**	**SA-125 SETPOINT**	**N/A**	**00:00:00**	**00:00:00**	**0**
INSTRUMENT AIR LEAK						
6	**SG01B**	**SG2 TUBE LEAK (100% = 3200 GPM)**	**5**	**00:00:00**	**00:02:00**	**8**
PRIMARY TO SECONDARY LEAKAGE IN STEAM GENERATOR 1 RISES TO GREATER THAN CHARGING PUMP CAPACITY						
7	**ED02D**	**LOSS OF SUT B TRANSFORMER**	**6****	**00:00:00**	**00:00:00**	**ACTIVE**
SUT B FAULT, EDG B FAILS TO AUTO START			**** SEE SIMULATOR SETUP NOTES**			
7	**EG08B**	**FAILURE OF DG B TO AUTOSTART**	**N/A**	**00:00:00**	**00:00:00**	**ACTIVE**
SUT B FAULT, EDG B FAILS TO AUTO START						
8	**SI02B**	**HPSI PUMP B FAILS TO AUTO START**	**N/A**	**00:00:00**	**00:00:00**	**ACTIVE**
HIGH PRESSURE SAFETY INJECTION PUMP B FAILS TO AUTO START						

REFERENCES

Event	Procedures*
1	OP-901-201, Steam Generator Level Control Malfunction, Rev. 5
2	OP-901-110, Pressurizer Level Control Malfunction, Rev. 6 OP-903-013, Monthly Channel Checks, Rev. 16 Tech Spec 3.3.3.5 Tech Spec 3.3.3.6
3	OP-901-202, Steam Generator Tube Leakage or High Activity, Rev. 9 Tech Spec 3.4.5.2
4	OP-901-212, Rapid Plant Power Reduction, Rev. 4
5	OP-901-511, Instrument Air Malfunction, Rev. 9 OP-902-000, Standard Post Trip Actions, Rev. 13
6	OP-902-000, Standard Post Trip Actions, Rev. 13 OP-902-009, Standard Appendices, Rev. 307, Appendix 1, Diagnostic Flow Chart and Appendix 2, Figures OP-902-007, Steam Generator Tube Rupture Recovery Procedure, Rev. 13
7	OP-902-000, Standard Post Trip Actions, Rev. 13 OI-038-000, Emergency Operating Procedure Operations Expectations/Guidance, Rev. 5

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Event Description: FWCS 2 Steam Generator Level Transmitter SG-ILT-1106 fails low

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize and report indications of failed Steam Generator level instrument.
		Alarms
		• SG 2 FW Contl Lvl Signal Dev/Pwr Lost (Cabinet F, T-19)
		• SG 2 Level Hi/Lo (Cabinet F, U-18)
		Indications
		• Controllers for Steam Generator 2 shift to MANUAL.
		o Main Feedwater Regulating Valve B Controller.
		o Startup Feedwater Regulating Valve B Controller
		o Main Feedwater Pump B Speed Controller
	SRO	Enter and direct the implementation of OP-901-201, Steam Generator Level Control Malfunction
OP-901-201, Steam Generator Level Control Malfunction, Section E0, General		
	N/A	1. If Steam Generator level is <41% NR and there is no Feedwater flow to the Steam Generator, then perform the following: 1.1 Trip the Reactor. 1.2 Go to OP-902-000, Standard Post Trip Actions
	SRO	2. Go to Attachment 1, General Actions.
OP-901-201, Steam Generator Level Control Malfunction, Attachment 1, General Actions		
	SRO	Did a Reactor Trip occur? NO - Continues though flowchart

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Event Description: FWCS 2 Steam Generator Level Transmitter SG-ILT-1106 fails low

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	Observe the affected Steam Generator FWCS controllers **AND** note **ANY** controllers that are behaving erratically. **Steam Generator 1** FW IFIC 1111 , S/G 1 FWCS Master Controller FW IHIC 1111 , S/G 1 Main FRV Controller FW IHIC 1105 , S/G 1 S / U FRV Controller FW IHIC 1107 , SGFP A Speed Controller **Steam Generator 2** FW IFIC 1121 , S/G 2 FWCS Master Controller FW IHIC 1121 , S/G 2 Main FRV Controller FW IHIC 1106 , S/G 2 S / U FRV Controller FW IHIC 1108 , SGFP B Speed Controller
	NOTE	Should determine that no controllers are malfunctioning.
	SRO/BOP	Place appropriate controllers for the affected FWCS in manual AND establish control of S/G level. (Determines proper controllers in MANUAL)
	SRO/BOP	Is the output of the affected FWCS Master Controller behaving erratically?
		• No
	SRO/BOP	Verify SGFP Discharge pressure for BOTH SGFP's is matched **AND** is greater than S/G pressures.
	N/A	Stop turbine load changes except to match Tave and Tref.
	SRO/BOP	Review the following guidelines **AND** restore S /G level to 50-70% NR: 4. **IF** one SGFP Speed controller is in auto, **THEN** use its output to help set the SGFP Speed controller that is in manual. 5. Momentary taps on the raise **AND** lower buttons of the Main Feedwater Reg Valve Controller have a noticeable impact on associated Steam Generator level. 6. Use the Startup Feedwater Reg Valve Controller to control Steam Generator level at low power levels. 7. Use indications on the unaffected FWCS controllers to help set affected FWCS controllers.

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Event Description: FWCS 2 Steam Generator Level Transmitter SG-ILT-1106 fails low

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	Check the following Control Channel indicators to determine if a Control Channel has failed: (See Note 3) • FW IFR 1111, Steam Generator 1 Feedwater Flow (green pen) • FW IFR 1011, Steam Generator 1 Steam Flow (red pen) • FW IFR 1121, Steam Generator 2 Feedwater Flow (green pen) • FW IFR 1021, Steam Generator 2 Steam Flow (red pen) • SG ILR1111, Steam Generator 1 Downcomer Level (green pen) • SG ILR1105, Steam Generator 1 Downcomer Level (red pen) • SG ILR1121, Steam Generator 2 Downcomer Level (green pen) • SG ILR1106, Steam Generator 2 Downcomer Level (red pen)
	Note	• SG ILR1106, Steam Generator 2 Downcomer Level (red pen) is the failed instrument.
	SRO	Control Channel level deviation of >7%?
		• **YES**
	SRO	Verify applicable controllers shifted to manual per automatic actions.
	Note	The Main Feed Reg Valve B, Startup Feed Reg Valve B, and Main Feedwater Pump B will have shifted to manual.
	SRO	Determine **AND** correct the cause of the malfunction.
		• Coverage of the flow chart in Attachment 1 should conclude that the failed instrument is the problem.
		• The SRO should discuss with the BOP necessary contingency actions necessary with the listed controllers in MANUAL. This should include actions on a Reactor trip or on Steam Generator High Level Override.

Examiner Note

This event is complete when the flow chart in Attachment 1 has been completed and the contingencies have been discussed and the <u>BOP has performed manual control during the power reduction</u>

Or

As directed by the Lead Evaluator

This failure requires additional actions by the BOP during the power reduction and after the Reactor trip later in the scenario.

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Event Description: Pressurizer Level Control Channel Level Transmitter, RC-ILT-0110X fails high

Time	Position	Applicant's Actions or Behavior
	ATC	Recognize and report indications of failed instrument.
		Alarms:
		• PRESSURIZER LEVEL HI/LO (Cabinet H, B-1)
		• PRESSURIZER LEVEL HI-HI (Cabinet H, A-1)
		• LETDOWN FLOW HI/LO (Cabinet G, C-1)
		• LETDOWN HX OUTLET PRESS HI (Cabinet G, A-2)
		Indications
		• Mismatch between Charging (CVC-IFI-0212) AND Letdown (CVC-IFI-0202) flow indications. Letdown rises to maximum, with 1 charging pump running
		• Deviation between indicated level AND programmed level as indicated on Pressurizer level recorder (RC-ILR-0110).
		• RC-ILI-0110X reading ~ 100%
		• Actual Pressurizer level RC-ILI-0110Y slowly lowering.
		• Pressurizer Backup Heaters energize
	SRO	May direct the ATC to take manual control of Pressurizer Level Controller, RC-ILIC-0110 and match Letdown flow and Charging flow prior to entering procedure.
	SRO	Enter and direct the implementation of OP-901-110, Pressurizer Level Control Malfunction.
OP-901-110, Section E0, General Actions		
	N/A	1. Stop Turbine load changes.
	N/A	2. IF malfunction is due to failure of Letdown Flow Control valve, THEN GO TO OP-901-112, CHARGING/LETDOWN MALFUNCTION.
	• SRO	3. IF malfunction is due to failure of Pressurizer Level Control Channel (incorrect readings on EITHER RC-ILI-0110X OR RC-ILI-0110Y), THEN GO TO Subsection E_1, Pressurizer Level Control Channel Malfunction.
OP-901-110, Section E1, Pressurizer Level Control Channel Malfunction		
NOTE Selecting the non-faulted channel may cause automatic actions to occur if actual level is not at program level.		

Op Test No.: 1 Scenario # 4 Event # 2 Page 238 of 289

Event Description: Pressurizer Level Control Channel Level Transmitter, RC-ILT-0110X fails high

Time	Position	Applicant's Actions or Behavior
	ATC	1. Place Pressurizer Level Controller (RC-ILIC-0110) in MAN AND adjust OUTPUT to slowly adjust letdown flow to restore Pressurizer level.
	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 ALL PROPORTIONAL AND BACKUP 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.
	SRO	8. Refer to Technical Specifications 3.3.3.5 and 3.3.3.6 for Remote Shutdown and Accident Monitoring operability determination.
	Note	The SRO should review Technical Specifications 3.3.3.5 and 3.3.3.6 and OP-903-013, Monthly Channel Checks. The SRO should determine that TS 3.3.3.6 requirements are met, but enter TS 3.3.3.5 Action a.

Examiner Note

This event is complete after Pressurizer Level Control System is selected to non-faulted channel and returned to automatic operation and Technical Specifications have been addressed

OR

As directed by the Lead Evaluator

Op Test No.: 1 Scenario # 4 Event # 3/4 Page 239 of 289

Event Description: Steam Generator 2 develops a tube leak/ Rapid Plant Power Reduction

Time	Position	Applicant's Actions or Behavior
	ATC	Recognize and report indications of Steam Generator Tube Leakage.
		Alarms:
		• RAD MONITORING SYS ACTIVITY HI-HI (Cabinet L, A-9)
		• VACUUM PUMPS EXHAUST ACTIVITY HI (Cabinet E, C-3)
		Indications
		• RM-11 Rad Monitor indication will display rising activity on Main Steam Rad Monitor 2, Steam Generator 2 N-16 Rad Monitor, Main Condenser Vacuum Pumps WRGM, and the Blowdown radiation monitor. • Steam Generator tube leakage indication rising as indicated on PMC Group PSLR (PMC PID C48304).
	SRO	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		
	SRO	1. IF Pressurizer level CANNOT be maintained with available Charging Pumps, THEN perform the following: 1.1 Manually trip Reactor. 1.2 Manually initiate Safety Injection Actuation (SIAS) AND Containment Isolation Actuation (CIAS). 1.3 GO TO 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.		

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Event Description: Steam Generator 2 develops a tube leak/ Rapid Plant Power Reduction

Time	Position	Applicant's Actions or Behavior
	ATC	2. Determine RCS leak rate using ANY of the following: • 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) and C48252 (RE5501 CH2 LEAK RATE) • Approximate RCS leak rate by subtracting total of Letdown flow AND 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
NOTE 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. IF Primary to Secondary Leakage in any Steam Generator is ≥75 GPD (~0.05 GPM) AND the rate of change is rising by ≥30 GPD/HR (~0.02 GPM/HR), THEN perform the following: 3.1 Commence a rapid plant shutdown in accordance with OP-901-212, RAPID PLANT POWER REDUCTION, AND concurrently with this Procedure, reduce Plant Power to ≤50% within 1 hour. 3.2 WHEN Plant Power is ≤50%, THEN in accordance with OP-901-212, RAPID PLANT POWER REDUCTION, AND concurrently with this Procedure, be in Mode 3 within 2 hours AND Mode 5 in the following 30 hours.
Examiner Note • **These conditions will be met. The CRS should enter OP-901-212 and perform it concurrently with OP-901-202.** • **Steps 4-6 are not applicable to the event. Steps 7 through 15 of Steam Generator Tube Leakage or High Activity are listed here. The CRS should begin the steps of Rapid Plant Power Reduction before working these steps. The steps of OP-901-212, Rapid Plant Power Reduction follow step 15 of OP-901-202.**		

Op Test No.: 1 Scenario # 4 Event # 3/4 Page 241 of 289

Event Description: Steam Generator 2 develops a tube leak/ Rapid Plant Power Reduction

Time	Position	Applicant's Actions or Behavior
	SRO	7. Notify Chemistry Department to perform the following: 7.1 Provide current Plant status including the following: • Primary to Secondary Leakrate • Primary to Secondary Leakage Rate of Change • Plant action(s) Operations is <u>OR</u> will be implementing (example: plant shutdown, rapid plant shutdown, monitoring) 7.2 Carry out actions in accordance with UNT-005-032, STEAM GENERATOR PRIMARY-TO-SECONDARY LEAKAGE. 7.3 Begin sampling Steam Generators for activity. 7.4 Quantify Steam Generator Tube leakage.
	SRO	8. Notify Radiation Protection to carry out the actions of UNT-005-032, STEAM GENERATOR PRIMARY-TO-SECONDARY LEAKAGE.
	BOP	9. Verify BD-303, DISCHARGE TO WASTE, Locked Closed.
	BOP	10. Verify BD-1162, BD FLASH TANK VENT, Closed.
	BOP	11. Verify CD-145, CD DUMP TO WASTE POND, Closed. 11.1 Notify Chemistry prior to dumping Condensate from the Condenser Hotwell to the CST.
	BOP	12. Establish <u>AND</u> monitor a PMC Trend of the following PMC points: • C48304 PRI TO SEC LEAKAGE • C48305 PRI TO SEC LEAK RATE CHANGE (GPD/HR) • C48251 RE5501 CH1 LEAK RATE • C48252 RE5501 CH2 LEAK RATE
	N/A	13. IF Primary to Secondary Leakage is ≥5 GPD AND <15 GPD THEN monitor the N-16 and Condenser Air Evacuation Radiation Monitors every 15 minutes for rising trends
	SRO	14. Advise Shift Manager to perform the following: • Review EP-001-001, RECOGNITION AND CLASSIFICATION OF EMERGENCY CONDITIONS. • Review OI-035-000, NOTIFICATION MATRIX, AND as a minimum notify the Duty Plant Manager AND Duty Operations Manager as soon as possible.

Op Test No.: 1 Scenario # 4 Event # 3/4 Page 242 of 289

Event Description: Steam Generator 2 develops a tube leak/ Rapid Plant Power Reduction

Time	Position	Applicant's Actions or Behavior
		NOTE Until arrangements are made for disposal of radioactively contaminated resin, Condensate Polisher Vessels should NOT be placed in service with resin loaded in the vessel.
	N/A	15. Remove from service ANY Condensate Polisher Vessels which are loaded with resin in accordance with OP-003-031, CONDENSATE POLISHER/BACKWASH TREATMENT. 15.1 Do not place in service any condensate polisher vessel loaded with resin without the coordination of Chemistry.
OP-901-212, Rapid Plant Power Reduction		
		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.
	ATC	1. Begin RCS Boration by one of the following methods:
	SRO/ATC	1.1 0 up to 170 EFPD: 1.1.1 Direct Boration Or 1.1.2 Emergency Boration using two Charging Pumps
OP-002-005, Chemical and Volume Control System, Section 6.7, Direct Boration		
		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.

Op Test No.: 1 Scenario # 4 Event # 3/4 Page 243 of 289

Event Description: Steam Generator 2 develops a tube leak/ Rapid Plant Power Reduction

Time	Position	Applicant's Actions or Behavior
	ATC	6.7.1 Inform SM/CRS that this Section is being performed.
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 <u>not</u> register below 3 GPM. The Boric Acid Flow Totalizer is most accurate in the range of 10 - 25 GPM.		

Op Test No.: 1 Scenario # 4 Event # 3/4 Page 244 of 289

Event Description: Steam Generator 2 develops a tube leak/ Rapid Plant Power Reduction

Time	Position	Applicant's Actions or Behavior
	ATC	6.7.9 If manual control of Boric Acid flow is desired, then 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.
	N/A	6.7.10 If automatic control of Boric Acid flow is desired, then 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 or Open.
	ATC	6.7.12 Observe Boric Acid flow rate for proper indication.
	ATC	6.7.13 When Boric Acid Makeup Batch Counter has counted down to desired value, then 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.**		
NOTE 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 and with SM/CRS permission, then 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 or Open. 6.7.14.3 Observe Boric Acid flow rate for proper indication. 6.7.14.4 When Boric Acid Makeup Batch Counter has counted down to desired value, then verify Boric Acid Makeup Control Valve, BAM-141, Closed.

Op Test No.: 1 Scenario # 4 Event # 3/4 Page 245 of 289

Event Description: Steam Generator 2 develops a tube leak/ Rapid Plant Power Reduction

Time	Position	Applicant's Actions or Behavior
	ATC	6.7.15 Verify Boric Acid Flow controller, BAM-IFIC-0210Y, in Manual.
	ATC	6.7.16 Verify both Boric Acid Flow controller, BAM-IFIC-0210Y, output and 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.
	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 Down Power		
NOTE 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.
	ATC	2.2 Reduce Pressurizer Spray Valve Controller (RC-IHIC-0100) setpoint potentiometer to establish spray flow and maintain RCS pressure 2250 PSIA (2175 – 2265).
CAUTION 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 9.9, Axial Shape Control Guidelines.
	CREW	4. Notify the Load Dispatcher (Woodlands) that a rapid power reduction is in progress.

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Event Description: Steam Generator 2 develops a tube leak/ Rapid Plant Power Reduction

Time	Position	Applicant's Actions or Behavior
	CREW	5. Announce to Station Personnel over the Plant Paging System that a rapid plant power reduction is in progress.
	ATC/BOP	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.
	BOP	7.2 Set selected rate in Display Demand Window.
	BOP	7.3 Depress ENTER pushbutton.
	BOP	7.4 Depress REFERENCE pushbutton.
	BOP	7.5 Set desired load in Reference Demand Window.
	BOP	7.6 Depress ENTER pushbutton.
	BOP	7.7 Depress GO pushbutton.
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.		
	CREW	8. When Reactor Power consistently indicates less than 98% power, as indicated on PMC PID C24631 [MAIN STEAM RAW POWER (MSBSRAW)], or an alternate point provided by Reactor Engineering, then verify the value of C24648 [BSCAL SMOOTHING VAL. APPLD (DUMOUT17)] automatically changes to 1.
	N/A	9. If C24648 does not automatically change to 1, then inform Reactor Engineering and 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.
	SRO	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.

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Event Description: Steam Generator 2 develops a tube leak/ Rapid Plant Power Reduction

Time	Position	Applicant's Actions or Behavior
	BOP	11. When Condensate flow is <18,000 gpm, verify Gland Steam Condenser Bypass, CD-154, Closed (PMC PID D02404).
	BOP	12. Monitor Condensate Polisher differential pressure and remove Polishers from service to maintain system pressure in accordance with OP-003-031, Condensate Polisher/Backwash Treatment.
	BOP	13. When Reactor Power is approximately 70% or Heater Drain Pump flow is unstable, then remove Heater Drain Pumps from service by taking pump control switches to Stop.

Examiner Note

This event is complete after the Reactivity Manipulation is satisfied

OR

At Lead Examiner's Discretion

Op Test No.: 1 Scenario # 4 Event # 5/6/7 Page 248 of 289

Event Description: Instrument Air Leak/Reactor Trip/Steam Generator Tube Rupture/Failure of SUT B/EDG B fails to Auto Start

Time	Position	Applicant's Actions or Behavior
	ATC / BOP	Recognize and report indications of the Instrument Air Leak.
		Alarms
		• INST AIR DRYERS BYPASSED (CABINET L, H-7)
		• VALVE OPERATORS NITROGEN BACKUP ACTUATED/TROUBLE (CABINET L, G-5)
		• INST AIR RECEIVER PRESSURE HI/LO (CABINET E, F-5)
		Indications
		• Instrument Air Header Pressure lowering as indicated on IA-IPI-9700 on CP-1
		• Possible repositioning of air operated valves
OP-901-511, Instrument Air Malfunction		
	SRO	1. IF Instrument Air pressure drops to 65 psig, THEN trip the Reactor AND perform OP-902-000, STANDARD POST TRIP ACTIONS, concurrently with this procedure.
	ATC	If directed by CRS, trip Reactor using 2 Reactor Trip pushbuttons at CP-2.
	SRO	Direct ATC and BOP to carry out Standard Post trip Actions.
	SRO	2. Dispatch an operator to the Air Compressors AND verify the following: • ALL Instrument Air AND Station Air Compressors running loaded with normal separator levels • SA Backup Supply for IA Press Cntl valve (SA 125) Open • IF Instrument Air pressure is less than 95 PSIG, THEN Instrument Air Dryers Bypass Solenoid valve (IA 123) Opens
	CREW	3. IF ALL of the actions of step 2 have occurred AND Instrument Air pressure is still dropping, THEN, using the Plant Paging System, announce the following two times: "Attention Station Personnel, Attention Station Personnel. The plant is experiencing a loss of Instrument Air Pressure. Discontinue use of Instrument Air AND Station Air. Report all air usage OR ANY air leaks to the Control Room".

Op Test No.: 1	Scenario # 4	Event # 5/6/7	Page 249 of 289
Event Description:	Instrument Air Leak/Reactor Trip/Steam Generator Tube Rupture/Failure of SUT B/EDG B fails to Auto Start		

Time	Position	Applicant's Actions or Behavior
		Examiner Note **Provided a Plant Page was made or personnel are requested to identify the leak, the leak will be found and isolated after the reactor is tripped.**
		Examiner Note **At Step 2 of OP-902-000, Steam Generator Tube Recovery, inform the Simulator Operator to initiate Trigger 5 (SG01B to 8%)**
OP-902-000, Standard Post Trip Actions		
	ATC	1. Determine **Reactivity Control** acceptance criteria are met: a. Check reactor power is dropping. b. Check startup rate is negative. c. Check less than **TWO** CEAs are **NOT** fully inserted.
	BOP	2. Determine **Maintenance of Vital Auxiliaries** acceptance criteria are met: a. Check the Main Turbine is tripped: • Governor valves closed • Throttle valves closed
	BOP	b. Check the Main Generator is tripped: • GENERATOR BREAKER A tripped • GENERATOR BREAKER B tripped • EXCITER FIELD BREAKER tripped

Op Test No.: 1 Scenario # 4 Event # 5/6/7 Page 250 of 289

Event Description: Instrument Air Leak/Reactor Trip/Steam Generator Tube Rupture/Failure of SUT B/EDG B fails to Auto Start

Time	Position	Applicant's Actions or Behavior
	BOP	c. Check station loads are energized from offsite electrical power as follows: **Train A** • 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 **Train B** • 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
CRITICAL TASK **ESTABLISH RCS INVENTORY CONTROL** This Task applies upon loss of power to the B3 bus. This task is satisfied by the crew taking action to start and load Emergency Diesel Generator B and manually start High Pressure Safety Injection Pump B.		
	BOP	Manually starts EDG B using Control Switch on CP-1, verifies EDG B starts and load, and manually starts HPSI Pump B.
	NOTE	After Safety Injection occurs SUT B fails and EDB B fails to AUTO start. The BOP needs to manually start EDG B to power HPSI Pump B which is the only available High Pressure Safety injection Pump. HPSI Pump B also fails to auto start after power is restored.
	ATC	3. Determine **RCS Inventory Control** acceptance criteria are met: a. Check that **BOTH** the following conditions exist: • Pressurizer level is 7% to 60% • Pressurizer level is trending to 33% to 60% b. Check RCS subcooling is greater than or equal to 28ºF.

Op Test No.: 1 Scenario # 4 Event # 5/6/7 Page 251 of 289

Event Description: Instrument Air Leak/Reactor Trip/Steam Generator Tube Rupture/Failure of SUT B/EDG B fails to Auto Start

Time	Position	Applicant's Actions or Behavior
	ATC	4. Determine **RCS Pressure Control** acceptance criteria are met by checking that **BOTH** of the following conditions exist: • Pressurizer pressure is 1750 psia to 2300 psia • Pressurizer pressure is trending to 2125 psia to 2275 psia
		4.2 **IF** pressurizer pressure is less than 1684 psia, **THEN** verify the following have initiated. • SIAS • CIAS
		4.3 **IF** pressurizer pressure is less than 1621 psia, **THEN** verify no more than two RCPs are operating
		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.
	ATC	5. Determine **Core Heat Removal** acceptance criteria are met: a. Check at least one RCP is operating. b. Check operating loop ΔT is less than 13ºF. c. Check RCS subcooling is greater than or equal to 28ºF.
	BOP	6. Determine **RCS Heat Removal** acceptance criteria are met: a. Check that at least one steam generator has **BOTH** of the following: • Steam generator level is 5% to 80% NR • Main Feedwater is available to restore level within 50%-70% NR.
	ATC	b. Check RCS TC is 530 ºF to 550 ºF
	BOP	c. Check steam generator pressure is 885 psia to 1040 psia.
	BOP	d. Check Feedwater Control in Reactor Trip Override: • 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. Reset moisture separator reheaters, and check the temperature control valves closed.

Op Test No.: 1 Scenario # 4 Event # 5/6/7 Page 252 of 289

Event Description: Instrument Air Leak/Reactor Trip/Steam Generator Tube Rupture/Failure of SUT B/EDG B fails to Auto Start

Time	Position	Applicant's Actions or Behavior
	ATC	7. Determine **Containment Isolation** acceptance criteria are met: a. Check containment pressure is less than 16.4 psia. b. Check NO containment area radiation monitor alarms OR unexplained rise in activity. c. Check NO steam plant activity monitor alarms OR unexplained rise in activity.
	NOTE	**Containment Isolation acceptance criteria are not met due to steam plant activity; however, there are no contingencies associated with this.**
	BOP	8 Determine **Containment Temperature and Pressure Control** acceptance criteria are met: a. Check containment temperature is less than or equal to 120ºF. b. Check 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. Proper use of chart will result in use of OP-902-007, Steam Generator Tube Rupture Recovery.
	SRO	Enter and direct the implementation of OP-902-007, Steam Generator Tube Rupture Recovery.
OP-902-007, Steam Generator Tube Rupture Recovery		
	CREW	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.
	CREW	2. Announce a Steam Generator Tube Rupture is in progress using the plant page.

Op Test No.: 1 Scenario # 4 Event # 5/6/7 Page 253 of 289

Event Description: Instrument Air Leak/Reactor Trip/Steam Generator Tube Rupture/Failure of SUT B/EDG B fails to Auto Start

Time	Position	Applicant's Actions or Behavior
	SRO	3. Advise the Shift Manager to REFER TO EP-001-001, "Recognition & Classification of Emergency Condition", and implement the Emergency Plan.
	SRO	4. **IF** power has been interrupted to either 3A or 3B safety buses, **THEN** perform Appendix 20, "Operation of DCT Sump Pumps".
	SRO	5. REFER TO Section 6.0, "Placekeeper", and record the time of the reactor trip.
	SRO/ATC	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: • Appendix 2-E, "HPSI Flow Curve" • Appendix 2-F, "LPSI Flow Curve" c. Verify **ALL** available charging pumps are operating.
	ATC	8. **IF** Pressurizer pressure is less than 1621 psia, **AND** SIAS is actuated, **THEN**: 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.
	ATC	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 382ºF, **THEN** verify no more than two RCPs are operating.
	BOP	10. Check a CCW pump is operating for each energized 4.16 KV safety bus.
	BOP	11. Commence a rapid RCS cooldown to less than 520°F T_H using Steam Bypass valves.
		Take OFF-AUTO-MAN switch for 1 Steam Bypass Valve to MAN
		Take M/A station for that same valve to MAN
		Raise output on that M/A station to achieve 50% output

Op Test No.: 1 Scenario # 4 Event # 5/6/7 Page 254 of 289

Event Description: Instrument Air Leak/Reactor Trip/Steam Generator Tube Rupture/Failure of SUT B/EDG B fails to Auto Start

Time	Position	Applicant's Actions or Behavior
	NOTE	MS-319A was the source of the Instrument Air Leak and is not available. The BOP will have to select an alternate valve to perform the cooldown.
Critical Task **PREVENT OPENING THE MAIN STEAM SAFETY VALVES** This task is satisfied by taking action to lower RCS pressure in accordance with step 12.		
	ATC	12. Depressurize the RCS: a. Maintain pressurizer pressure within **ALL** of the following criteria: • Within Appendix 2A-D, "RCS Pressure and Temperature Limits" • Less than 945 psia • Within 50 psi of the most affected steam generator pressure • IF RCPs are operating greater than the minimum RCP NPSH of Appendix 2A-D, "RCS Pressure and Temperature Limits" b. Operate Main or Auxiliary Pressurizer spray.
	Note	The ATC operator should receive direction from the CRS to perform this step. He should evaluate plant conditions and decide on a minimum RCS pressure. The critical task is satisfied when the applicant takes action to start reducing RCS pressure (< 945 PSIA does not need to be reached in the scenario).
	SRO/ATC	13. **IF** MSIS is **NOT** present, **THEN** lower the automatic initiation setpoints as the cooldown and depressurization proceed for MSIS (low SG Pressure).
		• The SRO should direct the ATC to perform this action during the rapid cooldown to < 520°F $T_{HOT.}$
	N/A	14. **IF** SIAS is **NOT** present, **THEN** lower the automatic initiation setpoints as the cooldown and depressurization proceed for SIAS (low PZR Pressure).
	N/A	15. **IF** offsite power has been lost, **THEN**: a. Verify MSIVs are closed. b. Verify following steam generator blowdown isolation valves are closed: • 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)

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Event Description: Instrument Air Leak/Reactor Trip/Steam Generator Tube Rupture/Failure of SUT B/EDG B fails to Auto Start

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	16. Determine the most affected steam generator by considering **ALL** of the following: • 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
CRITICAL TASK **ISOLATE RUPTURED STEAM GENERATOR** This task is satisfied by isolating Steam Generator 2 in accordance with step 17 after RCS T_{HOT} is reduced below 520 °F.		
	BOP	17. **When** the RCS T_H is less than 520°F, **THEN** isolate Steam Generator 2:
		Steam Generator 2
	BOP	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)**
	BOP	d. **IF** EFAS-2 is **NOT** initiated, **THEN** close EFW Isolation Valves: • EFW-228B SG 2 PRIMARY • EFW-229B SG 2 BACKUP
	BOP	e. Place EFW Flow Control Valves in MAN and close: **(CRITICAL)** • EFW-224B SG 2 PRIMARY • EFW-223B SG 2 BACKUP
	BOP	f. Close MS 401B, PUMP AB TURB STM SUPPLY SG 2. **(CRITICAL)**

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Event Description: Instrument Air Leak/Reactor Trip/Steam Generator Tube Rupture/Failure of SUT B/EDG B fails to Auto Start

Time	Position	Applicant's Actions or Behavior
	BOP	g. Close Main Steam Line 2 Drains: • MS 120B NORMAL • MS 119B BYPASS
	Note	These valves should already be closed.
	BOP	h. Close Steam Generator Blowdown isolation valves: • BD 103B STM GEN 2 (OUT) • BD 102B STM GEN 2 (IN)
	Note	These valves should already be closed.
	BOP	i. Check the Main Steam Safety valves are closed.
	Note	This will be accomplished by dispatching a non-licensed operator.
Examiner Note **This event is complete after Steam Generator 2 is isolated** **Or** **As directed by the Lead Evaluator.**		

Waterford 3

2012 NRC Exam

JOB PERFORMANCE MEASURE

P1

Atmospheric Dump Valve Local Operation

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Locally Operate Atmospheric Dump Valve A

Task Standard: Opened Atmospheric Dump Valve A to 25% in accordance with OP-005-004, Main Steam. Local pneumatic control failed during the evolution, requiring local handwheel control.

References: OP-005-004, Main Steam, revision 22

Alternate Path: Yes Time Critical: No Validation Time: 15 mins.

K/A 041 Steam Dump System and Turbine Bypass Control
A4.06 Atmospheric relief valve controllers
Importance Rating 2.9 / 3.1
RO / SRO

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-005-004, Main Steam, revision 22

Description:

Applicant will be directed to open Atmospheric Dump Valve A to 25% open. During the task, local pneumatic control will not function requiring local handwheel operation. Task will occur in Main Steam Isolation Valve A room and does require climbing ladders to access the platform. Gloves are required.

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 RCA in a manner that prevents anyone from viewing any of the RCA cameras.

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

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.

INITIAL CONDITIONS:

- The plant is in Mode 3
- RCS temperature is being controlled by Atmospheric Dump Valve A and B
- The CP-8 controller for Atmospheric Dump Valve A is not responding

INITIATING CUE:

- The CRS directs you to locally open MS-116A, Atmospheric Dump Valve A, to 25% open using OP-005-004, Main Steam, section 8.7

TASK ELEMENT 1	STANDARD
Procedure Note Refer to T.S. 3.7.1.7 prior to performing this section.	Note reviewed.
Comment: **EVALUATOR CUE:** The Control Room staff is addressing all Tech Specs.	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
Procedure Caution OPENING ADV MAY CAUSE AN RCS COOLDOWN, RESULTING IN A CHANGE IN REACTIVITY AND STEAM GENERATOR LEVELS.	Caution reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 3	STANDARD
8.7.1 Establish communications with the Control Room.	Control Room contacted.
Comment: **EVALUATOR CUE:** The Control Room is standing by for local operation of MS-116A, ADV 1.	**SAT / UNSAT**

TASK ELEMENT 4	STANDARD
8.7.2 If desired to operate MS-116A locally using pneumatic operation, then perform the following : 8.7.2.1 Record the pressure at the outlet of the transducer:	Pressure recorded.
Comment: **EVALUATOR CUE:** Pressure reads as it is displayed (~ 3 psig).	**SAT / UNSAT**

TASK ELEMENT 5	STANDARD
8.7.2.2 Adjust the pressure at Air Regulator outlet on the front of the panel to the pressure noted in step 8.7.2.1.	Pressure adjusted to pressure from preceding step.
Comment: Turning the regulator operator counter clockwise will lower pressure. **EVALUATOR CUE:** When handle is turned in the correct direction, cue that pressure lowers to required pressure.	**SAT / UNSAT**

TASK ELEMENT 6	STANDARD
8.7.2.3 Turn the Pneumatic Permissive Valve above the Transducer to Manual.	Pneumatic Permissive Valve is in manual.
Comment: **EVALUATOR CUE:** Valve handle is rotated from Auto to Manual.	**Critical** **SAT / UNSAT**

TASK ELEMENT 7	STANDARD
8.7.2.4 Turn the Pneumatic Permissive Valve above the Air Regulator to Manual.	Pneumatic Permissive Valve is in manual.
Comment: **EVALUATOR CUE:** Valve handle is rotated from Auto to Manual.	**Critical** **SAT / UNSAT**

TASK ELEMENT 8	STANDARD
Procedure Note The ADV will be closed when pressure at outlet of Air Regulator is < 4.5 PSIG and full open when pressure at outlet of Air Regulator is > 15 PSIG.	Note reviewed.
Comment:	**SAT / UNSAT**

Evaluator Note
The next step introduces the fault. When the air regulator is adjusted, provide the cue that there is no change in pressure and that MS-116A, ADV 1 is not moving.

Evaluator Note
If the applicant reports to the Control Room that local pneumatic control is not functioning without a recommendation, ask the applicant if there is an alternate method to operate the ADV. If local handwheel operation is identified, then direct the applicant to open ADV A to 25% open using the handwheel.

TASK ELEMENT 9	STANDARD
8.7.2.5 Adjust the Air Regulator pressure to obtain desired valve position by performing any of the following: • Open MS-116A by turning air regulator adjusting screw in the clockwise direction to raise air pressure. • Close MS-116A by turning the air regulator adjusting screw in the counterclockwise direction to lower air pressure.	Applicant attempts to adjust pressure.
Comment: Applicant attempts to open the ADV by rotating the regulator in the clockwise position. **EVALUATOR CUE:** Air regulator pressure and ADV position are not changing. Applicant should go to step 8.7.4.	**SAT / UNSAT**

TASK ELEMENT 10	STANDARD
8.7.4 <u>If</u> desired to operate MS-116A(B) using local handwheel, <u>then</u> perform the following:	Applicant proceeds with local handwheel operation of MS-116A.
Comment: **EVALUATOR CUE:**	**<u>Critical</u>** **SAT / UNSAT**

TASK ELEMENT 11	STANDARD
8.7.4.1 Close Local NG/IA Isolation to the positioner for applicable MS-116A(B) SG 1(2) MS Atm Dump Valve: ▪ NG-8271C, NG/IA Isolation to MS-116A or ▪ NG-8281D, NG/IA Isolation to MS-116B	NG-8271 C is closed
Comment: **EVALUATOR CUE:** Valve closes when operated.	**Critical** **SAT / UNSAT**

TASK ELEMENT 12	STANDARD
8.7.4.2 Open Filter Petcock Drain and bleed off Air/N2 pressure by opening Filter Petcock Drain.	Filter Petcock Drain is open.
Comment: **EVALUATOR CUE:** Air is heard coming from the drain when opened. Pressure lowers to zero and air flow stops and the sound of the air goes away.	**Critical** **SAT / UNSAT**

TASK ELEMENT 13	STANDARD
8.7.4.3 Open MS-116A(B) SG 1(2) MS Atm Dump Valve Local Valve Positioner Equalizing Valve.	Positioner Equalizing Valve is open.
Comment: **EVALUATOR CUE:** Valve open when operated.	**Critical** **SAT / UNSAT**

TASK ELEMENT 14	STANDARD
8.7.4.4 Engage local handwheel and Open MS-116A(B) SG 1(2) MS Atm Dump Valve to desired position by performing the following: 8.7.4.4.1 Unscrew clevis from top of the Manual Override Shaft.	Clevis removed.
Comment: **EVALUATOR CUE:** Clevis unscrews when operated counter clockwise.	**Critical** **SAT / UNSAT**

TASK ELEMENT 15	STANDARD
8.7.4.4.2 Turn handwheel to expose actuator shaft above manual override shaft.	Actuator shaft exposed.

Comment: **EVALUATOR CUE:** As handwheel is turned counter-clockwise, actuator shaft is exposed. When shaft is fully exposed, notch at the bottom of the shaft is visible.	**Critical** **SAT / UNSAT**

TASK ELEMENT 16	STANDARD
8.7.4.4.3 Slide clevis onto actuator shaft.	Clevis installed.
Comment: **EVALUATOR CUE:** Clevis fits into notch.	**Critical** **SAT / UNSAT**

TASK ELEMENT 17	STANDARD
8.7.4.4.4 Turn handwheel to open MS-116A(B) to desired position.	MS-116A, ADV 1 is 25% open.
Comment: **EVALUATOR CUE:** As handwheel is turned clockwise, MS-116 A, ADV 1 opens. Steam issues from ADV 1 exhaust pipe. Applicant will observe a loud noise and some heat.	**Critical** **SAT / UNSAT**

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 is in Mode 3
- RCS temperature is being controlled by Atmospheric Dump Valve A and B
- The CP-8 controller for Atmospheric Dump Valve A is not responding

INITIATING CUE:

- The CRS directs you to locally open MS-116A, Atmospheric Dump Valve A, to 25% open using OP-005-004, Main Steam, section 8.7

Waterford 3

2012 NRC Exam

JOB PERFORMANCE MEASURE

P2

Placing Shutdown Cooling Purification in Service

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Placing Shutdown Cooling Purification in service

Task Standard: Applicant performed all identified critical action steps correctly per OP-009-005, Shutdown Cooling. Shutdown Cooling Purification is in service and Shutdown Cooling Purification is aligned to Shutdown Cooling Train A.

References: OP-009-005, Shutdown Cooling, revision 31

Alternate Path: No Time Critical: No Validation Time: 20 mins.

K/A 005 K1.04 CVCS Importance Rating 2.9/3.1
G2.1.30 RO/SRO 4.4/4.0

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

_____

_____

_____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-009-005, Shutdown Cooling, revision 31

Description:
This task is performed on the -4 and -15 levels of the RCA.

When performing JPM validation, actions are necessary to ensure exam security is maintained.
Prior to commencing in plant JPM validation, contact Radiation Protection and direct them to disable all cameras in the RCA in a manner that prevents anyone from viewing any of the RCA cameras.

After all in plant JPMs are complete, contact Radiation Protection to restore the disabled cameras.

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.

INITIAL CONDITIONS:

- Shutdown Cooling Train A is in service
- Shutdown Cooling Purification Ion Exchanger A is aligned for service
- RCS Hot Leg Temperature is 105°F

INITIATING CUES:

- The following conditions exist:
  -Reactor Coolant System is at atmospheric pressure
  -Normal Letdown and Charging is secured
  -Sufficient room is available in the Boron Management System to flush Chemical and Volume Control System Purification Ion Exchanger(s)

- The CRS directs you to place Shutdown Cooling Purification in service using Purification Ion Exchanger A in accordance with OP-009-005, Shutdown Cooling Purification, Section 6.6.

TASK ELEMENT 1	STANDARD
Procedure Caution THE FOLLOWING SECTION HAS THE POTENTIAL TO AFFECT CORE REACTIVITY.	Caution reviewed
Comment: **EVALUATOR CUE:**	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
Procedure Note The following are prerequisites for placing Shutdown Cooling Purification System in service: (1) Reactor Coolant System is at atmospheric pressure. (2) Normal Letdown and Charging is secured. (3) One Shutdown Cooling train in service. (4) Sufficient room in Boron Management System to flush Chemical and Volume Control System Purification Ion Exchanger(s).	Note reviewed
Comment: **EVALUATOR CUE:** All perquisites are met for placing Shutdown Cooling Purification in service. The prerequisites are identified in the initiating cue and initial conditions.	**SAT / UNSAT**

TASK ELEMENT 3	STANDARD
Procedure Caution PLACING SHUTDOWN COOLING PURIFICATION IN SERVICE WITH EITHER HYDROGEN PEROXIDE OR HYDRAZINE PRESENT IN REACTOR COOLANT WILL DAMAGE CHEMICAL AND VOLUME CONTROL SYSTEM PURIFICATION ION EXCHANGER(S).	Caution reviewed
Comment: **EVALUATOR CUE:** If asked, there is no hydrogen peroxide or hydrazine present in the reactor coolant system.	**SAT / UNSAT**

TASK ELEMENT 4	STANDARD
6.6.1 Verify Letdown Stop Valve, CVC-101, Closed.	Contacts Control Room
Comment: **EVALUATOR CUE:** Letdown Stop Valve, CVC-101, is Closed.	**SAT / UNSAT**

TASK ELEMENT 5	STANDARD
Procedure Note Both of the following valves must be open to meet the Open permissive interlock for Letdown HX Temperature Control, CC-636. ▪ CVC-103 Letdown Inside Containment Isolation ▪ CVC-109 Letdown Outside Containment Isolation	Note Reviewed
Comment:	**SAT / UNSAT**

TASK ELEMENT 6	STANDARD
6.6.2 If RCS Hot Leg temperature is ≥ 120°F, then perform the following: 6.6.2.1 Verify the following valves Open: ▪ CVC-103 Letdown Inside Containment Isolation ▪ CVC-109 Letdown Outside Containment Isolation 6.6.2.2 Verify Regen HX Outlet Header to Letdown HX Temperature Indicator Controller, CVC-ITIC-0223, in Auto, and set potentiometer to maintain < 120°F.	Contacts Control Room to determine RCS Hot Leg temperature.
Comment: **EVALUATOR CUE:** RCS Hot leg temperature is 105°F.	**SAT / UNSAT**

TASK ELEMENT 7	STANDARD
6.6.3 Unlock and Open Letdown to LPSI Pumps Suction Isol, CVC-164.	Valve is unlocked and open.
Comment: **EVALUATOR CUE:** Provide cue to the applicant of valve position moving from closed to open.	**Critical** **SAT / UNSAT**

TASK ELEMENT 8	STANDARD
6.6.4 Unlock and Open Shdn Cooling Purification Supply Isol, SI-423.	Valve is unlocked and open.
Comment: **EVALUATOR CUE:** Provide cue to the applicant of valve position moving from closed to open.	**Critical** **SAT / UNSAT**

TASK ELEMENT 9	STANDARD
6.6.5 Place Letdown Backpressure Controller, CVC-IPIC-0201, to Manual, and adjust output to Zero.	Contacts Control Room

Comment: **EVALUATOR CUE:** The control room reports that the Letdown Backpressure Controller, CVC-IPIC-0201, is in Manual, and output is adjusted to Zero.	**SAT / UNSAT**

TASK ELEMENT 10	STANDARD
6.6.6 Unlock and slowly open RC Loop 2(1) Shdn Cooling Purification Supply Isol, SI-418A(B).	Valve is open.
Comment: **EVALUATOR CUE:** RC Loop 2, Shdn Cooling Purification Supply Isol, SI-418A is open. Note: The placard on the valve informs the applicant to verify the same valve on the opposite train valve closed. The applicant should identify SI-418B closed.	**Critical** **SAT / UNSAT**

TASK ELEMENT 11	STANDARD
6.6.7 Verify Letdown HX Outlet temperature < 120°F, as indicated by Letdown HX Tube Outlet Temperature indicator, CVC-ITI-0224.	Contacts Control Room
Comment: **EVALUATOR CUE:** The control room reports that Letdown HX Outlet temperature is 105°F, as indicated by Letdown HX Tube Outlet Temperature indicator, CVC-ITI-0224.	**SAT / UNSAT**

TASK ELEMENT 12	STANDARD
6.6.8 Verify Purification Ion Exchanger(s) is in service, in accordance with appropriate section of this procedure.	Recognizes Purification Ion Exchanger A is in service.
Comment: **EVALUATOR CUE:** Purification Ion Exchanger A is in service per the initial conditions.	**SAT / UNSAT**

TASK ELEMENT 13	STANDARD
6.6.9 Verify Letdown to Ion Exchangers Inlet/Bypass, CVC-140, control switch in AUTO.	Contacts Control Room
Comment: **EVALUATOR CUE:** The control room reports that Letdown to Ion Exchangers Inlet/Bypass, CVC-140, control switch is in AUTO.	**SAT / UNSAT**

TASK ELEMENT 14	STANDARD
6.6.10 At SM/CRS discretion, direct Chemistry Department to sample CVC Ion Exchanger effluent for boron, chlorides, and fluorides as follows:	Contacts control room and applicant recognizes that steps 6.6.10.1 through 6.6.10.6.3 are not required since sampling is completed with SAT results.
Comment: **EVALUATOR CUE:** The control room reports that Chemistry has completed their sample for CVC Ion Exchanger effluent and samples indicate that fluorides and chlorides are within limits and boron concentration is greater than Reactor coolant boron concentration.	**SAT / UNSAT**

Evaluator Note
The next step directs the applicant to Unlock and Close Purification Ion Exchs Outlet Header Isolation, CVC-1661. CVC-1661 is in the VCT room which is a High Radiation Room. The room is not accessible but the applicant should have knowledge that CVC-1661 is in the VCT room.

TASK ELEMENT 15	STANDARD
6.6.11 Unlock and Close Purification Ion Exchs Outlet Header Isolation, CVC-1661.	Applicant identifies that CVC-1661 is in the VCT room and indicates that he would unlock and close CVC-1661.
Comment: **EVALUATOR CUE:** Purification Ion Exchs Outlet Header Isolation, CVC-1661 is unlocked and closed. After the applicant identifies that CVC-1661 is in the VCT room, tell him that CVC-1661 is unlocked and closed.	**Critical** **SAT / UNSAT**

TASK ELEMENT 16	STANDARD
6.6.12 Unlock and Open Letdown to LPSI Pump A (B) Suction Isol, CVC-1654A(B).	Valve is open.
Comment: **EVALUATOR CUE:** Letdown to LPSI Pump A (B) Suction Isol, CVC-1654A(B) is unlocked and open. Note: The placard on the valve informs the applicant to verify the same valve on the opposite train valve closed. The applicant should identify CVC-1654B closed.	**Critical** **SAT / UNSAT**

TASK ELEMENT 17	STANDARD
6.6.13 Verify Letdown HX Outlet temperature < 120°F, as indicated by Letdown HX Tube Outlet Temperature indicator, CVC-ITI-0224.	Contacts Control Room
Comment: **EVALUATOR CUE:** The control room reports that Letdown HX Outlet temperature is 105°F, as indicated by Letdown HX Tube Outlet Temperature indicator, CVC-ITI-0224.	**SAT / UNSAT**

TASK ELEMENT 18	STANDARD
Procedure Caution FLOW RATE THROUGH CVC ION EXCHANGER(S) SHOULD NOT EXCEED 126 GPM.	Caution reviewed
Comment: **EVALUATOR CUE:**	**SAT / UNSAT**

TASK ELEMENT 19	STANDARD
6.6.14 Adjust Letdown Backpressure Controller, CVC-IPIC-0201, to obtain flow as required by SM/CRS.	Contacts Control Room
Comment: **EVALUATOR CUE:** The control room reports that the Letdown Backpressure Controller, CVC-IPIC-0201, has been adjusted to 80 gpm.	**SAT / UNSAT**

TASK ELEMENT 20	STANDARD
6.6.15 Verify Purification Ion Exchanger A(B)(C) differential pressure, as indicated on CVC-IDPI-0207(0205)(0203) is <20 PSID.	Satisfactory D/P is verified
Comment: **EVALUATOR CUE:** Purification Ion Exchanger A differential pressure, as indicated on CVC-IDPI-0207 is reading 5 PSID.	**SAT / UNSAT**

TASK ELEMENT 21	STANDARD
6.6.16 If Alternate Shutdown Cooling Purification is required, then perform Section 6.14, Alternate Shutdown Cooling Purification.	Contacts Control Room

Comment: **EVALUATOR CUE:** The control room reports that Alternate Shutdown Cooling Purification is not desired.	**SAT / UNSAT**

END OF TASK

APPLICANT CUE SHEET

Do Not Manipulate Any Plant Components

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- Shutdown Cooling Train A is in service
- Shutdown Cooling Purification Ion Exchanger A is aligned for service
- RCS Hot Leg Temperature is 105°F

INITIATING CUES:

- The following conditions exist:
  -Reactor Coolant System is at atmospheric pressure
  -Normal Letdown and Charging is secured
  -Sufficient room is available in the Boron Management System to flush Chemical and Volume Control System Purification Ion Exchanger(s)

The CRS directs you to place Shutdown Cooling Purification in service using Purification Ion Exchanger A in accordance with OP-009-005, Shutdown Cooling Purification, Section 6.6.

Waterford 3

2012 NRC Exam

JOB PERFORMANCE MEASURE

P3

SUPS 014 AB Operation

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

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

Task Standard: All identified critical steps for aligning SUPS 014 AB from the Alternate to Normal AC alignment in accordance with OP-006-005, Inverters and Distribution has been performed correctly.

References: OP-006-005, Inverters and Distribution. revision 306

Alternate Path: Yes Time Critical: No Validation Time: 20 mins.

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

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

_____

_____

_____

_____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-006-005, Inverters and Distribution, revision 306

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.

The first figure in this JPM package is a figure of the SUPS, depicting meters and the initial position of SUPS breakers. The second figure is a line diagram representation of the SUPS AB, including breakers and meter locations.

DIRECTION TO APPLICANT:

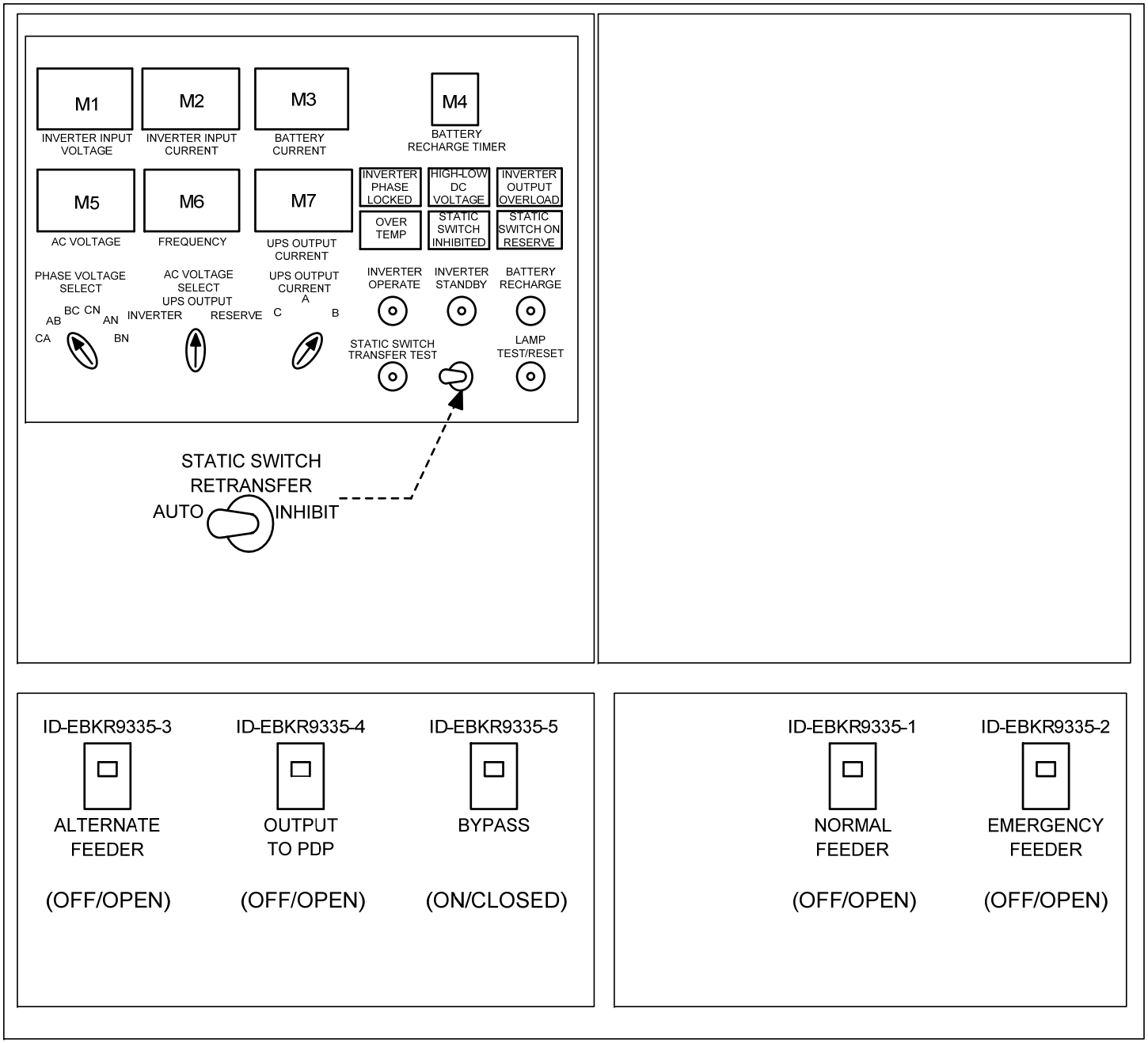
I will explain the initial conditions, and state the task to be performed. All steps for this JPM will be simulated; do not manipulate any plant components. Make all necessary communications to me. I will provide initiating cues and reports on other actions when directed by you. Indicate to me when you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

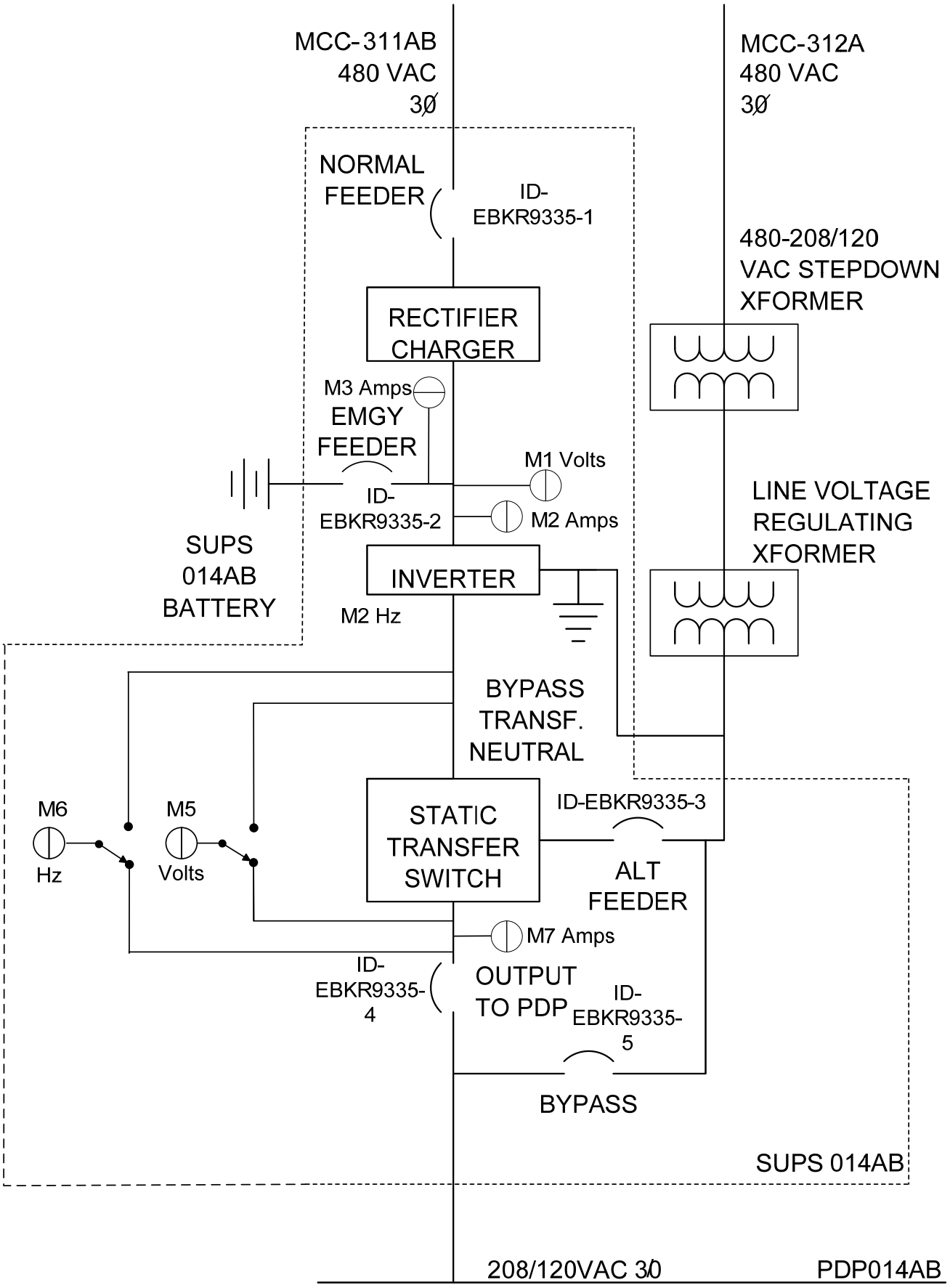
INITIAL CONDITIONS:

- 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 CUE:

- 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


M1
INVERTER INPUT VOLTAGE
M2
INVERTER INPUT CURRENT
M3
BATTERY CURRENT
M4
BATTERY RECHARGE TIMER
M5
AC VOLTAGE
M6
FREQUENCY
M7
UPS OUTPUT CURRENT
INVERTER PHASE LOCKED
HIGH-LOW DC VOLTAGE
INVERTER OUTPUT OVERLOAD
OVER TEMP
STATIC SWITCH INHIBITED
STATIC SWITCH ON RESERVE
PHASE VOLTAGE SELECT
AB BC CN AN CA BN
AC VOLTAGE SELECT
UPS OUTPUT INVERTER RESERVE
UPS OUTPUT CURRENT
A C B
INVERTER OPERATE
INVERTER STANDBY
BATTERY RECHARGE
STATIC SWITCH TRANSFER TEST
LAMP TEST/RESET
STATIC SWITCH RETRANSFER
AUTO INHIBIT
ID-EBKR9335-3
ALTERNATE FEEDER
(OFF/OPEN)
ID-EBKR9335-4
OUTPUT TO PDP
(OFF/OPEN)
ID-EBKR9335-5
BYPASS
(ON/CLOSED)
ID-EBKR9335-1
NORMAL FEEDER
(OFF/OPEN)
ID-EBKR9335-2
EMERGENCY FEEDER
(OFF/OPEN)


MCC-311AB
480 VAC
3Ø
MCC-312A
480 VAC
3Ø
NORMAL
FEEDER
ID-
EBKR9335-1
480-208/120
VAC STEPDOWN
XFORMER
RECTIFIER
CHARGER
M3 Amps
EMGY
FEEDER
M1 Volts
ID-
EBKR9335-2
M2 Amps
LINE VOLTAGE
REGULATING
XFORMER
SUPS
014AB
BATTERY
INVERTER
M2 Hz
BYPASS
TRANSF.
NEUTRAL
M6
Hz
M5
Volts
STATIC
TRANSFER
SWITCH
ID-EBKR9335-3
ALT
FEEDER
M7 Amps
ID-
EBKR9335-
4
OUTPUT
TO PDP
ID-
EBKR9335-
5
BYPASS
SUPS 014AB
208/120VAC 3Ø
PDP014AB

Indications

METERS

Item	Designation	Comment
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. Current increases momentarily and then goes back to zero.
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 is complete. In the UPS position, voltage reads zero until step 6.5.3.4.
M6	Frequency (57-63 Hz)	Frequency reads 57 until step 6.5.3.9. Will read 60 when step 6.5.3.9 is completed
M7	UPS Output Current (0-150 Amps AC)	System load current reads zero until step 6.5.3.6.

INDICATOR LIGHTS

Item	Designation	Indication
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.

6.5.3 Transfer SUPS 014AB from Alternate to Normal AC Power as follows:

TASK ELEMENT 1	STANDARD
6.5.3.1. If SUPS 014AB inverter has been isolated in accordance with step 6.5.2.7, then perform the following:	Step referred to.
Comment: The initial conditions state that SUPS 014AB has been isolated in accordance with step 6.5.2.7.	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
6.5.3.1.1 Place Normal Feeder breaker, ID-EBKR9335-1 to ON.	Breaker is ON.
Comment: **EVALUATOR CUE:** Breaker will be OFF on arrival, provide cue of breaker being moved from OFF to ON. Inverter input voltage (M1) reads as is after this step is performed. Inverter input current (M2) reads zero.	**Critical** **SAT / UNSAT**

TASK ELEMENT 3	STANDARD
6.5.3.1.2 Verify Inverter Input Voltage ≥ 121 VDC, then place Emergency Feeder breaker, ID-EBKR9335-2 to ON.	Breaker is ON.
Comment: **EVALUATOR CUE:** When meter checked Inverter Voltage reads as you see it. **EVALUATOR CUE:** Breaker will be OFF on arrival, provide cue of breaker being moved from OFF to ON.	**Critical** **SAT / UNSAT**

TASK ELEMENT 4	STANDARD
6.5.3.1.3 Depress and release Inverter Operate pushbutton.	Pushbutton is pressed and released.
Comment: **EVALUATOR CUE:** Pushbutton moved in when depressed and popped out when released.	**Critical** **SAT / UNSAT**

TASK ELEMENT 5	STANDARD
6.5.3.2 Verify SUPS 014AB Static Switch Retransfer toggle switch in INHIBIT.	Verification complete.

Comment: **EVALUATOR CUE:** The Static Switch Retransfer toggle switch is in INHIBIT.	**SAT / UNSAT**

TASK ELEMENT 6	STANDARD
6.5.3.3 Place SUPS 014AB Alternate Feeder breaker, ID-EBKR9335-3 to ON.	Breaker is ON.
Comment: **EVALUATOR CUE:** Breaker will be OFF on arrival, provide cue of breaker being moved from OFF to ON. The Static Switch Inhibited light goes OFF when this is performed.	**Critical** **SAT / UNSAT**

TASK ELEMENT 7	STANDARD
6.5.3.4 Depress and release SUPS 014AB Static Switch Transfer Test pushbutton.	Test pushbutton depressed and released.
Comment: **EVALUATOR CUE:** Pushbutton moved in when depressed and popped out when released. The Static Switch On Reserve light illuminates when this is performed.	**Critical** **SAT / UNSAT**

TASK ELEMENT 8	STANDARD
6.5.3.4.1 Verify Static Switch On Reserve light Illuminates.	Verification complete.
Comment: **EVALUATOR CUE:** The Static Switch On Reserve light is illuminated.	**SAT / UNSAT**

TASK ELEMENT 9	STANDARD
6.5.3.5 Depress and release SUPS 014AB Lamp Test/Reset pushbutton.	Pushbutton depressed and released.

Comment: **EVALUATOR CUE:** Pushbutton moved in when depressed and popped out when released.	**Critical** **SAT / UNSAT**

TASK ELEMENT 10	STANDARD
6.5.3.5.1 Verify Static Switch On Reserve light remains Illuminated.	Verification complete.
Comment: **EVALUATOR CUE:** The Static Switch On Reserve light is illuminated.	**SAT / UNSAT**

TASK ELEMENT 11	STANDARD
6.5.3.6 Place SUPS 014AB Output To PDP014AB, ID-EBKR9335-4 breaker to ON.	Breaker is ON.
Comment: **EVALUATOR CUE:** Breaker will be OFF on arrival, provide cue of breaker being moved from OFF to ON.	**Critical** **SAT / UNSAT**

TASK ELEMENT 12	STANDARD
6.5.3.7 Place SUPS 014AB Bypass breaker, ID-EBKR9335-5 to OFF.	Breaker is OFF.
Comment: **EVALUATOR CUE:** Breaker will be ON on arrival, provide cue of breaker being moved from ON to OFF.	**Critical** **SAT / UNSAT**

TASK ELEMENT 13	STANDARD
6.5.3.8 Place SUPS 014AB AC Voltage Select Switch to INVERTER.	Select Switch is verified in INVERTER.

Comment: **EVALUATOR CUE:** AC Voltage Select Switch is in INVERTER The AC Voltage Select Switch could be in what ever position the last watch stander left it in.	**SAT / UNSAT**

Evaluator Note
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 16.

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: • 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)	Depresses the Inverter Operate pushbutton and verifies proper voltage.
Comment: The applicant must use the multi-selector switch and move through these positions. **EVALUATOR CUE:** When the applicant initially checks voltage there is no voltage indicated in any Inverter position. Once the Inverter Operate pushbutton is depressed and released the voltages indicate the values given in the step. **EVALUATOR CUE:** If the applicant observes any UPS position, voltage will be as indicated. **EVALUATOR CUE:** Pushbutton moved in when depressed and popped out when released.	**Critical** **SAT / UNSAT**

TASK ELEMENT 15	STANDARD
6.5.3.10 Place SUPS 014AB Static Switch Retransfer toggle switch to AUTO.	Toggle Switch is in Auto.
Comment: **EVALUATOR CUE:** Static Switch Retransfer toggle switch will be in INHIBIT at this point, cue that the switch is moved from INHIBIT to AUTO.	**Critical** **SAT / UNSAT**

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: **EVALUATOR CUE:** 30 seconds have elapsed. After this pushbutton is depressed, the Static Switch On Reserve light will extinguish.	**Critical** **SAT / UNSAT**

TASK ELEMENT 17	STANDARD
6.5.3.11.1 Verify Static Switch On Reserve light Extinguished.	Verification complete.
Comment: **EVALUATOR CUE:** The Static Switch On Reserve light is extinguished.	**SAT / UNSAT**

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 CUE:

- 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