ES-301 **Administrative Topics Outline** **Form ES-301-1**

Facility: Comanche Peak NPP **Date of Examination:** 06-11-18

Examination Level: RO ■ SRO ☐ **Operating Test Number:**

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations RA(1) K/A Importance:	M	KA: Determine Time to uncover core on loss of RHR (modified from RA2-March 2009)
Conduct of Operations RA(2) K/A Importance:	N	KA: Estimate size of Steam Generator tube leak
Equipment Control RA(3) K/A Importance:	N	KA: Perform a Heat Balance
Radiation Control RA(4) K/A Importance:	D	KA: Determine Radiation doses during system alignment (RA4 June 2014)
Emergency Plan		Not sampled

NOTE: All items (five total) are required for SROs. RO applicants require only four items unless they are retaking only the administrative topics (which would require all five items).

*Type Codes and Criteria: (C)ontrol Room, (S)imulator, Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs and RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1, randomly selected)

ES-301 **Administrative Topics Outline** **Form ES-301-1**

Facility: Comanche Peak NPP **Date of Examination:** 06-11-18

Examination Level: RO ☐ SRO ■ **Operating Test Number:**

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations SA(5) K/A Importance:	N	KA Determine Close Contact Fuel Assembly Movement
Conduct of Operations SA(6) K/A Importance:	N	KA Evaluate Steam Generator Tube Leak effect on plant operations (New)
Equipment Control SA(7) K/A Importance:	N	KA Perform Heat balance and review for operability (New)
Radiation Control SA(8) K/A Importance:	M	KA Approve a release Permit (Modified from SA4-March 2009)
Emergency Plan SA(9) K/A Importance:	N	KA Determine the Correct Emergency Declaration

NOTE: All items (five total) are required for SROs. RO applicants require only four items unless they are retaking only the administrative topics (which would require all five items).

*Type Codes and Criteria:
(C)ontrol Room, (S)imulator, Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs and RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1, randomly selected)

Rev. 0

CPNPP 2018-06 Initial Exam
NRC Admin JPM Description

RO

(RA1) Determine Time to core uncover on loss of RHR (RA2-March 2009)
Demonstrate the ability to xxx and yyy in accordance with procedure zzzzz, "title……."

(RA2) Estimate size of Steam Generator tube leak (New)
Demonstrate the ability to xxx and yyy in accordance with procedure zzzzz, "title……."

(RA3) Perform a Heat Balance (New)
Demonstrate the ability to xxx and yyy in accordance with procedure zzzzz, "title……."

(RA4) Determine Radiation doses during system alignment (RA4 June 2014)
Demonstrate the ability to xxx and yyy in accordance with procedure zzzzz, "title……."

SRO

(SA5) Determine Close Contact Fuel Assemble Movement
Demonstrate the ability to review Fuel Transfer Forms and interpret procedure guidance for Close Contact Fuel Assembly moves in accordance with procedure xxx.

(SA6) Evaluate Steam Generator Tube Leak effect on plant operations (New)
Demonstrate the ability to xxx and yyy in accordance with procedure zzzzz, "title……."

(SA7) Perform Heat balance and review for operability (New)
Demonstrate the ability to xxx and yyy in accordance with procedure zzzzz, "title……."

(SA8) Approve a release Permit
Demonstrate the ability to xxx and yyy in accordance with procedure zzzzz, "title……."

(SA9) Determine Appropriate Protective Action Recommendation (Not S01136 or S01140)
Demonstrate the ability to xxx and yyy in accordance with procedure zzzzz, "title……."

Facility: CPNPP JPM # RA1 Task # K/A # 2.1.23 4.3 / 4.4

Title: Determine Loss of RHR Time Limitations

Examinee (Print): _____

Testing Method:

Simulated Performance:	_____	Classroom:	X
Actual Performance:	X	Simulator:	_____
Alternate Path:	_____	Plant:	_____

READ TO THE EXAMINEE

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- Unit 1 is in MODE 5 with water level in the Reactor Vessel at 52" above the Core Plate.
- All Pressurizer Safety Valves have been removed.
- Reactor Coolant System temperature is 130ºF.
- The Reactor was shutdown on May 15th at 0000 after operating at 100% power for the last 550 days.
- Today is June 11th and the Unit experienced a Loss of Residual Heat Removal cooling at 1200 hours.

Initiating Cue: The Unit Supervisor directs you to PERFORM the following:

- CALCULATE the following times per ABN-104, Residual Heat Removal System Malfunction, Attachment 5, Time to Saturation for Loss of All RHR with the RCS at Reduced Inventory and Attachment 19, Available Time for Containment Closure:
  - DETERMINE Time to Saturation _____
  - DETERMINE Time to Core Uncovery _____
  - DETERMINE Containment Closure Times:
    - Thermal Environment Limiting _____
    - Radiological Environment Limiting _____

Task Standard: Determine Time to Saturation is 20.5 ± .5 minutes, Time to Core Uncovery is 2.85 ± 0.15 hours, And Containment Closure Time following a Loss of Residual Heat Removal System per ABN-104 is 117 ± 5 minutes for Radiological Env. Limiting and 130 ± 5 minutes for Thermal Env Limiting.

Required Materials: ABN-104, Residual Heat Removal System Malfunction, Rev. 9.

Validation Time: 15 minutes Time Critical: N/A Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

CLASSROOM SETUP

EXAMINER:

PROVIDE the examinee with a copy of:

- **ABN-104, Residual Heat Removal Malfunction.**
  - **Attachment 5, Time to Saturation for Loss of All RHR with the RCS at Reduced Inventory.**
  - **Attachment 19, Available Time for Containment Closure.**

√ - Check Mark Denotes Critical Step

START TIME:	

Perform Step: 1	Determine Time to Saturation: • Calculate **Time After Shutdown**.
Standard:	DETERMINED number of hours between 0000 on May 15th and 1200 on June 11th and CALCULATED **Time After Shutdown = 660 hours**.
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 2√	Determine **Time to Saturation**: • Find **Time to Saturation** from Attachment 5, Page 1.
Standard:	REFERRED to Page 1 of Attachment 5 and PLOTTED the intersection of **Time After Shutdown** (660 hours) and **Initial Temp** (130ºF) and DETERMINED: TIME TO SATURATION = **20.5 ± .5 minutes**.
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 3√	Determine **Time To Core Uncovery**: • Find **Time To Core Uncovery** from Attachment 5, Page 2
Standard:	REFERRED to Page 2 of Attachment 5 and PLOTTED the intersection of **Time After Shutdown** (27.5 days or 660 hours) and **Initial RCS Level** (52 inches above the core plate) and DETERMINED: **Time To Core Uncovery = 2.85 ± 0.15 hours**.
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 4√	Determine Containment Closure time: • Find Containment Closure Time from Attachment 19: • Thermal Environment Limiting Curve.
Standard:	REFERRED to Attachment 19 and PLOTTED the intersection of **Time After Shutdown** and **Thermal Environment Limiting Curve** and DETERMINED: **Containment Closure Time** = 130 **± 5 minutes**.
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 5√	Determine Containment Closure time: • Find Containment Closure Time from Attachment 19: • Radiological Environment Limiting Curve.
Standard:	REFERRED to Attachment 19 and PLOTTED the intersection of **Time After Shutdown** and **Radiological Environment Limiting Curve** and DETERMINED: **Containment Closure Time = 117 ± 5 minutes**.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☙ UNSAT ☙**

STOP TIME:	

INITIAL CONDITIONS: **Given the following conditions:**

- **Unit 2 is in MODE 5 with water level in the Reactor Vessel at 52" above the Core Plate.**
- **All Pressurizer Safety Valves have been removed.**
- **Reactor Coolant System temperature is 130ºF.**
- **The Reactor was shutdown on May 15th at 0000 after operating at 100% power for the last 550 days.**
- **Today is June 11th and the Unit experienced a Loss of Residual Heat Removal cooling at 1200 hours.**

INITIATING CUE: **The Unit Supervisor directs you to PERFORM the following:**

- **CALCULATE the following times per ABN-104, Residual Heat Removal System Malfunction, Attachment 5, Time to Saturation for Loss of All RHR with the RCS at Reduced Inventory and Attachment 19, Available Time for Containment Closure:**
  - **DETERMINE Time to Saturation _____**
  - **DETERMINE Time to Core Uncovery _____**
  - **DETERMINE Containment Closure Times:**
    - **Thermal Environment Limiting _____**
    - **Radiological Environment Limiting _____**

Facility: CPNPP JPM # RA2 Task # K/A # 2.1.23 4.3 / 4.4

Title: Estimate Size of Steam generator Tube Leak

Examinee (Print): _____

Testing Method:

Simulated Performance:	_____	Classroom:	X
Actual Performance:	X	Simulator:	_____
Alternate Path:	_____	Plant:	_____

READ TO THE EXAMINEE

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: The plant has recently started up from a refueling outage and is now operating at 100% power for 2 days, BOL.

- You have just completed turnover and assumed the shift. The previous crew had started a RCS Leak Rate calculation IAW OPT-303, "REACTOR COOLANT SYSTEM WATER INVENTORY", revision 15, section 8.4 "Performing RCS Water Inventory Using Manual Calculation Method". The previous crew was only able to gather the initial and final values used for performing the calculation before turning over to you. The data gather by the last shift was independently reviewed by another RO and has been verified as being correct.

Initiating Cue: The Unit Supervisor directs you to PERFORM the following:

- CALCULATE the following times per ABN-104, Residual Heat Removal System Malfunction, Attachment 5, Time to Saturation for Loss of All RHR with the RCS at Reduced Inventory and Attachment 19, Available Time for Containment Closure:
  - DETERMINE Time to Saturation _____
  - DETERMINE Time to Core Uncovery _____
  - DETERMINE Containment Closure Times:
    - Thermal Environment Limiting _____
    - Radiological Environment Limiting _____

Task Standard: Determine Time to Saturation is 20.5 ± .5 minutes, Time to Core Uncovery is 2.85 ± 0.15 hours, And Containment Closure Time following a Loss of Residual Heat Removal System per ABN-104 is 117 ± 5 minutes for Radiological Env. Limiting and 130 ± 5 minutes for Thermal Env Limiting.

Required Materials: ABN-104, Residual Heat Removal System Malfunction, Rev. 9.

Validation Time: 15 minutes Time Critical: N/A Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

CLASSROOM SETUP

EXAMINER:

PROVIDE the examinee with a copy of:

- **ABN-104, Residual Heat Removal Malfunction.**
  - **Attachment 5, Time to Saturation for Loss of All RHR with the RCS at Reduced Inventory.**
  - **Attachment 19, Available Time for Containment Closure.**

√ - Check Mark Denotes Critical Step

START TIME:	

Perform Step: 1	Determine Time to Saturation: • Calculate **Time After Shutdown**.
Standard:	DETERMINED number of hours between 0000 on May 15th and 1200 on June 11th and CALCULATED **Time After Shutdown = 660 hours**.
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 2√	Determine **Time to Saturation**: • Find **Time to Saturation** from Attachment 5, Page 1.
Standard:	REFERRED to Page 1 of Attachment 5 and PLOTTED the intersection of **Time After Shutdown** (660 hours) and **Initial Temp** (130ºF) and DETERMINED: TIME TO SATURATION = **20.5 ± .5 minutes**.
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 3√	Determine **Time To Core Uncovery**: • Find **Time To Core Uncovery** from Attachment 5, Page 2
Standard:	REFERRED to Page 2 of Attachment 5 and PLOTTED the intersection of **Time After Shutdown** (27.5 days or 660 hours) and **Initial RCS Level** (52 inches above the core plate) and DETERMINED: **Time To Core Uncovery = 2.85 ± 0.15 hours**.
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 4√	Determine Containment Closure time: • Find Containment Closure Time from Attachment 19: • Thermal Environment Limiting Curve.
Standard:	REFERRED to Attachment 19 and PLOTTED the intersection of **Time After Shutdown** and **Thermal Environment Limiting Curve** and DETERMINED: **Containment Closure Time** = 130 **± 5 minutes**.
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 5√	Determine Containment Closure time: • Find Containment Closure Time from Attachment 19: • Radiological Environment Limiting Curve.
Standard:	REFERRED to Attachment 19 and PLOTTED the intersection of **Time After Shutdown** and **Radiological Environment Limiting Curve** and DETERMINED: **Containment Closure Time = 117 ± 5 minutes**.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☙ UNSAT ☙**

STOP TIME:	

INITIAL CONDITIONS: **Given the following conditions:**

- **Unit 2 is in MODE 5 with water level in the Reactor Vessel at 52" above the Core Plate.**
- **All Pressurizer Safety Valves have been removed.**
- **Reactor Coolant System temperature is 130ºF.**
- **The Reactor was shutdown on May 15th at 0000 after operating at 100% power for the last 550 days.**
- **Today is June 11th and the Unit experienced a Loss of Residual Heat Removal cooling at 1200 hours.**

INITIATING CUE: **The Unit Supervisor directs you to PERFORM the following:**

- **CALCULATE the following times per ABN-104, Residual Heat Removal System Malfunction, Attachment 5, Time to Saturation for Loss of All RHR with the RCS at Reduced Inventory and Attachment 19, Available Time for Containment Closure:**
  - **DETERMINE Time to Saturation _____**
  - **DETERMINE Time to Core Uncovery _____**
  - **DETERMINE Containment Closure Times:**
    - **Thermal Environment Limiting _____**
    - **Radiological Environment Limiting _____**

Appendix C	Job Performance Worksheet	Form ES-C-1

Facility: Comanche Peak Task No: Comanche Peak 2018-06 RA3

Task Title: Manual Heat Balance Job Performance Measure No: RO RA3

K/A Reference: 2.1.23

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of Testing

Simulated Performance _____ Actual Performance X

Classroom X Simulator _____ Plant _____

Hand Page 3 and the reference materials to the examinee and read to them the following:

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

Initial Conditions:

Given the following conditions:

- A Unit 1 Calorimetric is required
- The Plant Computer is unavailable for use
- All Prerequisites have been completed
- OPT-309-2, Calorimetric Data Reduction Worksheet, has been completed through Step 8.2.2.8 by a Reactor Operator
- Another Reactor Operator has performed an independent review of the recorded data on OPT-309-11 as being correct
- You are tasked with calculating the current power level for Unit 1 using OPT-309, Unit Calorimetric, step 8.2.2.10.D.

----------Stop Reading----------

Task Standard:

- Utilizing OPT-309, OPT-309-11, calculate a Unit 1 calorimetric heat balance using OPT-309-2

Required Materials:

- OPT-309, Unit Calorimetric, Rev 15 (partially filled out)
- OPT-309-2, Calorimetric Data Reduction Worksheet, Rev 8 (partially filled out)
- OPT-309-11, Unit 1 Calorimetric Data Sheet, Rev 6. (filled out)

General References:

- Steam Tables
- Calculator

Time Critical Task: No

Validation Time: 20 minutes

Initiating Cue:

Given the following conditions:

- A Unit 1 Calorimetric is required
- The Plant Computer is unavailable for use
- All Prerequisites for OPT-309 have been completed
- OPT-309-2, Calorimetric Data Reduction Worksheet, has been completed through Step 8.2.2.8 by a Reactor Operator
- Another Reactor Operator has performed an independent review of the recorded data on OPT-309-11 as being correct
- You are tasked with calculating the current power level for Unit 1 using OPT-309, Unit Calorimetric, step 8.2.2.10.D.

Performance Information

Denote critical steps with a check mark

_____ Performance step: OPT-309-2, step 8.2.2.9

Standard:

Correctly fill in the values for the S/G Enthalpy Rise

- Feed water enthalpy is 259.45 btu/lbm +/- 2 btu/lbm
- Steam Enthalpy is 1192.9 btu/lbm +/- .1 btu/lbm
- Δh for all four Steam Generators will be 933.45 btu/lbm +/- 2 btu/lbm

Comment:

- The candidate will obtain the enthalpy values for subcooled water and saturated steam from the Steam Tables provided
- See the Answer Key

_____ Performance step: OPT 309-2, step 8.2.2.10

Standard: Correctly calculate the heat gain of each steam generator and total for all four S/Gs

Comment:

- The acceptable values for S/G heat gain is listed in the answer key
- Acceptable values for total heat gain in all four S/Gs will be 5.711E9 btu +/- .01E9 btu
- See answer key

_____ Performance step: OPT-309-2, step 8.2.2.11

Standard: The candidate will calculate reactor power as a % of Rated Thermal Power

Comment:

- The acceptable answer for % power is 46.76% +/- 0.5%
- See answer key

Terminating cue: The JPM is complete when the candidate turns in the completed OPT-309-2

Verification of Completion

Job Performance Measure No. _____

Examinee's Name:

Examiner's Name:

Date Performed:

Facility Licensee Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question: _____
_____
_____
_____

Response: _____
_____
_____
_____

Result: Satisfactory/Unsatisfactory

Examiner's signature:_____ Date: _____

Appendix C	Job Performance Measure Worksheet	Form ES-C-1

Facility: Comanche Peak Task No: Comanche Peak 2018-06 RA4

Task Title: Determine Radiation Dose Job Performance Measure No: RO RA4

K/A Reference: 2.3.2

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of Testing

Simulated Performance _____ Actual Performance X

Classroom X Simulator _____ Plant _____

Hand Page 3 to the examinee and Read to them the following:

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

Initial Conditions:

Given the following conditions:

- A high dose alignment is scheduled in the Safeguards Building
- The general dose rate in the area is 75 mrem/hour but can be reduced to 5 mrem/hour if lead shielding is installed
- It will take Nuclear Equipment Operators (NEOs) Alpha & Bravo 90 minutes to install the shielding
- Independent of the shielding, it will take NEO Alpha five hours or NEOs Alpha & Bravo three hours to perform the maintenance.

----------*Stop Reading*----------

Task Standard:

Utilizing STA-657, calculated the dose received when performing a system alignment

Required Materials:

STA-657, ALARA Job Planning/Debriefing, Rev. 19

General References: None

Time Critical Task: No

Validation Time: 10 minutes

Initiating Cue:

Given the following conditions:

- A high dose alignment is scheduled in the Safeguards Building
- The general dose rate in the area is 75 mrem/hour but can be reduced to 5 mrem/hour if lead shielding is installed
- It will take Nuclear Equipment Operators (NEOs) Alpha & Bravo 90 minutes to install the shielding
- Independent of the shielding, it will take NEO Alpha five hours or NEOs Alpha & Bravo three hours to perform the maintenance.

The Work Control Supervisor directs you to PERFORM the following:

CALCULATE the dose received when performing the system alignment for each of the following conditions

- NEO Alpha **without** shielding _____ mrem
- NEOs Alpha & Bravo **without** shielding _____ mrem
- NEO Alpha **with** shielding (installed by NEOs Alpha and Bravo) _____ mrem
- NEOs Alpha & Bravo **with** shielding (installed by NEOs Alpha and Bravo) _____ mrem

Performance Information

Denote critical steps with a check mark

_____ Performance step:

Standard:

The Work Control Supervisor directs you to PERFORM the following:

CALCULATE the dose received when performing the system alignment for each of the following conditions

- NEO Alpha **without** shielding _____ mrem
- NEOs Alpha & Bravo **without** shielding _____ mrem
- NEO Alpha **with** shielding (installed by NEOs Alpha and Bravo) _____ mrem
- NEOs Alpha & Bravo **with** shielding (installed by NEOs Alpha and Bravo) _____ mrem

Comment:

Terminating cue: When the candidate turns in a completed page 3, the JPM is complete.

Verification of Completion

Job Performance Measure No. RA4

Examinee's Name:

Examiner's Name:

Date Performed:

Facility Licensee Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question: _____

Response: _____

Result: Satisfactory/Unsatisfactory

Examiner's signature: _____ Date: _____

Facility: CPNPP JPM # NRC SA5 Task # FH1305 K/A # 2.1.42 2.5 / 3.4
Title: Determine Close Contact Fuel Assembly Movement

Examinee (Print): _____

Testing Method:

Simulated Performance:		Classroom:	X
Actual Performance:	X	Simulator:	
Alternate Path:		Plant:	
Time Critical:			

READ TO THE EXAMINEE

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- Unit 1 is in Mode 6 and Core Reload is in progress
- The last Fuel Assembly placed in the Core was at location A8

Initiating Cue: You have just relieved the Fuel Handling Supervisor on the Refueling Machine and you have the following documents:

- RFO-302, Handling of Fuel Assemblies
- A copy of the current Fuel Reload Sequence Plan
- A map of all core locations showing the current status of Fuel Assemblies that have been placed in the core

You are to DETERMINE the types of Close Contact movement to be performed for the next 3 Fuel Assemblies.

Use the area below to describe the Close Contact movement for each Fuel Assembly:

First Fuel Assembly:

Second Fuel Assembly:

Third Fuel Assembly:

Task Standard: DETERMINED the correct Close Contact movement for the identified Fuel Assemblies per the key. The first assembly to be moved is to core location B7 by lowering off-index in open water until just above core plate (6" from bottom), then use inching (manual or electric) to move on-index in one direction, then on-index in the other direction, and lower at slow speed. The second assembly to be moved is to core location B8 by lowering on-index at slow speed. The third assembly to be moved is to core location C12 by lowering off-index in open water until just above core plate (6" from bottom), then use inching (manual or electric) to move on-index in one direction, then on-index in the other direction, and lower at slow speed.

Ref. Materials: RFO-302, Handling of Fuel Assemblies Rev. 21 PCN -

Validation Time: 15 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

CLASSROOM SETUP

EXAMINER:

MAKE the following available in the classroom:

- **RFO-302, Handling of Fuel Assemblies (Procedure)**
- **The current Fuel Reload Sequence Plan (Handout 1)**
- **A map of all core locations showing the current status of Fuel Assemblies that have been placed in the core (Handout 2)**

√ - Check Mark Denotes Critical Step

START TIME:	

Perform Step: 1√	DETERMINE correct Close Contact movement for Fuel Assembly to be placed in core location B7.
Standard:	DETERMINED Fuel Assembly to be placed in core location B7 should be lowered off-index in open water until just above core plate (6" from bottom), then inching (Manual or Electric) should be used to move to on-index in one direction, then on-index in the other direction, then lowered at slow speed.
Comment:	**SAT UNSAT**

Perform Step: 2√	DETERMINE correct Close Contact movement for Fuel Assembly to be placed in core location B8.
Standard:	DETERMINED Fuel Assembly to be placed in core location B8 should be lowered on-index at slow speed.
Comment:	**SAT UNSAT**

Perform Step: 3√	DETERMINE correct Close Contact movement for Fuel Assembly to be placed in core location C12.
Standard:	DETERMINED Fuel Assembly to be placed in core location C12 should be lowered off-index in open water until just above core plate (6" from bottom), then inching (Manual or Electric) should be used to move to on-index in one direction, then on-index in the other direction, then lowered at slow speed.
Comment:	**SAT UNSAT**

STOP TIME:	

Initial Conditions: **Given the following conditions:**

- **Unit 1 is in Mode 6 and Core Reload is in progress**
- **The last Fuel Assembly placed in the Core was at location A8**

Initiating Cue: **You have just relieved the Fuel Handling Supervisor on the Refueling Machine and you have the following documents:**

- **RFO-302, Handling of Fuel Assemblies**
- **A copy of the current Fuel Reload Sequence Plan**
- **A map of all core locations showing the current status of Fuel Assemblies that have been placed in the core**

You are to DETERMINE the types of Close Contact movement to be performed for the next 3 Fuel Assemblies.

Use the area below to describe the Close Contact movement for each Fuel Assembly:

First Fuel Assembly:

Second Fuel Assembly:

Third Fuel Assembly:

Appendix C	Job Performance Measure Worksheet	Form ES-C-1

Facility: Comanche Peak Task No: Comanche Peak 2018-06 SA6

Task Title: Eval SGTL effect on plant Job Performance Measure No: SRO SA6

K/A Reference: 2.1.33

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of Testing

Simulated Performance _____ Actual Performance X

Classroom X Simulator _____ Plant _____

Hand page 3, and the references to the examinee and read the following:

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

Initial Conditions:

The plant has recently started up from a refueling outage and is now operating at 100% power for 2 days, BOL. You have just completed turnover and assumed the shift.

The previous crew completed a RCS Leak Rate calculation IAW OPT-303, "REACTOR COOLANT SYSTEM WATER INVENTORY", revision 15, section 8.4 "Performing RCS Water Inventory Using Manual Calculation Method" and the completed surveillance. The completed surveillance requires a SRO review and signoff.

NOTE: There was no VCT auto make-up during the data collection. There were no diversions of letdown flow during this period.

----------Stop Reading----------

Task Standard:

Complete the SRO review of OPT-303-1, corrects any errors and determines current plant status.

Required Materials:

OPT-303-1, “Unit 1 Reactor Coolant System Water Inventory” (filled out)

TDM-804A, “Equipment Data Tank Height vs Volume”, revision 3 Comanche Peak Technical Specifications

Calculator with memory erased

General References:

Steam Tables

Time Critical Task: No

Validation Time: 30 minutes

Terminating cue:

When the applicant completes the review of OPT-303-1, corrects any mistakes and determines current plant status.

Initiating Cue:

The plant has recently started up from a refueling outage and is now operating at 100% power for 2 days, BOL. You have just completed turnover and assumed the shift.

The previous crew completed a RCS Leak Rate calculation IAW OPT-303, "REACTOR COOLANT SYSTEM WATER INVENTORY", revision 15, section 8.4 "Performing RCS Water Inventory Using Manual Calculation Method" and the completed surveillance. The completed surveillance requires a SRO review and signoff.

NOTE: There was no VCT auto make-up during the data collection. There were no diversions of letdown flow during this period.

Performance Information

Denote critical steps with a check mark

_____√ Performance step 1: Primary to Secondary Leakage Verification

The examinee must identify that the Primary to Secondary leakage calculation is incorrect. The correct value is 160 GPD which is above the T.S. value of 150 GPD.

Standard:

Identify the error and correct it.

Comment:

See Answer Key

_____ Performance step 2: 8.4.5 Mass change of RCS calculation

There are three errors in the calculation for the change in mass of the RCS used in 8.4.5a, and 8.4.5B. The two pressures filled in the surveillance are in PSIG. The correct values are 2250 psia. The change in mass is also incorrect. The value filled in is 4037.3 lbs when the correct value is -4037.3 lbs.

Standard:

Identify the errors and correct them.

Comment:

See Answer Key

_____ Performance step 3: 8.4.5C, 8.4.5D, 8.4.5E Mass change of Pressurizer

The same error of psig being used instead of psia is in this part of the calculation. There is also another error filled in for the final PZR liquid volume. The filled out surveillance has the value for 56" in the PZR and incorrect value of 7655.1 gallons. The correct liquid volume for 59" in the PZR is a liquid volume of 8030.8 gallons

Standard:

The examinee must identify this error to calculate the corrected value for the RCS leak rate.

Comment:

See Answer Key

_____√ Performance step 4: 8.4.5I Total Calculated Leak Rate

Standard:

The examinee will identify that the calculation for the Total RCS Leakage Rate is incorrect. The person that made the calculation used an elapsed time of 100 minutes instead of the correct value of 200 minutes.

Comment:

See Answer Key

Terminating cue:

When the SRO Examinee has completed the review of the surveillance, made the corrections and handed it back in.

Verification of Completion

Job Performance Measure No. _____

Examinee's Name:

Examiner's Name:

Date Performed:

Facility Licensee Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question: _____
_____
_____
_____

Response: _____
_____
_____
_____

Result: Satisfactory/Unsatisfactory

Examiner's signature:_____ Date: _____

Appendix C	**Job Performance Measure Worksheet**	**Form ES-C-1**

Facility: Comanche Peak Task No: Comanche Peak 2018-06 SA3

Task Title: Review Heat Balance Job Performance Measure No: SRO SA7

K/A Reference: 2.1.23

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of Testing

Simulated Performance Actual Performance

Classroom Simulator Plant

Hand Page 3 and the reference materials to the examinee and read the following:

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

Initial Conditions:

Given the following conditions:

- A Unit 1 Calorimetric was recently performed by a RO
- The Plant Computer is unavailable for use
- The OPT-309-11, Unit 1 Calorimetric Data Sheet was reviewed for accuracy by another RO and the data recorded on it is all correct
- OPT-309-2, Calorimetric Data Reduction Worksheet, has been completed by a Reactor Operator

----------Stop Reading----------

Task Standard:

Review and verify the accuracy of the completed OPT-309-2 and OPT-309-12
Determine Current Plant Status

Required Materials:

- OPT-309, Unit Calorimetric, Rev 15
- OPT-309-2, Calorimetric Data Reduction Worksheet, Rev 8
- OPT-309-11, Unit 1 Calorimetric Data Sheet, Rev 6

General References:

- Steam Tables
- calculator

Time Critical Task: No

Validation Time:

Initiating Cue:

The Shift Manager directs you to PERFORM the following:

- Review a completed OPT-309, Calorimetric Heat Balance for Unit 1 using Section 8.2, Manual Calorimetric Calculation IAW step 8.2.2.12
- Review and Verify the accuracy of OPT-309-2, Calorimetric Data Reduction Worksheet
- Make corrections to the completed OPT-309-2, Calorimetric Data Reduction Worksheet as necessary
- Determine the current Status of the Plant after completing a review of OPT-309-12

Performance Information

Denote critical steps with a check mark

_____ Performance step: OPT-309, step 8.2.2.9, S/G Enthalpy Rise Calculation

Standard:

Find the error in step 8.2.2.9 where the incorrect value for FW enthalpy is used. The correct value will be 259.45 +/- 2 btu/lbm

Comment:

The incorrect value used in the completed OPT-309-2 is the enthalpy for saturated water at 290 psia rather than the correct value of 259.45 btu/lbm for 290 F subcooled water.

_____ Performance step: OPT-309, step 8.2.2.10, SG Heat Gain Calculation

Standard:

The calculations for SG Heat Gain must be reperformed due to the incorrect FW enthalpy value used in the 8.2.2.9 calculation

Comment:

See the Answer Key

_____ Performance step: OPT-309, step 8.2.2.11

Standard:

The calculations for Percent Rated Power must be reperformed with the corrected SG Heat Gain values. The corrected Unit 1 power level will be 46.76% +/- .5%.

Comment:

_____ Performance step: Review OPT-309, step 8.2.3 and OPT-309-12

Standard:

The candidate will identify that all 4 Power Range Nuclear Instruments are Inoperable and determine that L.C.O. 3.0.3 must be entered for more than 1 required Power Range being Inoperable.

Comment:

L.C.O. 3.3.1 Condition E is only applicable if only 1 Power Range NI is Inoperable

---

Terminating cue:

When the candidate has completed the review of OPT-2 and made a determination of current plant status.

Verification of Completion

Job Performance Measure No. _____

Examinee's Name:

Examiner's Name:

Date Performed:

Facility Licensee Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question: _____
_____
_____
_____

Response: _____
_____
_____
_____

Result: Satisfactory/Unsatisfactory

Examiner's signature:_____ Date: _____

Facility: CPNPP JPM # Task # SO1039B K/A # 2.3.6 2.0 / 3.8

Title: Approve a Liquid Waste Release Permit

Examinee (Print): _____

Testing Method:

Simulated Performance:		Classroom:	X
Actual Performance:	X	Simulator:	
		Plant:	

READ TO THE EXAMINEE

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Unit 1 is shutdown for Refueling and the following conditions exist:

- Residual Heat Removal Pump 1-01 is operating with Residual Heat Removal Pump 1-02 in standby.
- Circulating Water Pump 1-03 is operating and the water boxes are open on the other three Circulating Water Pumps.
- X-RE-5253, Liquid Waste Effluent Radiation Monitor is out-of-service.
- Waste Water Holdup Tank #2 is being released.
- Unit 2 is operating at 100% with all systems in normal alignments.
- The previous shift placed Plant Effluent Tank (PET) #1 on recirculation and initiated a request for release.
- The permit has just been received in the Control Room to release PET #1 and the Unit 1 Circulating Water System has been selected as the discharge path.

Initiating Cue: The Shift Manager directs you to REVIEW the Release Permit and Plant Conditions and CIRCLE the results:

- Correct tank is being discharged YES / NO
- Radiation Monitor is OPERABLE YES / NO
- LCOAR is required YES / NO
- STA-603-13 is required YES / NO
- Unit #1 Discharge flowpath allowed YES / NO
- Unit #2 Discharge flowpath allowed YES / NO
- PET & WWHT simultaneous release allowed YES / NO

Task Standard: Locate and correctly perform Critical Steps of STA-603.

Required Materials: STA-603, Control of Station Radioactive Effluents, Rev. 20, PCN-1
STA-603-10, Batch Liquid Radioactive Effluent Release Data Sheet, Rev. 17

Validation Time: 10 minutes Time Critical: N/A Completion Time: _____ minutes

Comments:

Result: SAT UNSAT

Examiner (Print / Sign): _____ Date: _____

CLASSROOM SETUP

EXAMINER:

PROVIDE the examinee with a copy of:

- **STA-603, Control of Station Radioactive Effluents.**
- **COMPLETE STA-603-10, Batch Liquid Radioactive Effluent Release Data Sheet up to the Shift Manager review with the following errors:**
  - **NONE of the requirements for X-RE-5253 being OOS will have been performed.**

√ - Check Mark Denotes Critical Step

START TIME:	

Perform Step: 1 √	Review Release Permit, STA-603-10, Batch Liquid Radioactive Effluent Release Data Sheet.
Standard:	REVIEW STA-603-10, Release Permit and DETERMINE the following: • Correct tank is being discharged and CIRCLE **YES**. • Radiation Monitor is OPERABLE and CIRCLE **NO**. • LCOAR is required and CIRCLE **YES**. • STA-603-13 is required and CIRCLE **YES**.
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 2 √	Based on the initial conditions determine the required minimum dilution requirements are not met for a release via Unit 1.
Standard:	DETERMINE that a minimum of two Circulating Water pumps are required for a release and CIRCLE Unit #1 Discharge flowpath allowed is **NO**.
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 3 √	Determine if dilution requirements for release are met on Unit 2.
Standard:	DETERMINE that all four Circulating Water Pumps are running on Unit 2 which exceeds the minimum required of two Circulating Water pumps running and CIRCLE Unit #2 Discharge flowpath allowed is **YES**.
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 4 √	Determine if simultaneous release of the Plant Effluent Tank #1 and Waste Water Holdup Tank #1 is allowed.
Standard:	REVIEW STA-603, Control of Station Radioactive Effluents, and DETERMINE that simultaneous release from Plant Effluent Tank #1 and Waste Water Holdup Tank #1 is allowed and CIRCLE **YES**.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ⬙ UNSAT ⬙**

STOP TIME:	

INITIAL CONDITIONS: Unit 1 is shutdown for Refueling and the following conditions exist:

- Residual Heat Removal Pump 1-01 is operating with Residual Heat Removal Pump 1-02 in standby.
- Circulating Water Pump 1-03 is operating and the water boxes are open on the other three Circulating Water Pumps.
- X-RE-5253, Liquid Waste Effluent Radiation Monitor is out-of-service.
- Waste Water Holdup Tank #2 is being released.
- Unit 2 is operating at 100% with all systems in normal alignments.
- The previous shift placed Plant Effluent Tank (PET) #1 on recirculation and initiated a request for release.
- The permit has just been received in the Control Room to release PET #1 and the Unit 1 Circulating Water System has been selected as the discharge path.

INITIATING CUE: The Shift Manager directs you to REVIEW the Release Permit and Plant Conditions and CIRCLE the results:

- Correct tank is being discharged YES / NO
- Radiation Monitor is OPERABLE YES / NO
- LCOAR is required YES / NO
- STA-603-13 is required YES / NO
- Unit #1 Discharge flowpath allowed YES / NO
- Unit #2 Discharge flowpath allowed YES / NO
- PET & WWHT simultaneous release allowed YES / NO

Facility: CPNPP JPM # SA9 Task # SRO K/A # 2.1.4 4.3 / 4.4

Title: Determine the Correct Emergency Declaration

Examinee (Print): _____

Testing Method:

Simulated Performance:		Classroom:	X
Actual Performance:	X	Simulator:	
Alternate Path:		Plant:	

READ TO THE EXAMINEE

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- Unit 1 is in MODE 5 with water level in the Reactor Vessel at 10" above the Core Plate and lowering at a rate of 1" per minute.
- All Pressurizer Safety Valves have been removed.
- Reactor Coolant System temperature is 212ºF and stable.
- The Reactor was shutdown on May 15th at 0000 after operating at 100% power for the last 550 days.
- Today is June 11th and the Unit experienced a Loss of Residual Heat Removal cooling at 1200 hours.
- Containment closure has been established
- Containment pressure is 0.5 psig and rising by .05 psig per minute
- There is no detectable hydrogen in the Containment Atmosphere
- All power has been lost to the site, all diesels have failed to start, and it is not expected to regain power for the next several hours

Initiating Cue: The Unit Supervisor has directed you to make an Emergency Action Level determination:

Task Standard: Make an EAL call based on the above indications.

Required Materials: Copy of Comanche Peak EALs.

Validation Time: 15 minutes Time Critical: N/A Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

CLASSROOM SETUP

EXAMINER:

PROVIDE the examinee with a copy of:

- **ABN-104, Residual Heat Removal Malfunction.**
  - **Attachment 5, Time to Saturation for Loss of All RHR with the RCS at Reduced Inventory.**
  - **Attachment 19, Available Time for Containment Closure.**
  - **Comanche Peak EAL and EAL basis document**

√ **- Check Mark Denotes Critical Step**

START TIME:	

Perform Step: 1	Determine the Correct EAL:
Standard:	General Emergency CG1.1 Loss of RCS inventory affecting fuel clad integrity with containment challenged
Comment:	**SAT ⬭ UNSAT ⬭**

Initial Conditions: Given the following conditions:

- Unit 1 is in MODE 5 with water level in the Reactor Vessel at 10” above the Core Plate and lowering at a rate of 1” per minute.
- All Pressurizer Safety Valves have been removed.
- Reactor Coolant System temperature is 212ºF and stable.
- The Reactor was shutdown on May 15th at 0000 after operating at 100% power for the last 550 days.
- Today is June 11th and the Unit experienced a Loss of Residual Heat Removal cooling at 1200 hours.
- Containment closure has been established
- Containment pressure is 0.5 psig and rising by .05 psig per minute
- There is no detectable hydrogen in the Containment Atmosphere
- All power has been lost to the site, all diesels have failed to start, and it is not expected to regain power for the next several hours

Initiating Cue: The Unit Supervisor has directed you to make an Emergency Action Level determination:

ES-301 Control Room/In-Plant Systems Outline Form ES-301-2

Facility: Comanche Peak NPP Date of Examination: 06-11-18

Exam Level: RO ■ SRO-I ☐ SRO-U ☐ Operating Test No.: _____

Control Room Systems:* 8 for RO, 7 for SRO-I, and 2 or 3 for SRO-U

System / JPM Title	Type Code*	Safety Function
a. (S1) Perform RCS dilution at Power (RO1301)	S, D	1
b. (S2) Transfer ECCS System from Inj Phase to CL Recirc Phase	S, N, A, EN, E	2
c. (S3) Solid Plant Pressure Control	S, N, A, L	3
d. (S4) Start RCP 1-04 (modified from RO1102D)	S, M, A, L	4P
e. (S5) Verify Containment Spray Flow	S, N, A, EN, E	5
f. (S6) Restore 1EA2 bus to Offsite Power (mod. from RO4215A)	S, M	6
g. (S7) CCW pipe rupture-Trip Rx, Trip RCPs (Time Critical)	S, N, A	8
h. (S8) Respond to Radioactive Gas Release (R04005)	S, D, A, E	9
In-Plant Systems:* 3 for RO, 3 for SRO-I, and 3 or 2 for SRO-U		
i. (P1) Refill Unit 2 CCW surge tank locally during loss of Instrument Air (Time Critical)	N, E, R	8
j. (P2) Locally respond to MG set trouble	N, A, R	1
k. (P3) Align Emergency Air to RHR Control Valves during Loss of Instrument Air (start with A06411)	D, R, E	2

* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions, all 5 SRO-U systems must serve different safety functions, and in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO/SRO-I/SRO-U
(A)lternate Path	4-6 / 4-6 / 2-3
(C)ontrol Room	
(D)irect from Bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN) gineered Safety Features	≥ 1 / ≥ 1 / ≥ 1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

ES-301 Control Room/In-Plant Systems Outline Form ES-301-2

Facility: Comanche Peak NPP Date of Examination: 06-11-18

Exam Level: RO ☐ SRO-I ■ SRO-U ☐ Operating Test No.: _____

Control Room Systems:* 8 for RO, 7 for SRO-I, and 2 or 3 for SRO-U

System / JPM Title	Type Code*	Safety Function
a.		
b.		
c.		
d.		
e.		
f.		
g.		
h.		
In-Plant Systems:* 3 for RO, 3 for SRO-I, and 3 or 2 for SRO-U		
i.		
j.		
k.		

* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions, all 5 SRO-U systems must serve different safety functions, and in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO/SRO-I/SRO-U
(A)lternate Path	4-6 / 4-6 / 2-3
(C)ontrol Room	
(D)irect from Bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN) gineered Safety Features	≥ 1 / ≥ 1 / ≥ 1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

ES-301 **Control Room/In-Plant Systems Outline** **Form ES-301-2**

Facility: Comanche Peak NPP **Date of Examination:** 06-11-18

Exam Level: RO ☐ SRO-I ☐ SRO-U ■ **Operating Test No.:** _____

Control Room Systems:* 8 for RO, 7 for SRO-I, and 2 or 3 for SRO-U

System / JPM Title	Type Code*	Safety Function
a.		
b.		
c.		
d.		
e.		
f.		
g.		
h.		
In-Plant Systems:* 3 for RO, 3 for SRO-I, and 3 or 2 for SRO-U		
i.		
j.		
k.		

* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions, all 5 SRO-U systems must serve different safety functions, and in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO/SRO-I/SRO-U
(A)lternate Path	4-6 / 4-6 / 2-3
(C)ontrol Room	
(D)irect from Bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN) gineered Safety Features	≥ 1 / ≥ 1 / ≥ 1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Control Room Systems JPMs

(S1) Perform RCS dilution at Power

(S2) Transfer ECCS System from Inj Phase to CL Recirc Phase

(S3) Solid Plant Pressure Control

(S4) Start RCP 1-04

(S5) Verify Containment Spray Flow

(S6) Transfer 4.16KV Bus from EDG to Offsite Power

(S7) CCW Pipe Rupture

(S8) Respond to Accidental Release

In Plant Systems JPMs

(P1) **Refill Unit 2 CCW Surge Tank due to loss of IA**

(P2) **Respond to MG set Trouble**

(P3) **Align Emergency Air to RHR Control Valves during Loss of Instrument Air**

Facility: CPNPP JPM # S-1 Task # RO1301 K/A # 004.A4.07 3.7 / 3.9 SF-1
Title: Perform RCS Dilution at Power

Examinee (Print): _____

Testing Method:

Simulated Performance:		Classroom:	
Actual Performance:	X	Simulator:	X
Alternate Path:		Plant:	
Time Critical:		Low Pwr:	
Bank / Mod / New	D R01301	Emerg:	EN:

READ TO THE EXAMINEE

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- Unit 1 has just returned to full power after a refueling outage
- The automatic Reactor makeup system is malfunctioning and 43/1-MU, RCS MU MODE SELECT is in OFF
- Chemistry has already been informed to prepare to sample the RCS and PRZR after the dilution
- Rod Control is in manual

Initiating Cue: The Unit Supervisor directs you to PERFORM the following:

- Manually dilute the VCT with 100 gallons to restore Tave to Tref within 0.25°F
- Dilution rate is be 100 gpm using SOP-104A, REACTOR MAKEUP AND CHEMICAL CONTROL SYSTEM, Section 5.2.2
- All prerequisites of SOP-104A are met

Task Standard: The applicant added 100 gallons to the VCT at a rate of 100 gpm (± 10 gpm) and completed all critical steps satisfactorily

Ref. Materials: SOP-104A, “Reactor Makeup and Control System” Rev. 15.
TDM-203A, “CVCS Controller Data” Rev 3.

Validation Time: 10 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

SIMULATOR SETUP

SIMULATOR OPERATOR:

INITIALIZE to IC-60

Ensure BA Batch Flow, 1-FY-110B set to 00000.0 prior to each JPM (prevents BA DEV alarm actuation)

OR

INITIALIZE to at power IC and INSERT the following:

- **RCR 19 to borate 2 ppm or manually insert control rods to lower RCS_{avg} Temperature 2°F**

Place 43/1MU in OFF

ENSURE Rod Control is in Manual

EXAMINER:

PROVIDE the examinee with a copy of:

- **SOP-104A, Reactor Make-up and Chemical Control System (Procedure 1)**
- **When requested, TDM-203A, "CVCS Controller Data (Procedure 2)**

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following steps are from SOP-104A, Section 5.2.2. The candidate may ask for Peer Checks throughout performance of this procedure which should be addressed as discussed during the NRC candidate briefing.**
Perform Step: 1 5.2.2A	Ensure the prerequisites of section 2.2 are met
Performance Standard:	Given in initial conditions, prerequisites of Section 2.2 are met.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2 5.2.2B	IF a large dilution (i.e. >300 gallons in a one hour period) is anticipated, THEN ENSURE Chemistry NOTIFIED of the approximate volume to be added to the RCS this shift.
Performance Standard:	N/A since dilution is small
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3 5.2.2.C	ENSURE 1/1-MU, RCS MU MAN ACT in STOP
Performance Standard:	Operator places **1/1-MU**, RCS MU MAN ACT in **STOP**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4 5.2.2.D	Ensure the following handswitches are in AUTO <u>AND</u> the valves are CLOSED.
Performance Standard:	• 1/1-FCV-111A, RMUW BLNDR FLO CTRL VLV • 1/1-FCV-111B, RCS MU TO VCT ISOL VLV • 1/1-FCV-110A, BA BLNDR FLO CTRL VLV • 1/1-FCV-110B, RCS MU TO CHRG PMP SUCT ISOL VLV
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5√ 5.2.2.E	Place 43/1-MU, RCS MU MODE SELECT in MAN.
Performance Standard:	Operator places **43/1-MU**, RCS MU MODE SELECT in **MAN**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6 5.2.2.F	Set 1-FK-111, RMUW BLNDR FLO CTRL to obtain desired flowrate.
Performance Standard:	Applicant places **1-FK-111**, RMUW BLNDR FLO CTRL, **pot set to 6.25 (6.00 to 6. 5)** **Notes: Per TDM-203A for 100 gpm, the operator can adjust the pot setting to achieve the desired flow rate after the dilution is started**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7 5.2.2.G	Set 1-FY-111B, RCS MU BATCH FLO to obtain the desired Total Volume.
Performance Standard:	Applicant **sets u-FY-111B, RCS MU BATCH FLO**, to the desired value of **99 gallons (may set it higher and then stop dilution at approximately 100 gal).**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8√ 5.2.2.H	Open 1/1-FCV-111B, RCS MU TO VCT ISOL VLV .
Performance Standard:	Applicant places **1/1-FCV-111B**, RCS MU TO VCT ISOL VLV in the **OPEN** position
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 9 5.2.2.I	Close 1/1-FCV-110A, BA BLNDR FLO CTRL VLV.
Performance Standard:	Applicant verifies 1/1-FCV-110A, BA BLNDR FLO CTRL VLV.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 10√ 5.2.2.J	Start dilution by placing 1/1-MU, RCS MU MAN ACT in START.
Performance Standard:	Applicant momentarily places **1/1-MU**, RCS MU MAN ACT in the **START** position.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 11 5.2.2.K	Verify 1/1-FCV-111A, RMUW BLNDR FLO CTRL VLV throttles to the preset flow rate.
Performance Standard:	Applicant verifies **1/1-FCV-111A**, RMUW BLNDR FLO CTRL VLV throttles to **100 gpm.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 12 5.2.2.L	Verify the following are operating properly: • 1-FY-111B, RCS MU BATCH FLO counter • 1-FR-110, R: BA FLO TO BLNDR/G: RCS MU FLO Flow Recorder
Performance Standard:	Applicant verifies: • u-FY-111B, RCS MU BATCH FLOW, counting • u-FR-110, BA and PRI WRT recorder, red pen indicates 0 and green pen indicates 100 gpm
Comment:	**SAT ☐ UNSAT ☐**

NOTE: The following step is intended to reduce the severity of VCT pressure and level transients which can significantly impact RCS Hydrogen concentration. The applicability of this step is dependent on the expected magnitude of the dilution.

Perform Step: 13 5.2.2.M	OPERATE the following as necessary to MAINTAIN proper VCT level. • 1/1-LCV-112A, VCT LVL CTRL VLV • 1-LK-112C, VCT LVL CTRL
Performance Standard:	Applicant determines operation of 1/1-LCV-122A and 1-LK-112C is not necessary.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 14√ 5.2.2.N	**WHEN** the desired amount of Reactor Makeup Water is added, **THEN** place 1/1-MU, RCS MU MAN ACT in STOP
Performance Standard:	Applicant momentarily places **1/1-MU**, RCS MU MAN ACT in the **STOP** position **when the 100 gallon dilution is completed**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 15 5.2.2.O	VERIFY 1/1-FCV-111A, RMUW BLNDR FLO CTRL VLV - CLOSES.
Performance Standard:	Applicant verifies **1/1-FCV-111A**, RMUW BLNDR FLO CTRL VLV **CLOSED**.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 16 5.2.2.P	IF continuing with a series of dilutions, THEN RETURN to step F.
Performance Standard:	Applicant determines a series of dilutions is not required and proceeds to step 5.2.2.Q
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 17√ 5.2.2.Q	PLACE the following handswitches in AUTO AND VERIFY the valves CLOSED. • 1/1-FCV-111B, RCS MU TO VCT ISOL VLV • 1/1-FCV-110A, BA BLNDR FLO CTRL VLV
Performance Standard:	Applicant places 1/1-FCV-111B, RCS MU TO VCT ISOL VLV in AUTO and ensures valve closed. **Note: The Applicant may go to Close then Auto. The critical portion is that FCV-111B ends up in Close.** Applicant places **1/1-FCV-110A**, BA BLNDR FLO CTRL VLV in **[unlabeled center position] AUTO**
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

Initial Conditions: **Given the following conditions:**

- **Unit 1 has just returned to full power after a refueling outage**
- **The automatic Reactor makeup system is malfunctioning and 43/1-MU, RCS MU MODE SELECT is in OFF**
- **Chemistry has already been informed to prepare to sample the RCS and PRZR after the dilution**
- **Rod Control is in manual**

Initiating Cue: **The Unit Supervisor directs you to PERFORM the following:**

- **Manually dilute the VCT with 100 gallons to restore Tave to Tref within 0.25°F**
- **Dilution rate is be 100 gpm using SOP-104A, REACTOR MAKEUP AND CHEMICAL CONTROL SYSTEM, Section 5.2.2**
- **All prerequisites of SOP-104A are met**

Facility: CPNPP JPM # S-2 Task #RO1506N K/A E11 EA1.1 3.9 / 4.0 SF-2

Title: Transfer the ECCS System from Inj Phase to CL Recirc

Examinee (Print): _____

Testing Method:

Simulated Performance:			Classroom:		
Actual Performance:	X		Simulator:	X	
Alternate Path:	X		Plant:		
Time Critical:			Low Pwr:	X	
Bank / Mod / New	N	NRC 2018-06	Emerg:	X	EN: X

READ TO THE EXAMINEE

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- A Large Break Loss of Coolant Accident has occurred.
- Refueling Water Storage Tank LO-LO level alarm has been reached.
- The “A” train RHR pump is tagged out.
- Train B Containment Spray Pumps and Hx Outlet valve were taken to PULLOUT when CS HX 2 OUT VLV, 1-HS-4777 could not be opened.

Initiating Cue: The Unit Supervisor directs you to PERFORM the following:

- ALIGN the Emergency Core Cooling System for Cold Leg Recirculation per EOS-1.3A, Transfer to Cold Leg Recirculation.
- Another operator will implement Attachment 1H for Containment Spray realignment

Task Standard: Applicant will realign for single train ECCS recirculation per EOS-1.3A with the ‘B’ RHR pump supplying both trains CCP’s and SIPs suction source. The ‘B’ RHR pump will start to cavitate due to sump blockage on the train ‘B’ sump. The applicant must secure at least one of the four pumps (A or B CCP, A or B SIP) to remove the cavitation. The applicant must not secure the ‘B” RHR pump because this is the only pump that is cooling the core.

Required Materials: EOS-1.3A, Transfer to Cold Leg Recirculation.

Validation Time: 15 min Time Critical: N/A Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

SIMULATOR SETUP

SIMULATOR OPERATOR:

INITIALIZE to IC-61

- **LOAD Scenario file – 2018 NRC JPM S-2**
- **Place RHRP 1, 1/1-APRH1 in PULLOUT and place a CAUTION tag on the handswitch.**
- **Place Out-Of-Normal pink Operator Aids on CSP 2 & 4 and CS HX 2 OUT VLV handswitches in PULLOUT**
- **ENSURE Alarm Horns are ON**
- **Place simulator in Run then Freeze until Examinee is ready to begin.**
- **Turn Off Turbine OT speaker**

OR

INITIALIZE to any at power Initial Condition and PERFORM the following:

a. **INSERT malfunction RC08D2, Large Break LOCA.**
b. **PLACE Simulator in RUN.**
c. **REDUCE AFW flow to all Steam Generators.**
d. **RESET the following:**
   1. **Safety Injection.**
   2. **Safety Injection Sequencers.**
   3. **Phase A & B Containment Isolation.**

- **STOP both Emergency Diesel Generators.**
- **STOP all Reactor Coolant Pumps.**
- **ENSURE CCW Flow established to RHR and Containment Spray Heat Exchangers.**
- **Turn Off Turbine OT speaker**
- **Place Train B, Containment Spray Pumps and Heat Exchanger Outlet valve in Pull-out.**
- **Place 'A" RHR pump in Pull-out, place tag on its switch.**

When the RWST reaches the LO-LO level setpoint of 33%:

FREEZE the Simulator.

INSERT the following overrides:

;Inserts sump blockage when 1/1-8806 is closed

- **{LOSI8806_2.Value=0} MMF RH09B f:75**

;Modifies sump blockage when CCP or SIP is taken to Stop or PLT

- **{DICVAPCH1.Value=0} IMF RH09B f:0**
- **{DICVAPCH2.Value=0} IMF RH09B f:0**
- **{DISIAPSI1.Value=0} IMF RH09B f:0**
- **{DISIAPSI2.Value=0} IMF RH09B f:0**

- **{DICVAPCH1.Value=1} IMF RH09B f:0**
- **{DICVAPCH2.Value=1} IMF RH09B f:0**
- **{DISIAPSI1.Value=1} IMF RH09B f:0**
- **{DISIAPSI2.Value=1} IMF RH09B f:0**

EXAMINER:

PROVIDE the examinee with a copy of EOS-1.3A, Transfer to Cold Leg Recirculation.

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following steps are from EOS-1.3A.**

> CAUTION: Steps 1 through 4 should be performed without delay. FRGs should not be implemented prior to completion of these steps.

Perform Step: 1 [Step 1]	Reset SI.
Standard:	• DEPRESSED 1/1-SIRA and 1/1-SIRB • CHECKS PCIP window 1.8 DARK and 2.8 LIT solid
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2 [Step 2]	Verify CCW Flow As Required: • From RHR heat exchangers • From Containment Spray heat exchangers
Standard:	VERIFIED FLOW on 1-FI-4556, 1-FI-4560, 1-FI-4558 and 1-FI-4562
Comment:	**SAT ☐ UNSAT ☐**

CAUTION: Any ECCS pump taking suction from RWST should be stopped at RWST EMPTY. Any Containment Spray pump taking suction from RWST should be stopped when RWST level reaches 0%.

CAUTION: Any ECCS or Containment Spray pump that loses suction or shows indication of cavitation should be stopped. The CCP and SI pump should be stopped before stopping the RHR pump.

CAUTION: SI pumps should be stopped if RCS pressure is greater than their shutoff head pressure.

NOTE: If this procedure is being performed to align Containment Spray for recirculation only (SI Terminated and ECCS aligned with CCP in normal injection), Step 4 provides applicable instructions.

Perform Step: 3 [Step 3.a.]	Align ECCS For Cold Leg Recirculation: a. Check open CNTMT SMP TO RHRP 1 AND RHRP 2 SUCT ISOL VLVS: • 1/1-8811A • 1/1-8811B
Standard:	DETERMINED BOTH valves are OPEN, red lights LIT, green lights DARK
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4√ [Step 3.b.]	b. CLOSE RWST TO RHRP 1 AND RHRP 2 SUCT VLVS: • 1/1-8812A • 1/1-8812B
Standard:	PERFORMED the following: • PLACED BOTH 1/1-8812A AND 1/1-8812B, in CLOSE • OBSERVED green CLOSE lights LIT, red OPEN lights DARK
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5√ [Step 3.c.]	b. Close SIP 1 AND SIP 2 MINIFLO VLVS: • 1/1-8814A • 1/1-8814B • 1/1-8813
Standard:	PERFORMED the following: • PLACED 1/1-8814A in CLOSE • PLACED 1/1-8814B in CLOSE • PLACED 69/1-8813 POWER in ON • PLACED 1/1-8813 in CLOSE • OBSERVED green CLOSE lights LIT, red OPEN lights DARK for all three valves
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6√ [Step 3.d.]	Close RHRP 1 AND RHRP 2 XTIE VLVS: • 1/1-8716A • 1/1-8716B
Standard:	PERFORMED the following: • PLACED 1/1-8716A in CLOSE • PLACED 1/1-8716A in CLOSE • OBSERVED green CLOSE lights LIT, red OPEN lights DARK for both valves
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7√ [Step 3.e.]	Close the CCP ALT MINIFLO ISOL VLVS: • 1/1-8511A • 1/1-8512B • 1/1-8511B • 1/1-8512A
Standard:	PERFORMED the following: • PLACED 1/1-8511A in CLOSE • PLACED 1/1-8512B in CLOSE • PLACED 1/1-8511B in CLOSE • PLACED 1/1-8512A in CLOSE • OBSERVED green CLOSE lights LIT, red OPEN lights DARK on all four valves.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8√ [Step 3.f.]	Open SI CHRG SUCT HDR XTIE VLVS: • 1/1-8807A • 1/1-8807B
Standard:	PERFORMED the following: • PLACED 1/1-8807A in OPEN • PLACED 1/1-8807B in OPEN • OBSERVED green CLOSE lights DARK, red OPEN lights LIT for both valves.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 9√ [Step 3.g.]	Open RHRPs TO CCP/SIP SUCT VLVs: • 1/1-8804A • 1/1-8804B
Standard:	PERFORMED the following: • PLACED 1/1-8804A in OPEN • PLACED 1/1-8804B in OPEN • OBSERVED green CLOSE lights DARK, red OPEN lights LIT for both valves.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 10 [Step 4]	Align Containment Spray System for recirculation.
Examiner Cue:	**Another Operator will perform Attachment 1H of EOS-1.3A.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Step 5 of EOS-1.3A is a Continuous Action Step and will be required after the SI Pump suctions from the RWST have been closed.**
Examiner Cue:	**If operator questions status of Containment Spray pumps in step 5 of EOS-1.3A below, inform applicant that another operator is still aligning Containment Spray per Attachment 1H and to continue with the procedure.**

NOTE: FRGs many now be implemented as necessary.

Perform Step: 11 [Step 5.a.]	Verify ECCS AND Containment Spray Pumps NOT affected by Sump Blockage: a. ECCS and Containment Spray pumps operating parameters - Normal. • ECCS pumps (when aligned) • Containment Spray pumps (when aligned)
Standard	VERIFIED pump operating parameters - NORMAL
Comment:	**SAT ☐ UNSAT ☐**

Examiner Cue:	**If operator questions status of Containment Spray pumps in step 5 of EOS-1.3A below, inform applicant that another operator is still aligning Containment Spray per Attachment 1H and to continue with the procedure.**

CAUTION: ECCS recirculation flow to RCS must be maintained at all times.

CAUTION: If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment (CCP will be running with no suction).

Perform Step: 12 [Step 6.a.]	Perform The Following To Complete Recirculation Alignment a. Check ECCS aligned for cold leg recirculation
Standard	VERIFIED ECCS aligned for cold leg recirculation.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 13 [Step 6.b.]	Verify closed CCP MINIFLO VLVS. • 1/1-8110 • 1/1-8111
Standard	DETERMINED BOTH valves are CLOSED, red lights DARK, green lights LIT.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 14√ [Step 6.c.]	Close RWST TO CHRG PMP SUCT VLVS. • 1/1-LCV-112D • 1/1-LCV-112E
Standard	PERFORMED the following: • PLACED 1/1-LCV-112D in CLOSE • PLACED 1/1- LCV-112E in CLOSE OBSERVED green CLOSE lights LIT, red OPEN lights DARK on both valves.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 15 [Step 6.d.]	Verify CCP injection flow
Standard	VERIFIED flow on CCP SI FLO instrument, 1-FI-917 (CB04)
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 16√ [Step 6.e.]	Close RWST TO SIP SUCT VLV • 1/1-8806
Standard	CLOSED 1/1-8806, verifies red light DARK, green light LIT
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Train B Recirculation Sump Blockage begins when 1/1-8806 is closed. Step 5 of EOS-1.3A is a Continuous Action Step and should be addressed at this time.**
Perform Step: 17 [Step *5.a.]	Verify Pumps Aligned From Containment Recirculation Sump NOT affected by Sump Blockage: a. Pump(s) operating parameters - Normal. • ECCS pumps (when aligned) • Containment Spray pumps (when aligned)
Standard	DETERMINED RHR Pump 1-02 amps and flow are oscillating due to cavitation/sump blockage.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The RHR Pump 1-02 oscillating flow/amps are due to sump blockage on containment sump #2. The Operator will not perform step 5.a. RNO 1) because only ONE RHR pump is running.** **The following steps are from 5.a. RNO 2).**
Examiner Note:	**The Applicant MUST NOT stop the "B" RHR pump or they fail the step and JPM.**
Perform Step: 18√ [Step *5.a. RNO 2)A)]	IF one recirculation sump affected AND ONE RHR pump is running, THEN take actions to protect the affected train: A) Stop any CCP or SI pump(s) taking suction from the affected RHR pump. (This action will stop the RHR pump cavitation. The candidate may choose to stop both CCPs and both SIPs although it is not required).
Standard:	PLACED 1/1-APCH1 in STOP or PULL OUT and/or PLACED 1/1-APCH2 in STOP or PULL OUT and/or PLACED 1/1-APSI1 in STOP or PULL OUT and/or PLACED 1/1-APSI2 in STOP or PULL OUT
Comment:	**SAT ☐ UNSAT ☐**

Examiner Cue:	**The operator performing Attachment 1H will monitor and take any necessary actions for cavitation on the Containment Spray Pumps**
Perform Step: 19 [Step *5.a. RNO 2)B)]	IF one recirculation sump affected AND ONE RHR pump is running, THEN take actions to protect the affected train: If indication of cavitation exists, then stop the affected train(s) Containment Spray pumps.
Standard:	DETERMINED another operator will monitor and take actions for the Containment Spray Pumps as necessary per the provided cue.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 20 [Step *5.a. RNO 2)C)]	IF one recirculation sump affected AND ONE RHR pump is running, THEN take actions to protect the affected train: If indication of cavitation on the running RHR pump exists, THEN stop the RHR pump
Standard:	DETRMINED RHR pump parameters are normal and did not stop the RHR pump.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

Initial Conditions: **Given the following conditions:**

- **A Large Break Loss of Coolant Accident has occurred.**
- **Refueling Water Storage Tank LO-LO level alarm has been reached.**
- **The "A" train RHR pump is tagged out.**
- **Train B Containment Spray Pumps and Hx Outlet valve were taken to PULLOUT when CS HX 2 OUT VLV, 1-HS-4777 could not be opened.**

Initiating Cue: **The Unit Supervisor directs you to PERFORM the following:**

- **ALIGN the Emergency Core Cooling System for Cold Leg Recirculation per EOS-1.3A, Transfer to Cold Leg Recirculation.**
- **Another operator will implement Attachment 1H for Containment Spray realignment**

Facility: CPNPP JPM # S-3 RO NEW Task # RO NEW K/A # 004.A2.07 3.4 / 3.7 SF-1
Title: S-3 Solid Plant Pressure Control

Examinee (Print): _____

Testing Method:

Simulated Performance:		Classroom:	
Actual Performance:	X	Simulator:	X
Alternate Path:	X	Plant:	
Time Critical:			

READ TO THE EXAMINEE

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- Unit 1 is in MODE 4
- IPO-005A, "Plant Cooldown from Hot Standby to Cold Shutdown," has been completed up to Step H of Attachment 6 for removing the bubble from the top of the pressurizer.
- RCS activity is not high

Initiating Cue: The Unit Supervisor directs you to PERFORM the following:

- Complete steps H thru J of Attachment 6 of IPO-005A to collapse the bubble in the pressurizer until the RCS is in a solid condition.

DO NOT READ BELOW THIS LINE TO APPLICANTS

Task Standard: During step J, LTDN HX OUT PRESS CTRL Valve 1-PCV-131 will fail open, requiring entry into ABN-121, section 3, raise charging flow or decrease letdown flow to stabilize pressure and maintain RCP seal DP < 200psid and maintain overall pressure in the RCS with 1-HCV-128 such that no RCPs are required to be tripped nor is LTOP setpoint reached.

Required Materials: IPO-005A, "Plant Cooldown From Hot Standby To Cold Shutdown."
When asked, and AFTER alt path entry, hand them ABN-121, Solid Plant Malfunctions.

Validation Time: 8 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

SIMULATOR SETUP

BOOTH OPERATOR:

INITIALIZE to IC-45.

- **ALLOW alarms to annunciate and THEN, PLACE the simulator in freeze until candidate has been cued.**

BOOTH OPERATOR IC DEVELOPMENT

- **Use an IC in MODE 4, preparing to enter MODE 5.**
- **EXECUTE the following override:**
  - **IOR AICVHC128 f:0.**
- **ALLOW alarms to annunciate and THEN, PLACE the simulator in freeze until candidate has been cued.**

EXAMINER:

PROVIDE the examinee with a copy of:

- **IPO-005A.**
- **Have a copy of ABN-121 waiting to handout once asked.**

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following steps are from IPO-005A, Attachment 6, step H.**
Perform Step: 1√ Att 6, step H	Perform the following to cycle a PORV and remove H2 bubble from the top of the pressurizer. 1) If RCS activity is High, notify RP and … 2) When Cold calibrated pressurizer level indication is > 75%, then OPEN a PORV for approximately 5 seconds 3) When Cold calibrated pressurizer level indication is > 78%, then OPEN a PORV for approximately 5 seconds
Standard:	1) RCS activity is not high (in the initial cue) 2) Opens PORV for 5 seconds at > 75% level 3) Opens PORV for 5 seconds at > 78% level
Comment: Applicant should use xx instrument for cold cal of pressurizer level	**SAT ☐ UNSAT ☐**
Perform Step: 2 Att 6, step I	When Cold Calibrated Pressurizer level is approximately 80%, THEN closely monitor indicated Cold Calibrated Pressurizer level AND RCS Pressure.
Standard:	Closely monitors level because at 84% Cold Cal level, it is considered solid at that point because the ACTUAL level is 100%.
Comment:	**SAT ☐ UNSAT ☐**
Perform Step: 3√ Att 6, step J	WHEN RCS pressure is stable with increasing letdown, THEN the RCS is in a solid condition. Perform the following as applicable: • Slowly adjust 1-FK-121 as necessary to obtain desired charging and letdown flow. • Adjust 1-PK-131, LTDN HX OUT PRESS CTRL, AUTO setpoint to maintain RCS pressure below the LTOP setpoint and RCP seal $\triangle$p > 200psid.
Standard:	When the adjustment is made to 1PK-121 it fails open, and RCS pressure starts to decrease
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following two steps represent the Alternate Path of this JPM. Applicant should enter ABN-121 for SOLID PLANT PRESSURE MALFUNCTIONS, section 3.**
Perform Step: 4 ABN-121, section 3.3 step 1	1. Verify seal differential > 200 psid (if not then stop any operating RCPs)
Standard:	Seal DP should be > 200 psid
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5 ABN-121, sec 3.3, step 2	2. Verify charging and letdown flow - MATCHED
Standard:	They should not be matched at this point, so RNO is required
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6 sec 3.3, step 2a RNO	Perform the following: a. If CCP tripped, then reduce letdown flow to stabilize RCS pressure and go to ABN-105.
Standard:	a. CCP should not have tripped
Perform Step: 6√ sec 3.3, step 2b RNO	b. If letdown greater than charging, THEN reduce letdown to less than or equal to charging AND check RCS pressure STABLE or DECREASING.
Standard:	• Place 1-PK-131 in MANUAL AND ADJUST in the close direction to match charging and letdown to stabilize pressure • Control 1-HCV-128 to maintain pressure stable. **Note for examiner: Pressure should become stable at this point with PK-131 in MANUAL and matching letdown and charging flows and pressure control on the HCV-128 valve.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7√	Once 1-PK-131 is in MANUAL and controlling letdown and charging roughly matched and controlling RCS pressure with 1-HCV-128 and pressure is stable, then JPM is complete/
Standard:	letdown and charging roughly matched, pressure is stable with all RCPs running.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

INITIAL CONDITIONS: **Given the following conditions:**

- **Unit 1 is in MODE 4**
- **IPO-005A, "Plant Cooldown from Hot Standby to Cold Shutdown," has been completed up to Step H of Attachment 6 for removing the bubble from the top of the pressurizer.**
- **RCS activity is not high**

INITIATING CUE: **The Unit Supervisor directs you to PERFORM the following:**

- **Complete steps H thru J of Attachment 6 of IPO-005A to collapse the bubble in the pressurizer until the RCS is in a solid condition.**

Facility: CPNPP JPM # S-4 Task # RO1102 K/A # 003.A2.02 3.7/3.9 SF-4
Title: Start Reactor Coolant Pump 1-04

Examinee (Print): _____

Testing Method:

Simulated Performance:			Classroom:	
Actual Performance:	X		Simulator:	X
Alternate Path:	X		Plant:	
Time Critical:			Low Pwr	X
Bank / Mod / New	M	From R01102	Emerg:	EN

READ TO THE EXAMINEE

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- Unit 1 is in MODE 5
- RCP 4 is the only running pump
- SOP-108A, Reactor Coolant Pump prerequisites in Section 2.1 are met
- SOP-108A, Reactor Coolant Pump control switch alignment per SOP-108A-RC-C01 is complete
- Radiation Protection has been notified of the potential for increased dose rates
- 1PCPX1, Reactor Coolant Pump 1-01 Motor Breaker (Bus 1A1 CUB 2) is racked into CONNECT and the Overcurrent Trip Selector switch is in the COLD LOOP position
- Radiation Protection is NOT allowing personnel to observe the pump at this time
- Seal Injection flow was not isolated to the RCPs during the shutdown

Initiating Cue: The Unit Supervisor directs you to PERFORM the following:

- Start RCP 1-01 per SOP-108A, Reactor Coolant Pump Section 5.1

Task Standard: STARTED RCP 1-01 per SOP-108A and STOPPED RCP, 1-01 within 5 minutes of pump start, when Motor Current did not decay to less than 750 amps.

Required Materials: SOP-108A, Reactor Coolant Pump

Validation Time: 14 minutes Time Critical: N/A Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

SIMULATOR SETUP

SIMULATOR OPERATOR:

- **INITIALIZE to IC-63 and Run Scenario File 2018 NRC JPM S-4**
- **Silence PC11 Alarms – ALWAYS**
- **Turn Turbine OT Alarm Speaker down**

OR

INITIALIZE to IC-4 and then PERFORM the following:

- **Adjust 1-HC-606, RHR HX 1 FLO CTRL to O**
- **Allow RCS Temperature to increase into MODE 4**
- **Ensure RCP 4 is operating**
- **INSERT Conditional to Override AORCIIRCP1 to 800 amps when RCP 1-01 RED Light comes on. {AORCIIRCP1.Value=800} IOR AORCIIRCP1 f:800**
- **INSERT Conditional to DELETE Override AORCIIRCP1 to 0 amps when RCP 1-01 GREEN Lights comes on. {DIRCRCP1.Value=0} IOR AORCIIRCP1 f:0**
- **Silence PC11 Alarms – ALWAYS**
- **Turn Turbine OT Alarm Speaker**

EXAMINER:

PROVIDE the examinee with a copy of:

- **SOP-108A, Reactor Coolant Pump Section 5.1**

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following steps are from SOP-108A Section 5.1**

CAUTION: IF loss of seal injection flow or loss of CCW flow to the Thermal Barrier Heat Exchanger occurs, THEN refer immediately to ABN-101.

Perform Step: 1 5.1.A	Verify the prerequisites in Section 2.1 are met.
Standard:	CHECKED Step as complete based on Initial Conditions.
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 2 5.1.B	Verify that the control switch alignment per SOP-108A-RC-C01 is complete.
Standard:	CHECKED Step as complete based on Initial Conditions.
Comment:	**SAT ⬙ UNSAT ⬙**

CAUTION: When an RCS low temperature overpressure protection system is in service, RCS pressure should be maintained as low as possible without violating the differential pressure requirement across the number 1 seal.

- 250 psid in MODE 5 with Pressurizer steam bubble.
- 200 psid in MODE 5 with Pressurizer water solid OR in MODEs 3 & 4. RCS pressure of approximately 325 psig ensures adequate net positive suction head to the RCPs.

NOTE: When LTOP is in service, instrument error is reduced between LTOP and actual RCS pressure by using Plant Computer Points. See Attachment 1.

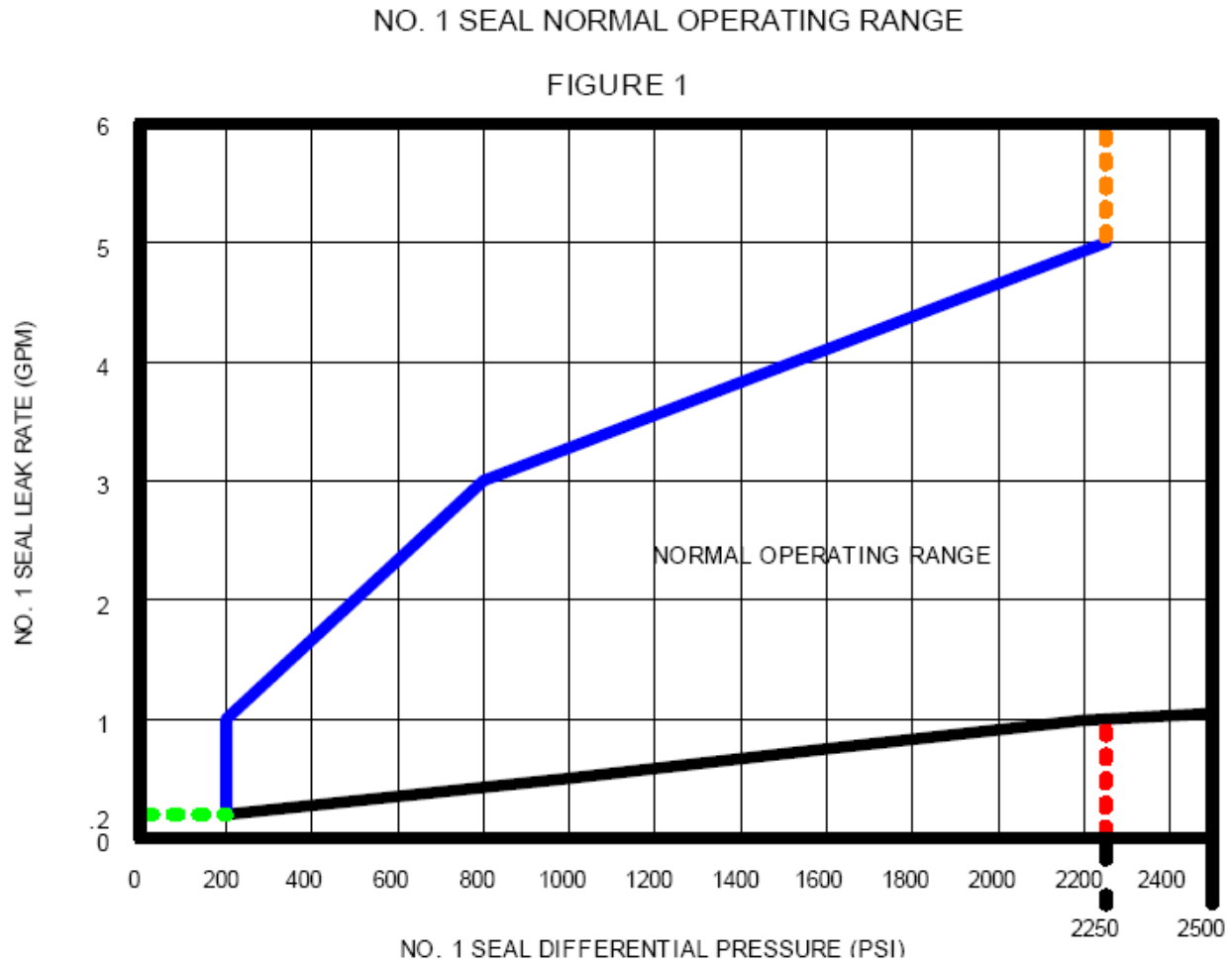
Perform Step: 3 5.1.C	IF starting an RCP with low temperature overpressure protection in service, THEN verify RCS pressure is being maintained at less than or equal to 325 psig using Plant Computer.
Standard:	VERIFIED RCS pressure reading less than 325 psig using the Plant Computer.
Comment:	**SAT ⬙ UNSAT ⬙**

CAUTION:	Abnormal RCP parameter indications could be indicative of degrading conditions. An RCP shall not be started unless operating conditions are stable and within procedure limitations OR an evaluation has been performed to justify pump operation.

Perform Step: 4 5.1.D	Verify seal water injection flow between 6 and 10 gpm to each RCP. • 1-FI-145, RCP 1 SEAL WTR INJ FLO • 1-FI-144, RCP 2 SEAL WTR INJ FLO • 1-FI-143, RCP 3 SEAL WTR INJ FLO • 1-FI-142, RCP 4 SEAL WTR INJ FLO
Standard:	CHECKED Steps as Complete based on indicated flows.
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 5 5.1.E	Verify Volume Control Tank pressure is being maintained at or above 15 psig. (1-PI-115, VCT PRESS)
Standard:	CHECKED Step as Complete based on indicated pressure.
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 6 5.1.F	Ensure the RCP seal leakoff valves are OPEN. • 1/1-8141A, RCP 1 SEAL 1 LKOFF VLV • 1/1-8141B, RCP 2 SEAL 1 LKOFF VLV • 1/1-8141C, RCP 3 SEAL 1 LKOFF VLV • 1/1-8141D, RCP 4 SEAL 1 LKOFF VLV
Standard:	CHECKED Step as Complete based on RCP seal leakoff valves in the OPEN position.
Comment:	**SAT ⬙ UNSAT ⬙**



Perform Step: 7 5.1.G	Verify RCP No. 1 seal leakoff flows are in the normal operating range of Figure 1. • 1-FR-157, RCP 1 • 1-FR-156, RCP 2 • 1-FR-155, RCP 3 • 1-FR-154, RCP 4
Standard:	CHECKED Steps as Complete based on indicated flows.
Comment:	**SAT** ☐ **UNSAT** ☐

Perform Step: 8 5.1.H	Verify the following alarms for the affected pump on 1-ALB-5A are clear. • 1.2 ANY RCP SEAL 1 LKOFF FLO HI • 1.6 ANY RCP SEAL WTR INJ FLO LO • 2.2 ANY RCP SEAL 1 ∆P LO • 3.1 ANY RCP SEAL WTR STANDPIPE LVL HI • 3.2 ANY RCP SEAL 2 LKOFF FLO HI • 4.1 ANY RCP SEAL WTR STANDPIPE LVL LO • 1.4 RCP 1 UP BRG L/O RESVR LVL HI/LO • 1.5 RCP 1 LOW BRG L/O RESVR LVL HI/LO
Standard:	CHECKED Steps as Complete based on indicated alarms.
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 9 5.1.I. & 5.1.I.1)	Verify the following cooling water flows for the affected pump are normal. • RCP 1-4 UP BRG L/O CLR CCW RET FLO 170 gpm (150 gpm to 190 gpm) • 1-FI-4675, RCP 1
Standard:	CHECKED Step as Complete for RCP 1 based on indicated flow.
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 10 5.1.I. & 5.1.I.2)	Verify the following cooling water flows for the affected pump are normal. • RCP 1-1 LOW BRG L/O CLR CCW RET FLO 6 gpm (5 gpm to 6 gpm) • 1-FI-4677, RCP 1
Standard:	CHECKED Step as Complete for RCP 1 based on indicated flow.
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 11 5.1.I. & 5.1.I.3)	Verify the following cooling water flows for the affected pump are normal. • RCP 1-4 MOTOR AIR CLR CCW RET FLO 360 gpm (340 gpm to 380 gpm) • 1-FI-4676, RCP 1
Standard:	CHECKED Step as Complete for RCP 1 based on indicated flow.
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 12 5.1.I. & 5.1.I.4)	Verify the following cooling water flows for the affected pump are normal. • RCP 1-1 THBR CLR CCW RET FLO 45 gpm (35 gpm to 55 gpm) • 1-FI-4678, RCP 1
Standard:	CHECKED Step as Complete for RCP 1 based on indicated flow.
Comment:	**SAT ⬙ UNSAT ⬙**

Examiner Note:	**DO NOT allow examinee to make plant announcement.**
Perform Step: 13 5.1.J	Perform the Following: • Initiate trending of data on the computer for affected RCP(s) per Attachment 1, if not previously done. • Contact Radiation Protection to expect increased dose rates after RCP start. • Make Plant Announcement about increasing dose rates throughout the RCA after RCP start.
Standard:	INITIATED trending of data on the computer for affected RCP 1 per Attachment 1 and Radiation Protection had already been notified based on Initial Conditions.
Comment: Step	**SAT ⬙ UNSAT ⬙**

Perform Step: 14 5.1.K	Ensure the breaker for the RCP(s) to be started is racked into CONNECT. • 1PCPX1, Reactor Coolant Pump 1-01 Motor Breaker (Bus 1A1 CUB 2)
Standard:	CHECKED Step as complete based on Initial Conditions.
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 15 5.1.L	Ensure the Overcurrent Trip Selector switch for the RCP(s) to be started is in the COLD LOOP position. • 1PCPX1, Reactor Coolant Pump 1-01 Motor Breaker (Bus 1A1 CUB 2)
Standard:	CHECKED Step as complete based on Initial Conditions.
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 16 5.1.M	IF the selected RCP(s) is accessible, THEN station personnel to observe the pump for normal operation.
Standard:	MARKED Step as N/A based on Initial Conditions.
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 17 5.1.N	IF RCP 1 or 4 is the first pump to be started …
Standard:	MARKED Step as N/A as RCP 4 pump IS already running.
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 18√ 5.1.O	START the associated oil lift pump two minutes before starting the RCP. • 1/1-PCPX1-LP, RCP 1 OIL LIFT PMP
Standard:	PLACED 1/1-PCPX1-LP, RCP 1 OIL LIFT PMP in START.
Comment:	**SAT ⬙ UNSAT ⬙**

Examiner CUE:	**Time Compression may be used when Blue permissive light is illuminated. If desired, provide applicant the following cue;** **Two minutes have passed.**
Perform Step: 19 5.1.P	Observe OIL PRESS permissive interlock (blue light) lit. • 1/1-PCPX1-LP, RCP 1 OIL LIFT PMP
Standard:	OBSERVED Oil Press permissive interlock Blue Light LIT.
Comment:	**SAT ⬙ UNSAT ⬙**

CRITICAL START TIME:	

Examiner Note:	**The time of the RCP Start should be recorded because the RCP must be Stopped within 5 minutes per vendor guidance to avoid pump damage. Failure to take action at 1 minute per the procedure should also be evaluated with respect to examinee performance.**	
Perform Step: 20√ 5.1.Q	START the selected RCP. • 1/1-PCPX1, RCP 1	
Standard:	PLACED 1/1-PCPX1 in START.	
Comment:		**SAT ⬙ UNSAT ⬙**

Perform Step: 21 5.1.R & 5.1.R.1)	Perform the following to check for proper start of the RCP. • Verify the associated RCP Undervoltage TSLB goes out. • RCP 1 BUS UNDERVOLT, 1-TSLB-4,1.2	
Standard:	OBSERVED 1-TSLB-4, 1.2 goes DARK.	
Comment:		**SAT ⬙ UNSAT ⬙**

Perform Step: 22 5.1.R & 5.1.R.2)	Perform the following to check for proper start of the RCP. • Verify alarm 2.1 on 1-ALB-5B, ANY RCP FAIL TO START OR ACCELERATE, is clear.	
Standard:	OBSERVED alarm 2.1 on 1-ALB-5B Clear.	
Comment:		**SAT ⬙ UNSAT ⬙**

Perform Step: 23 5.1.R & 5.1.R.3)	Perform the following to check for proper start of the RCP. • IF loop flow does not rise within 10 seconds, THEN STOP the RCP. • 1-FI-414/15/16, RC LOOP 1 FLO	
Standard:	OBSERVED loop flow increasing.	
Comment:		**SAT ⬙ UNSAT ⬙**

Perform Step: 24√ 5.1.R & 5.1.R.4)	Perform the following to check for proper start of the RCP. • IF current does not decay to less than or equal to 750 amps within one minute after startup, THEN STOP the RCP. • 1-II-RCP1, RCP 1 MOTOR CURRENT
Standard:	OBSERVED at one minute after pump start, Motor Current remains Greater than 750 amps. PLACES 1/1-PCPX1, RCP 1 in STOP within 5 minutes of pump start.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT** ⬙ **UNSAT** ⬙

CRITICAL STOP TIME:	

STOP TIME:	

Initial Conditions: **Given the following conditions:**

- **Unit 1 is in MODE 5**
- **RCP 4 is the only running pump**
- **SOP-108A, Reactor Coolant Pump prerequisites in Section 2.1 are met**
- **SOP-108A, Reactor Coolant Pump control switch alignment per SOP-108A-RC-C01 is complete**
- **Radiation Protection has been notified of the potential for increased dose rates**
- **1PCPX1, Reactor Coolant Pump 1-01 Motor Breaker (Bus 1A1 CUB 2) is racked into CONNECT and the Overcurrent Trip Selector switch is in the COLD LOOP position**
- **Radiation Protection is NOT allowing personnel to observe the pump at this time**
- **Seal Injection flow was not isolated to the RCPs during the shutdown**

Initiating Cue: **The Unit Supervisor directs you to PERFORM the following:**

- **Start RCP 1-01 per SOP-108A, Reactor Coolant Pump Section 5.1**

Facility: CPNPP JPM # S-5 Task # RO1702N K/A # EPE 14 EA1.1 3.7/3.7 SF-5

Title: Verify Containment Spray Flow

Examinee (Print): _____

Testing Method:

Simulated Performance:			Classroom:		
Actual Performance:	X		Simulator:	X	
Alternate Path:	X		Plant:		
Time Critical:			Low Pwr	X	
Bank / Mod / New	N	NRC-2018-06	Emerg:	X	EN: X

READ TO THE EXAMINEE

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: A Reactor trip and safety injection occurred on Unit 1 due to a LOCA. The Crew is working through Procedure EOP-0.0A.

Initiating Cue: The Unit Supervisor directs you to PERFORM the following:

- Step 7 of EOP-0.0A, Verify Containment Spray Not Required

Task Standard: During verification of Containment Spray flow per Step 7 of EOP-0.0A, applicant must:

1) Reposition four valves (1-HS-4776 and 1HS-4777 must be opened), and 1-HS-4701 and 1-HS-4708 must be closed),
2) STOP all four RCPs, and
3) OPEN one Chem Add tank valve (1-HS-4754)

Required Materials: EOP-0.0A

Validation Time: 8 minutes Time Critical: N/A Completion Time: _____ minutes

Comments:

Result: SAT UNSAT

Examiner (Print / Sign): _____ Date: _____

SIMULATOR SETUP

SIMULATOR OPERATOR:

- **INITIALIZE to IC-64**
- **DO NOT Run Scenario File**

OR

INITIALIZE to any at power Initial Condition and PERFORM the following:

- **INSERT malfunction RC08D2, Large Break LOCA.**
- **PLACE Simulator in RUN.**
- **REDUCE AFW flow to all Steam Generators to 175 gpm.**
- **Run Scenario file 2018 NRC JPM S-5**
    - **OR**
- **insert the following:**

;FAILURE OF VARIOUS PHASE B ACTUATIONS

;PREVENT HS-4776 AND HS-4777 FROM AUTO OPENING.

- **IMF CS07A f:1**
- **IMF CS07B f:1**

;PREVENTS RCP CLR CCW RET ISOLS FROM CLOSING

- **IOR DICCHS4708 f:2**
- **IOR DICCHS4701 f:2**

;PREVENT CT CHEM ADD TANK VALVE FROM OPENING

- **IOR DICSHS4754 f:0**

;Modifies overrides when switches repositioned

- **{DICCHS4701.Value=0} MOR DICCHS4701 f:0**
- **{DICCHS4708.Value=0} MOR DICCHS4708 f:0**
- **{DICSHS4754.Value=2} MOR DICSHS4754 f:2**

;Manual CT/Phase B handswitches in "NORMAL"

- **IOR DIRPCIPBA1A f:0**
- **IOR DIRPCIPBA2A f:0**
- **IOR DIRPCIPBA1B f:0**
- **IOR DIRPCIPBA2B f:0**

EXAMINER:

PROVIDE the examinee with a copy of:

- **EOP-0.0A, Reactor Trip or Safety Injection**
- **EOP-0.0A, Reactor Trip or Safety Injection, Attachment 6, Containment Spray/Phase B Isolation**

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following steps are from EOP-0.0A, starting at step 7**
Perform Step: 1 EOP 0.0A Step 7	Verify Containment Spray Not Required: a. Containment pressure – HAS REMAINED LESS THAN 18.0 PSIG • 1-ALB-2B window 1-8, CS ACT- NOT ILLUMINATED -AND- • 1-ALB-2B window 4-11, CNTMT ISOL PHASE B ACT - NOT ILLUMINATED -AND • Containment Pressure – LESS THAN 18.0 PSIG
Standard:	Current Containment Pressure is 22 psig and both alarm window lights are lit.
Comment:	**SAT ⬙ UNSAT ⬙**

Examiner Note:	**The Alternate Path portion of the JPM starts at Perform Step 2 (EOP-0.0A, Step 7 RNO).**
Examiner Note:	**Phase B actuation handswitches must be actuated simultaneously, two-handed operation is required**
Perform Step: 2 EOP 0.0A Step 7 RNO a (1)	Perform the following: 1) Verify Containment Spray AND Phase B Actuation initiated. IF NOT, THEN manually actuate.
Standard:	CHECKED alarm windows in first step above and they were both lit with CS and Phase B actuations NOT complete, MANUALLY actuated at CB-02 and CB-07 <u>CB-02</u> • 1/1-CIPBA1A, CS/CNTMT ISOL PHASE B MAN ACT • 1/1-CIPBA2A, CS/CNTMT ISOL PHASE B MAN ACT <u>CB-07</u> • 1/1-CIPBA1B, CS/CNTMT ISOL PHASE B MAN ACT • 1/1-CIPBA2B, CS/CNTMT ISOL PHASE B MAN ACT
Comment:	**SAT ⬎ UNSAT ⬎**

Perform Step: 3 EOP 0.0A Step 7 RNO a (2)	Verify appropriate MLB indication for CNTMT SPRAY (BLUE WINDOWS) AND PHASE B (ORANGE WINDOWS).
Standard:	All blue windows NOT lit and all orange windows NOT lit
Comment:	**SAT ⬎ UNSAT ⬎**

Examiner Note:	**Operators may reposition valves without using EOP-0.0A, Attachment 6. This is allowed per Operations Guideline 3, Attachment 6, Strategies for Successful Transient Mitigation, section 7.2, Operator Action versus Automatic Action.**
Perform Step: 4√ EOP 0.0A Step 7 RNO a (2)	IF valves NOT aligned, THEN manually align valve(s) as appropriate. (Refer to Attachment 6 as necessary).
Standard:	Using Attachment 6 of EOP-0.0A, finds the following valves out of position and repositions them as listed: Location Valve Description Expected Position CB-02 1-HS-4754 CS TK DISCH VLV OPEN (it was closed) CB-02 1-HS-4776 CS HX 1 OUT VLV OPEN (it was closed) CB-02 1-HS-4777 CS HX 2 OUT VLV OPEN (it was closed) CB-03 1-HS-4701 RCP CLR CCW RIV CLOSED (it was open) CB-03 1-HS-4708 RCP CLR CCW RIV CLOSED (it was open)
Comment:	**SAT UNSAT**

Examiner Note:	**It takes the two Containment Spray valves that were not open above (HS-4776 and 4777) about 2 minutes to open, then spray flow should be roughly 3000 gpm for each CS pump.**
Perform Step: 5 EOP 0.0A Step 7 RNO 3	Verify containment spray flow
Standard:	VERIFIED Containment Spray Flow by utilizing the flow meters on CB-02. • 1-FI-4772-1, CSP 1 DISCH FLO • 1-FI-4772-2, CSP 3 DISCH FLO • 1-FI-4773-1, CSP 2 DISCH FLO • 1-FI-4773-2, CSP 4 DISCH FLO
Comment:	**SAT UNSAT**

Perform Step: 6 EOP 0.0A Step 7 RNO 4	Ensure the CHEM ADD TK DISCH VLVs – OPEN • 1-HS-4752 • 1-HS-4753
Standard:	1-HS-4752 is verified to be open 1-HS-4753 is verified to be open Red lights LIT Green lights OFF for both valves.
Comment:	**SAT UNSAT**

Perform Step: 7√ EOP 0.0A Step 7 RNO 5	Stop all RCPs
Standard:	Stops all four RCPs by placing switches in OFF or PTL • 1/1-PCPX1, RCP 1 • 1/1-PCPX2, RCP 2 • 1/1-PCPX3, RCP 3 • 1/1-PCPX4, RCP 4 Verifies green light indication and 0 amp indication for all RCPs.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ⬎ UNSAT ⬎**

STOP TIME:	

Initial Conditions: **A Reactor trip and safety injection occurred on Unit 1 due to a LOCA. The Crew is working through Procedure EOP-0.0A.**

Initiating Cue: **The Unit Supervisor directs you to PERFORM the following:**

- **Step 7 of EOP-0.0A, Verify Containment Spray Not Required**

Facility: CPNPP JPM # S-6 Task # RO4215A K/A # EPE 55 EA1.07 4.3/4.5 SF-6

Title: Transfer 1EA2 bus from DG 1-02 to XST2

Examinee (Print): _____

Testing Method:

Simulated Performance:		Classroom:	
Actual Performance:	X	Simulator:	X
Alternate Path:		Plant:	
Time Critical:		Low Pwr	
Bank / Mod / New	M From RO4115A	Emerg:	EN:

READ TO THE EXAMINEE

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following:

- Bus 1EA2 is being supplied from the diesel generator following work on Breaker 1EA2-1
- The preferred and alternate incoming breakers are open
- All relays have been reset
- Power is available from Transformer XST2

Initiating Cue: The Unit Supervisor directs you to perform the following:

- Transfer power from DG 1-02 to XST2 for Bus 1EA2 per SOP-609A, Diesel Generator System, Section 5.7, Transferring from DG Supplying Alone to Normal Supply

Task Standard: The applicant successfully transferred load off of DG 1-02 to offsite power and completed all critical steps satisfactorily.

Required Materials: SOP-609A, Diesel Generator System, Rev. 21, PCN-18.

Validation Time: 8 minutes Time Critical: N/A Completion Time: _____ minutes

Comments:

Result: SAT UNSAT

Examiner (Print / Sign): _____ Date: _____

SIMULATOR SETUP

SIMULATOR OPERATOR:

INITIALIZE to IC-65 or IC-54

PLACE Equipment Out of Normal Position pink circles on the following;

- **CS-1DG2N, DG 2 NORM STOP/START**
- **CS-1EG2, DG 2 BKR 1EG2**
- **CS-1EA2-1, INCOMING BKR 1EA2-1**

PLACE a pink rectangular label marked MW on;

- **65-1EG2, DG 2 SPD CTRL**

PLACE a pink rectangular label marked VARS on;

- **90-1EG2, DG 2 VOLT CTRL**

SIMULATOR OPERATOR INSTRUCTIONS TO BUILD IC:

RESET to any 50% power equilibrium Initial Condition

START and parallel DG 1-02 to the Train B SFGD bus

OPEN CS-1EA2-1, INCOMING BKR 1EA2-1

PLACE Equipment Out of Normal Position pink circles on the following;

- **CS-1DG2N, DG 2 NORM STOP/START**
- **CS-1EG2, DG 2 BKR 1EG2**
- **CS-1EA2-1, INCOMING BKR 1EA2-1**

PLACE a pink rectangular label marked MW on;

- **65-1EG2, DG 2 SPD CTRL**

PLACE a pink rectangular label marked VARS on;

- **90-1EG2, DG 2 VOLT CTRL**

EXAMINER:

PROVIDE the examinee with a copy of:

- **SOP-609A, Diesel Generator System, Section 5.7, Transferring From DG Supplying Alone to Normal or Alternate Supply.**

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following steps are from SOP-609A, Section 5.7, Transferring From DG Supplying Alone to Normal or Alternate Supply**
Perform Step: 1√ [Step 5.7.A]	Turn the synchroscope for the selected breaker ON.
Standard:	PLACED SS-1EA2-1, BKR 1EA2-1 SYNCHROSCOPE switch to ON
Comment:	**SAT UNSAT**

Perform Step: 2√ [Step 5.7.B]	Using the DG VOLT CTRL, adjust running voltage to match incoming voltage.
Standard:	ADJUSTED RUNNING Volts (V–RUN) to match INCOMING Volts (V–IN) • 90-1EG2, DG 2 VOLT CTRL
Comment:	**SAT UNSAT**

Perform Step: 3√ [Step 5.7.C]	Using the DG SPD CTRL, adjust the speed so that the synchroscope is moving 2 to 4 RPM in the SLOW direction..
Standard:	RAISED or LOWERED 65-1EG2, DG SPD CTRL, so that the synchroscope is moving 2 to 4 rpm in the SLOW direction
Comment:	**SAT UNSAT**

Perform Step: 4 [Step 5.7.D]	IF Grid induced load, voltage, or frequency fluctuations occur while the DG is synchronized to the bus, THEN open the DG Output Breaker:
Standard:	OBSERVED Grid induced load, voltage, or frequency fluctuations did NOT occur while the DG is synchronized to the bus
Comment:	**SAT UNSAT**

Perform Step: 5√ [Step 5.7.E]	Close the feeder breaker when the synchroscope is slightly before the 12 o'clock position and moving 2 to 4 RPM in the SLOW direction. • CS-1EA2-1, INCOMING BKR 1EA2-1
Standard:	CLOSED CS-1EA2-1, INCOMING BKR 1EA2-1 when the synchroscope was slightly before the 12 o'clock position and moving 2 to 4 rpm in the SLOW direction.
Comment:	**SAT UNSAT**

Perform Step: 6√ [Step 5.7.F]	RAISED DG load to 0.5 MW, as necessary, to prevent a reverse power trip using DG SPD CTRL handswitch.
Standard:	ADJUSTS 65-1EG2, DG SPD CTRL as required while observing W-1EG2, DG2 MEGAWATTS to establish ~ to 0.5 MWe load on the 1-02 DG.
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 7 [Step 5.7.E]	Turn the synchroscope for the selected breaker OFF.
Standard:	PLACED SS-1EA2-1, BKR 1EA2-1 SYNCHROSCOPE to OFF position
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 8 [Step 5.7.E]	Maintain 0-500 KVAR out by adjusting the selected DG VOLT CTRL handswitch
Standard:	ADJUST 90-1EG2, DG VOLT CTRL and maintain 0-500 KVAR by OBSERVING VAR-1EG2, DG 2 KILOVARS
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ⬙ UNSAT ⬙**

STOP TIME:	

Initial Conditions: **Given the following:**

- **Bus 1EA2 is being supplied from the diesel generator following work on Breaker 1EA2-1**
- **The preferred and alternate incoming breakers are open**
- **All relays have been reset**
- **Power is available from Transformer XST2**

Initiating Cue: **The Unit Supervisor directs you to perform the following:**

- **Transfer power from DG 1-02 to XST2 for Bus 1EA2 per SOP-609A, Diesel Generator System, Section 5.7, Transferring from DG Supplying Alone to Normal Supply**

Facility: CPNPP JPM # S-7 Task #RO1506N K/A 008 K3.03 4.1 / 4.2 SF-8

Title: CCW Pipe Rupture (Trip Rx, RCPs)

Examinee (Print): _____

Testing Method:

Simulated Performance:			Classroom:		
Actual Performance:	X		Simulator:	X	
Alternate Path:	X		Plant:		
Time Critical:	X		Low Pwr		
Bank / Mod / New	N	NRC 2018-06	Emerg:	X	EN:

READ TO THE EXAMINEE

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following:

- Unit 1 is at 100% power
- CCW Pump 1-01 is in service
- CCW Pump 1-02 is in standby with all pre-start checks completed satisfactory
- SSWP 1-02 is already running

Initiating Cue: The Unit Supervisor directs you to PERFORM the following:

- Swap the running CCW Pump from 1-01 to 1-02 in accordance with SOP-502A, Component Cooling Water System, for their bi-weekly rotation per OWI-409, Equipment Rotation Program.

Task Standard: Applicant will start CCW Pump 1-02, then recognize that a loss of non-safeguards loop of CCW has occurred (a pipe break has occurred on the CCW line going into Containment), enter ABN-502 and then trip the Reactor and all four RCPs within 10 minutes of the complete loss of all non-safeguards CCW.

Required Materials: SOP-502A, "System Operating Procedure Manual," Rev 19, PCN-7.
ABN-502, CCW System Malfunctions, Rev 9. (must be requested)

Validation Time: 12 minutes Time Critical: Yes* Completion Time: _____ minutes

Comments: *The Time Critical portion of the JPM occurs from the time that the loss of CCW occurs until the reactor is tripped and all four RCPs are tripped (10 minutes per TCA Table).

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

SIMULATOR SETUP

SIMULATOR OPERATOR:

INITIALIZE to IC-18 and LOAD Scenario File 2018 NRC JPM S-7

PLACE GD CCWP2 on RO Plant Computer Screen

Place simulator in Run then Freeze until Examinee is ready to begin.

OR

INITIALIZE to any at power Initial Condition and PERFORM the following:

- **SSWP 2 running, all pre-start parameters for CCWP 2 are in band.**
- **Setup CCW heat loads such that Step 5.2.1.1 C will not be applicable (CCW pressure at 140 psig?)**
- **SET UP Plant Computer screen to monitor CCW Pump temperatures.**
- **INSERT CCW Leak on start of CCW pump 1-02 {DICCHS4519A.Value=4} IMF CC01B f:3800 d:3**
- **Deletes CCW leak when Safeguards Loops isolation closes {LOCCHS4515_2.Value=0} DMF CC01B**

EXAMINER:

PROVIDE the applicant with a copy of SOP-502A, "System Operating Procedure Manual," Rev 19:

- **Precautions and Limitations**
- **Step 5.2.1.1, Starting a Standby CCW Pump During Normal Operation.**

When applicant requests the ABN, PROVIDE him/her with a copy of ABN-502, Component Cooling Water System Malfunctions.

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following steps are from SOP-502A, "System Operating Procedure Manual"**
Perform Step: 1 step 5.2.1.1 A	Ensure the Station Service Water pump associated with the CCW pump to be started is operating
	Given in Initial Conditions that SSWP 2 is running.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2 step 5.2.1.1 B	Ensure the oil level in the bearing housings for CCWP 2 are normal
Standard:	DISPATCHED NEO to verify oil levels for CCWP 2. Given in initial conditions that prestart checks are good.
Examiner Cue:	**The NEO reports that bearing housing oil levels are normal.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3 step 5.2.1.1 C	If CCW heat load is low, THEN additional CCW flow should be established through the CS's HX AND/OR RHR HXs prior to starting the second pump.
Standard:	Candidate may establish flow through RHR HX 2 and CS HX 2 by throttling open; • 1-HS-4575, CS HX 2 CCW RET VLV • 1-HS-4573, RHR HX 2 CCW RET VLV
Examiner Cue:	**If the applicant calls for an NEO to perform any checks, respond that the checks were completed satisfactorily.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4√ step 5.2.1.1 D	START the idle CCW Pump. • 1-HS-4519A, CCWP 2
Standard:	PERFORMED the following: • PLACED 1-HS-4519A for CCWP 2 to START and observed pump start (Green light OFF Red Light ON), CCW flow increases. The start of CCW Pump #2 will trigger a pipe rupture of the CCW pipe supplying the RCPs. There will be many annunciator alarms and abnormal indications. The examinee will have to diagnose what has happened and enter the CCW Malfunctions Abnormal Procedure, ABN-502.
Standard:	Started CCWP 1-02
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The Applicant may take actions without procedure to trip the reactor and stop the RCPs when it is determined Non-Safeguards Loop CCW has been lost. These actions are allowed per the guidance contained in ODA-102, Conduct of Operations and Operations Guideline 3.**
Examiner Note:	**The following step represents the alternate path of this JPM.**
Examiner Note:	**The following steps are from ABN-502, CCW System Malfunctions, Section 5 for Loss of Flow to the Non-Safeguards Loop.** **Once the Applicant has entered the ABN, -OR- Diagnosed Event, Inform the applicant that this portion of the JPM is time critical.** **Start Time for this Step _____**
Perform Step: 5√ 5.3 step 1a- RNO step 1	ESTABLISH Non-Safeguards Loop flow: • Start the Standby CCW Pump - RNO TRIP the Reactor AND GO TO EOP-0.0A while other operators continue with this procedure.
Standard:	PERFORMED the following: Applicant recognizes that both CCW pumps are running, essentially at runout conditions and temperatures are still rising and enters the RNO column of ABN-502 and • TRIPS THE REACTOR by placing 1/1-RTC, RX TRIP BKR to TRIP
Examiner Note:	**Inform the applicant that the US directs to CONTINUE WITH ACTIONS IN THE ABN and the crew will continue with EOP-0.0A actions**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6√ 5.3 step 1a- RNO step 2	STOP ALL RCPS:
Standard:	PERFORMED the following: • PLACED 1/1-PCPX1 for RCP 1-01 in STOP • PLACED 1/1-PCPX2 for RCP 1-02 in STOP • PLACED 1/1-PCPX3 for RCP 1-03 in STOP • PLACED 1/1-PCPX4 for RCP 1-04 in STOP • OBSERVED green STOP lights LIT, red START lights DARK for all four RCPs.
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

Initial Conditions: **Given the following:**

- **Unit 1 is at 100% power**
- **CCW Pump 1-01 is in service**
- **CCW Pump 1-02 is in standby with all pre-start checks completed satisfactory**
- **SSWP 1-02 is already running**

Initiating Cue: **The Unit Supervisor directs you to PERFORM the following:**

- **Swap the running CCW Pump from 1-01 to 1-02 in accordance with SOP-502A, Component Cooling Water System, for their bi-weekly rotation per OWI-409, Equipment Rotation Program.**

Facility: CPNPP JPM # S-8 Task #RO4103A K/A 060 AA1.02 2.9 / 3.1 SF-9

Title: Respond to Radioactive Gas Release

Examinee (Print): _____

Testing Method:

Simulated Performance:		Classroom:		
Actual Performance:	X	Simulator:	X	
Alternate Path:	X	Plant:		
Time Critical:		Low Pwr:		
Bank / Mod / New	D	Emerg:	X	EN:

READ TO THE EXAMINEE

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- The Unit is at 100% power with no evolutions in progress.
- CRV053, CR HVAC, N. VENT (X-RE-5895A) in RED Alarm
- CRV054, CR HVAC, N. VENT (X-RE-5895B) in RED Alarm

Initiating Cue: The Unit Supervisor directs you to PERFORM the following:

- Respond to the RED (High) Radiation condition per ABN-902, Release of Radioactive/Toxic Gas, Section 2.0, Release of Radioactive Gas

Task Standard: Using ABN-902, section 2, applicant will determine that CR ventilation did not realign for the required conditions of high radiation as required and will establish Train B Control Room ventilation for Emergency recirculation per SOP-802.

Required Materials: ABN-902, Release of Radioactive/Toxic Gas, Rev 7.
SOP-802, Control Room Ventilation System, Section 5.3.2, Emergency Recirculation Manual Initiation, Rev 13.

Validation Time: 10 minutes Time Critical: No Completion Time: _____ minutes

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

SIMULATOR SETUP

SIMULATOR OPERATOR:

INITIALIZE to IC-70

OR

INITIALIZE to any 100% power IC and PERFORM the following:
INSERT malfunction RM053, Process Radiation Monitor
X-RE-5895A/CVR04 @ 1.5 x 10-4 on Key 1
INSERT malfunction RM054, Process Radiation Monitor
X-RE-5895B/CVR05 @ 1.5 x 10-4 on Key 1
INSERT remote function RMR02, RM-80 Actuations to OFF.

EXAMINER:

PROVIDE the examinee with a copy of:
ABN-902, Release of Radioactive/Toxic Gas, Section 2.0, Release of Radioactive Gas.

When required, PROVIDE the examinee with a copy of:
SOP-802, Control Room Ventilation System, Section 5.3.2, Emergency Recirculation Manual Initiation.

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following steps are from ABN-902, "Release of Radioactive/Toxic Gas, Section 2.0**
Perform Step: 1 Step 2.3.1.a	Verify Containment air radiation alarms – CLEAR: • CAPu98 (u-RE-5502), CNTMT AIR PIG PART • CAGu97 (u-RE-5503), CNTMT AIR PIG GAS
Standard:	OBSERVED PC-11 and DETERMINED the following: • CAP198 (1-RE-5502), CNTMT AIR PIG PART is NOT in alarm. • CAP197 (1-RE-5503), CNTMT AIR PIG GAS is NOT in alarm.
Examiner Cue:	
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2 Step 2.3.1.b	Verify the following radiation alarms – CLEAR: • PVF684 (X-RE-5570A), S. WRGM EFFLUENT • PVF685 (X-RE-5570B), N. WRGM EFFLUENT • ABV089 (X-RE-5701), AUX BLDG VENT DUCT
Standard:	OBSERVED PC-11 and DETERMINED the following: • PVF684 (X-RE-5570A), S. WRGM EFFLUENT is NOT in alarm. • PVF685 (X-RE-5570B), N. WRGM EFFLUENT is NOT in alarm. • ABV089 (X-RE-5701), AUX BLDG VENT DUCT is NOT in alarm.
Examiner Cue:	
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3 Step 2.3.1.c	Verify the following radiation alarms – CLEAR: • CRV053 (X-RE-5895A), CR HVAC, N VENT • CRV054 (X-RE-5895B), CR HVAC, N VENT • CRV091 (X-RE-5896A), CR HVAC, S VENT INTK • CRV092 (X-RE-5896B), CR HVAC, S VENT
Standard:	OBSERVED PC-11 and DETERMINED the following: • CRV053 (X-RE-5895A), CR HVAC, N VENT is in HIGH alarm. • CRV054 (X-RE-5895B), CR HVAC, N VENT is in HIGH alarm.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4 2.3.1.c RNO c.1)	Perform the following: Ensure Emergency Recirculation Automatic Initiation has occurred (X-ZL-5877A/B, CR EMER RECIRC).
Standard:	DETERMINED Control Room Ventilation did NOT shift to the Emergency Recirculation Mode and OBSERVED the following on Panel CV-03: • X-ZL-5877A & X-ZL-5877B, CR EMER RECIRC, red lights DARK. • X-ZL-5878A & X-ZL-5878B, CR NORM VENT, white lights LIT.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5 2.3.1.c RNO c.2)	Perform the following: Manually initiate Emergency Recirculation per SOP-802.
Standard:	REFERRED to SOP-802, Control Room Ventilation System, Section 5.3.2, Emergency Recirculation Manual Initiation.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps are from SOP-802, Section 5.3.2.**
Examiner Note:	**The following steps represent the Alternate Path of this JPM.**

CAUTION: Emergency Recirculation can cause high differential pressure across the control room door. Signs may be posted to warn personnel that the control room door is difficult to open.

NOTE: The cooling and heating capacities of the Control Room A\C Units are based on a maximum outdoor air temperature of 110˚F and a minimum outdoor air temperature of 20˚F in order to prevent the indoor temperature from exceeding or falling below the indoor design limits.

Perform Step: 6 5.3.2.A	VERIFY outside ambient air temperature is between 20°F to 110°F.
Standard:	DETERMINED outside ambient air temperature is approximately 83°F as read on X-UR-4115 Meteorological Tower indication.
Examiner Cue:	**Another operator is tracking runtimes per OPT-115, Charcoal Adsorber Runtime Monitoring.**
Comment:	**SAT ☐ UNSAT ☐**

CAUTION: Do NOT ALLOW both Pressurization or both Filtration Units to run in parallel for greater than 1 hour under blackout, SI or high radiation conditions. (Based on Control Room dose rate calculations)

NOTE:
- Run times are tracked any time Control Room Emergency Pressurization and Filtration fans are run with the charcoal adsorbers in operation per OPT-115.
- Alarms X-ALB-13A, 3.16 and 4.16, will come in when Emergency Recirculation is initiated.

Perform Step: 7√ 5.3.2.B.1)	PLACE handswitch X-HS-5877, EMER RECIRC MAN ACT in ACTUATE AND VERIFY the following occur. • The Pressurization and Filtration Unit fans have started AND the associated inlet dampers have opened.
Standard:	PERFORMED the following: • PLACED X-HS-5877, EMER RECIRC MAN ACT handswitch in ACT position (**critical**). • OBSERVED Train A X-HS-5831A, CR EMER PRZN FN 5 (X-HV-5831 on X-HS-5831D) red light LIT (**NOT critical**). • OBSERVED Train A X-HS-5845, CR EMER FILT FN 23 & FILT IN DMPR 41 (X-HV-5839) red FAN and DAMPER lights LIT (**NOT critical**). • OBSERVED Train B X-HS-5834A, CR EMER PRZN FN 6 (X-HV-5834 on X-HS-5834D) red light LIT (**NOT critical**). • OBSERVED Train B X-HS-5846, CR EMER FILT FN 24 & FILT IN DMPR 42 (X-HV-5840) red FAN and DAMPER lights LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8 5.3.2.B.2)	B.2) VERIFY the following occur. • The operating supply and exhaust fans have stopped.
Standard:	VERIFIED Supply and Exhaust Fans have STOPPED: • OBSERVED X-HS-5825A, CR MU AIR SPLY FN 37 & SUCT DMPR 16 (X-HV-5825A) green DAMPER and FAN lights LIT. • OBSERVED X-HS-5828A, CR MU AIR SPLY FN 38 & SUCT DMPR 19 (X-HV-5828A) green DAMPER and FAN lights LIT. • OBSERVED X-HS-5855, CR EXH FN 1 (X-PV-5855 on X-HS-5855A) green light LIT. • OBSERVED X-HS-5856, CR EXH FN 2 (X-PV-5856 on X-HS-5856A) green light LIT. • OBSERVED X-HS-5857, CR KTCHN & TOIL EXH FN 3 & SUCT DMPR 27 (X-HV-5857) green DAMPER and FAN lights LIT. • OBSERVED X-HS-5858, CR KTCHN & TOIL EXH FN 4 & SUCT DMPR 28 (X-HV-5858) green DAMPER and FAN lights LIT.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Cue:	**The Unit Supervisor directs you to shift to single Train B operation.**
Perform Step: 9 5.3.2.C	PERFORM the following steps to shift to single train operation.
Standard:	DETERMINED single train operation is required.
Comment:	**SAT ☐ UNSAT ☐**

NOTE: During a rad monitor COT, I&C needs both trains RESET and to leave both trains of CR HVAC in Emergency recirc because the COT will re-actuate the Emergency Recirc signal. Once COT is completed, then resume this section.

Perform Step: 10√ 5.3.2.C.1)	Momentarily PLACE the reset switch in RESET for the train to be shutdown.
Standard:	PERFORMED the following: • PLACED Train B X-HS-5877B, EMER RECIRC RESET switch to RESET position (**critical**). • OBSERVED Train B red X-ZL-5877B light DARK and white X-ZL-5878B CR NORM VENT light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Examiner Cue:	**Two minutes have passed.**
Perform Step: 11√ 5.3.2.C.2)	C.2) After approximately 1 to 3 minutes, STOP the selected operating Emergency Filtration and Pressurization Unit fans AND ENSURE the handswitches are in AUTO with the associated inlet damper closed. • X-HS-5834A, CR EMER PRZN FN 6
Standard:	PERFORMED the following after 1 to 3 minutes: • TURNED Train B X-HS-5834A, CR EMER PRZN FN 6 (X-HV-5834 on X-HS-5834D) switch to STOP (**critical**). • OBSERVED green STOP light LIT (**NOT critical**). For inlet damper closed (X-HS-5846, CR EMER FILT FN 24 & FILT IN DMPR 42) • TURNED Train B X-HS-5846, CR EMER FILT FN 24 & FILT IN DMPR 42 (X-HV-5840) switch to STOP (**critical**). • OBSERVED green DAMPER and FAN lights LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Train B Air Conditioning Fans #2 & #4 are verified shutdown.**
NOTE: The Control Room Ventilation System should be operated by train, except for the A/C units. Any combination of the four A/C units may be used with either train of ventilation.	
Perform Step: 12 5.3.2.C.3)	ENSURE air conditioning units NOT required are shutdown AND VERIFY the associated suction damper is closed. • X-HS-5851A, CR A/C FN 2 & SUCT DMPR 10 (X-HV-5851) • X-HS-5853A, CR A/C FN 4 & SUCT DMPR 12 (X-HV-5853)
Standard:	PERFORMED the following: • OBSERVED X-HS-5851A, CR A/C FN 2 & SUCT DMPR 10 (X-HV-5851) green DAMPER and FAN STOP lights LIT. • OBSERVED X-HS-5853A, CR A/C FN 4 & SUCT DMPR 12 (X-HV-5853) green DAMPER and FAN STOP lights LIT.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 13 5.3.2.C.4)	ENSURE power supply breakers for the following fans are ON (manually reset breakers, as required): • 480V MCC XEB1-1 (AB 852') • 480V MCC XEB2-1 (ECB 854')
Standard:	CONTACTED a Nuclear Equipment Operator to ENSURE breakers are ON.
Examiner Cue:	**Another operator will perform Step 5.3.2.C.4)**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 14 5.3.2.C.5)	VERIFY X-ALB-13A, 4.3, CR EMER PRZN ANY SPLY FN/HTR TRIP is dark.
Standard:	DETERMINED Annunciator X-ALB-13A, Window 4.3 – CR EMER PRZN ANY SPLY FN/HTR TRIP, is DARK.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 15√ 5.3.2.C.6)	CLOSE the intake damper for the shutdown train: • X-HS-5838A, CR S INTK DMPR 15 (TRN B)
Standard:	PERFORMED the following: • PLACED Train B X-HS-5838A, CR S. INTK DMPR 15 switch to CLOSE (**critical**). • OBSERVED green CLOSE light LIT (**NOT critical**).
Terminating Cue:	**Another operator will verify proper train operation by observing light indication of Attachment 4. This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

Initial Conditions: **Given the following conditions:**

- **The Unit is at 100% power with no evolutions in progress.**
- **CRV053, CR HVAC, N. VENT (X-RE-5895A) in RED Alarm**
- **CRV054, CR HVAC, N. VENT (X-RE-5895B) in RED Alarm**

Initiating Cue: **The Unit Supervisor directs you to PERFORM the following:**

- **Respond to the RED (High) Radiation condition per ABN-902, Release of Radioactive/Toxic Gas, Section 2.0, Release of Radioactive Gas**

Facility: CPNPP JPM # P-1 RO Task # K/A # 065 AA1.04 3.5 / 3.4 SF-8

Title: Refill U2 CCW Surge Tank locally during loss of Inst. Air

Examinee (Print): _____

Testing Method:

Simulated Performance:	X	Classroom:	
Actual Performance:		Simulator:	
Alternate Path:		Plant:	X
Time Critical:			

READ TO THE EXAMINEE

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: **Initial Conditions:**

- **Unit 1 is in MODE 3**
- **Unit 2 is in MODE 3**
- **The Control Room is performing ABN-301, Instrument Air Malfunction**
- **The level in Unit 2's CCW surge tank level is lowering out of band**

Initiating Cue: **The Unit Supervisor directs you to:**

- **Restore the CCW Unit 2 tank to within the normal operating band by manually controlling the makeup valve(s) in accordance with ABN-301, Loss of Instrument Air.**
- **This is a Time Critical JPM.**

Task Standard: **The applicant is expected to locate the makeup valve 2-LV-4501 (AB 874' X-245), describe how they would use the pipe wrench to remove the AOV locknut and manually control the MU valve, where they would observe the tank's level, and restore level to within band of 40-66% within 30 minutes.**

Ref. Materials: ABN-301, Instrument Air Malfunction, rev 13, section 2.3, page 20

Validation Time: 20 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

SIMULATOR SETUP

BOOTH OPERATOR:
N/A – Plant JPM

Handouts:

ABN-301, "INSTRUMENT AIR SYSTEM MALFUNCTION" Section 2.3, Rev. 13

√ **- Check Mark Denotes Critical Step** | **START TIME:** |

Examiner Note:	**The following steps are from ABN-301, Section 2.3.**
Perform Step: 1 2.3 Step 17	CHECK CCW Surge Tank level - GREATER THAN 40%: 2- LI-4501, CCW SRG TK LVL
Performance Standard:	Applicant locates the local level indication and the examiner cues with a pen that It is 38% and lowering
Comment:	**SAT ☐ UNSAT ☐**

NOTE: A 14" Pipe Wrench for loosening the AOV lock nut is located on the floor attached to the ladder for the CCW Surge Tank.	
Perform Step: 2 9.3 step 3	Applicant must find and discuss the use of the Pipe wrench to get the AOV lock nut off of the valve.
Performance Standard:	The pipe wrench is attached to the ladder for the CCW Surge Tank (as indicated in the NOTE in the procedure above this section and listed above in the JPM). The applicant must find the 14” Pipe Wrench that is required to manually operate the valve and discuss how to use it.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2 2.3 Step 17 RNO	Locally CONTROL makeup valve 2-LV-4501 (Located at AB 874' X-245), to raise level for CCW SRG TK 2-01 to restore band of 40-66%:
Performance Standard:	The applicant removes the AOV locknut with the pipe wrench, then can open the MU valve 2LV-4501 by manually turning the hand wheel to restore level
Examiner CUE:	**As hand wheel opens you hear flow and level begins to rise in the U2 CCW surge tank. Once level is cued as above 40% the JPM can be terminated**
Comment:	**SAT ☐ UNSAT ☐**

Must be 30 minutes or less from start to stop time | **STOP TIME:** |

Initial Conditions: **Initial Conditions:**

- **Unit 1 is in MODE 3**
- **Unit 2 is in MODE 3**
- **The Control Room is performing ABN-301, Instrument Air Malfunction**
- **The level in Unit 2's CCW surge tank level is lowering out of band**

Initiating Cue: **The Unit Supervisor directs you to:**

- **Restore the CCW Unit 2 tank to within the normal operating band by manually controlling the makeup valve(s) in accordance with ABN-301, Loss of Instrument Air.**

- **This is a Time Critical JPM.**

Facility: CPNPP JPM # P-2 RO Task # K/A # 004.A4.07 3.7 / 3.9 SF-1

Title: Locally respond to MG set trouble

Examinee (Print): _____

Testing Method:

Simulated Performance:	X	Classroom:	
Actual Performance:		Simulator:	
Alternate Path:		Plant:	X
Time Critical:			

READ TO THE EXAMINEE

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: **Given the following conditions:**

- **Unit 2 is in MODE 1 at 100% power**
- **CRDM MG Trouble alarm is lit**

Initiating Cue: **The Unit Supervisor directs you to PERFORM the following:**

- **ABN-712, Section 9.0 for Rod Control System malfunction**

Task Standard: **The applicant …**

Ref. Materials: ABN-712, “Rod Control System Malfunction” Rev. 11
SOP-702B, “Rod Control System,” Rev 6.

Validation Time: 10 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

SIMULATOR SETUP

BOOTH OPERATOR:
INITIALIZE to IC-xx?

OR
Load any at power IC
AND

Handouts:

ABN-712, "Rod Control System Malfunction" Section 9.0, Rev. 11

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following steps are from ABN-712B, Section 9.0.**
Perform Step: 1 9.3 step 1	Check “CRDM MG TRBL” (6D-4.9) alarm - LIT
Performance Standard:	It is lit
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2 9.3 step 2	Verify GROUND DETECTION REPLAY (CV-2MG1/2) – NOT ACTUATED
Performance Standard:	It is not actuated
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3 9.3 step 3	Verify BOTH Motor Breakers - CLOSED
Performance Standard:	They are both closed
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4 9.3 step 4	ENSURE SYNCHRONIZE GENERATOR SELECTOR SWITCH - OFF
Performance Standard:	They are both in OFF
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5 9.3 step 5	VERIFY BOTH MG 1 AND 2 DIRECTIONAL OVERCURRENT A AND B Relays – NOT ACTUATED AND MG GENERATOR OVERVOLTAGE TRIP light – NOT Lit
Performance Standard:	
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6 9.3 step 6	VERIFY BOTH Generator Breakers - CLOSED
Performance Standard:	MG SET 2 GENERATOR BKR IS OPEN
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7√ 9.3 step 6 RNO 1	ENSURE affected generator breaker - PULLOUT
Performance Standard:	
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8√ 9.3 step 6 RNO step 2	DEPRESS OC TRIP SWITCH RESET pushbutton on affected breaker
Performance Standard:	
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 9 9.3 step 6 RNO step 3	VERIFY “CRDM MG TRBL” (6D-4.9) alarm - DARK
Performance Standard:	
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 10 9.3 step 6 RNO step 4	INITIATE Condition report per STA-421.
Performance Standard:	
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 11 9.3 step 7	VERIFY GENERATOR LINE VOLTS for each Generator Phase – APPROXINATELY 260 VOLTS (255-265 volts)
Performance Standard:	MG SET 2 VOLTAGE is low (245 volts). MG SET 1 VOLTAGE IS IN SPEC AT 260 volts
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 12√ 9.3 step 7 RNO	If MG motor OR generator breaker tripped, THEN First ADJUST on-line MG's GENERATOR VOLTAGE ADJUST to obtain 260 volts
Performance Standard:	
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 11√	After time compression, the problem has been fixed on the MG set and is ready for return to service.
Performance Standard:	
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 12	Go to SOP-702B, section 5.1.2 for paralleling MG sets to recover MG set
Performance Standard:	Complete all steps of this section of procedure to parallel the MG sets.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 13 5.2.2.M	•
Performance Standard:	
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 14√ 5.2.2.N	
Performance Standard:	
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 15√ 5.2.2.O	
Performance Standard:	
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 16 5.2.2.P	
Performance Standard:	
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

Initial Conditions: **Given the following conditions:**

- **Unit 1 is in MODE 1 at 100% power**
- **The automatic Reactor makeup system is malfunctioning**
- **Chemistry has already been informed to prepare to sample the RCS and PRZR after the dilution**
- **Rod Control is in manual**
- **All prerequisites are met**

Initiating Cue: **The Unit Supervisor directs you to PERFORM the following:**

-

Facility: CPNPP JPM # AO6411 Task #AO6411 K/A #065.AA1.04 3.5 / 3.4 SF-8

Title: Align Emergency Air to RHR Control Valves After A Loss of Instrument Air

Examinee (Print): _____

Testing Method:

Simulated Performance:	X	Classroom:	
Actual Performance:		Simulator:	
		Plant:	X

READ TO THE EXAMINEE

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- The Control Room has been evacuated due to a Fire and is inaccessible.
- Instrument air has been lost.

Initiating Cue: The Unit Supervisor directs you to PERFORM the following:

- ALIGN an emergency source of Instrument Air to Unit 2 per ABN-104, Residual Heat Removal System Malfunction, Attachment 14, Unit 2 Emergency Air Supply Hookup to RHR Valves 2-FCV-618 and 2-HCV-606.

Task Standard: Locate and correctly perform Critical Steps of ABN-104, Attachment 14.

Required Materials: ABN-104, Residual Heat Removal System Malfunction, Rev. 8, PCN-5.

Validation Time: 15 minutes Time Critical: N/A Completion Time: _____ minutes

Comments:

Result: SAT UNSAT

Examiner (Print / Sign): _____ Date: _____

PLANT SETUP

EXAMINER:

PROVIDE the examinee with a copy of:

- **ABN-104, Residual Heat Removal System Malfunction,**
  - **Attachment 14, Unit 2 Emergency Air Supply Hookup to RHR Valves 2-FCV-618 AND 2-HCV-606.**

EXAMINER NOTE:

This JPM will be performed on Unit 2 only due to Panel design considerations.

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**Remind examinee to simulate all actions.**
Examiner Note:	**Safe Shutdown Repair Kit is located in the Safeguards Building 790' North/South hallway across from the Chem Add Tank Area.**
Perform Step: 1√	Locate the Safe Shutdown Repair Kit.
Standard:	LOCATE the Safe Shutdown Repair Kit.
Examiner Cue:	**The cabinet is OPEN.**
Comment:	**SAT UNSAT**

Examiner Note:	**The valve is located in Safeguards Building 790' Room 2-070.**
Perform Step: 2√	Close the following instrument air valves: • 2CI-0384, U2 SFGD BLDG EL 790 HALLWAY INST AIR HDR ISOL VLV.
Standard:	TURN handwheel for 2CI-0384, U2 SFGD BLDG EL 790 HALLWAY INST AIR HDR ISOL VLV 0384 in the CLOCKWISE direction to CLOSE valve.
Examiner Cue:	**The valve is CLOSED.**
Comment:	**SAT UNSAT**

Examiner Note:	**The valve is located in Safeguards Building 790' Room 2-070.**
Perform Step: 3√	Close the following instrument air valves: • 2CI-0385, U2SFGD BLDG EL 790 HALLWAY INST AIR HDR ISOL VLV.
Standard:	TURN handwheel for 2CI-0385, U2SFGD BLDG EL 790 HALLWAY INST AIR HDR ISOL VLV 0385 in the CLOCKWISE direction to CLOSE valve.
Examiner Cue:	**The valve is CLOSED.**
Comment:	**SAT UNSAT**

Examiner Note:	**The breaker is located in Safeguards Building 790' Room 2-070.**
Perform Step: 4√	Place 2ESB1/20/BKR, PORTABLE INSTR AIR COMPR 120 VAC FUSED PWR RECEPTACLE 2-01 SPLY BKR 20 - OFF
Standard:	PLACE breaker 2ESB1/20/BKR, PORTABLE INSTR AIR COMPR 120 VAC FUSED PWR RECEPTACLE 2-01 SPLY BKR 20 in OFF position.
Examiner Cue:	**The breaker is OPEN.**
Comment:	**SAT UNSAT**

Examiner Note:	**The panel is located in Safeguards Building 790' Room 2-070.**
Examiner Note:	**Operations has granted permission to open this Unit 2 Panel.**
Perform Step: 5√	Open the cover for 120V AC receptacle CP2-EPPRNC-01.
Standard:	TURN or REMOVE latches and OPEN cover on 120V AC receptacle CP2-EPPRNC-01.
Examiner Cue:	**The cover is REMOVED.**
Comment:	**SAT UNSAT**

Examiner Note:	**The breaker is located in Safeguards Building 790' Room 2-070.**
Perform Step: 6√	Place breaker in 120V AC Receptacle Panel CP2-EPPRNC-01 - OFF
Standard:	PLACE breaker 120V AC Receptacle Panel CP2-EPPRNC-01 in OFF position.
Examiner Cue:	**The breaker is OPEN.**
Comment:	**SAT UNSAT**

Perform Step: 7√	Place fuse from fuse holder FH 4 into fuse holder FH 3.
Standard:	REMOVE fuse from fuse holder FH 4 and PLACE into fuse holder FH 3.
Examiner Cue:	**The fuse is MOVED to FH 3.**
Comment:	**SAT UNSAT**

Perform Step: 8√	Place fuse from fuse holder FH 1 into fuse holder FH 2.
Standard:	REMOVE fuse from fuse holder FH 1 and PLACE into fuse holder FH 2.
Examiner Cue:	**The fuse is MOVED to FH 2.**
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 9√	Plug portable air compressor into receptacle in panel CP2-EPPRNC-01.
Standard:	PLUG portable air compressor into receptacle in Panel CP2-EPPRNC-01.
Examiner Cue:	**The Compressor is PLUGGED IN.**
Comment:	**SAT ⬙ UNSAT ⬙**

Examiner Note:	**The valve is located in Safeguards Building 790' Room 2-070.**
Perform Step: 10√	Connect air hose to 2CI-0431, U2 SFGD BLDG EL 790 CORR ALT AIR SPLY IN ISOL VLV.
Standard:	CONNECT air hose to valve 2CI-0431, U2 SFGD BLDG EL 790 CORR ALT AIR SPLY IN ISOL VLV.
Examiner Cue:	**The air hose is CONNECTED to the valve.**
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 11√	Connect air hose to portable air compressor.
Standard:	CONNECT air hose to portable air compressor.
Examiner Cue:	**The air hose is CONNECTED to the portable compressor.**
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 12√	Place breaker in 120V AC Receptacle Panel CP2-EPPRNC-01 – ON.
Standard:	PLACE breaker 120V AC Receptacle Panel CP2-EPPRNC-01 in ON position.
Examiner Cue:	**The breaker is CLOSED.**
Comment:	**SAT ⬙ UNSAT ⬙**

Perform Step: 13√	Place 2ESB1/20/BKR – ON.
Standard:	PLACE breaker 2ESB1/20/BKR in ON position.
Examiner Cue:	**The breaker is CLOSED and the portable compressor is running.**
Comment:	**SAT ⬙ UNSAT ⬙**

Examiner Note:	**The valve is located in Safeguards Building 790' Room 2-070.**
Perform Step: 14√	OPEN 2CI-0431, U2 SFGD BLDG EL 790 CORR ALT AIR SPLY IN ISOL VLV.
Standard:	TURN handwheel for 2CI-0431, U2 SFGD BLDG EL 790 CORR ALT AIR SPLY IN ISOL VLV 0431 in the COUNTER CLOCKWISE direction to OPEN valve.
Terminating Cue:	**The valve is OPEN. This JPM is complete.**
Comment:	**SAT ⬙ UNSAT ⬙**

STOP TIME:	

INITIAL CONDITIONS: **Given the following conditions:**

- **The Control Room has been evacuated due to a Fire and is inaccessible.**
- **Instrument air has been lost.**

INITIATING CUE: **The Unit Supervisor directs you to PERFORM the following:**

- **ALIGN an emergency source of Instrument Air to Unit 2 per ABN-104, Residual Heat Removal System Malfunction, Attachment 14, Unit 2 Emergency Air Supply Hookup to RHR Valves 2-FCV-618 and 2-HCV-606.**

Scenario Event Description
CPNPP 2018 NRC Scenario 1

Facility:	CPNPP 1 & 2		Scenario No.:	1	Op Test No.: CPNPP 2018 NRC
Examiners:			Operators:		

Initial Conditions: Unit 1 is stable at 2 - 3% Reactor Power. MFW Pump 1A is in service. EHC pumps A & C are running. EHC Pump B is out of service. BOL Boron is 1662 ppm (by sample).

Turnover: Warmup and synchronization of the turbine generator planned per IPO-003A, Power Operations Section 5.1, Warmup and Synchronization of the Turbine Generator. Power Ramp is on hold due to awaiting Core Performance updated reactivity projections for power ascension.

Critical Tasks:
- CT-1 Trip reactor coolant pumps within 5 minutes upon a loss of Subcooling per EOP-0.0A, Reactor Trip or Safety Injection OR EOP-1.0A, Loss of Reactor or Secondary Coolant.
- CT-2 Initiate Cooldown of Reactor Coolant System Prior to Exiting EOS-1.2A, Post LOCA Cooldown and Depressurization.

Event No.	Malf. No.	Event Type*	Event Description
1	RP06C	C (RO, SRO) TS (SRO)	Loop 3 N16 Channel (1-JI-431A/B) Fails High LCO 3.3.1.E, Reactor Trip System Instrumentation
2	DIED 1B41 DITCHS 6552	C (BOP,SRO)	Loss of 1B4, EHC Pump C Fails to Auto Restart
3	(COND)	C (BOP, SRO)	SG 1-02 FW BYP Controller Failure, 1-LK-560 Demand Fails to 0% in Auto
4	FW13A DIFWHS2450A	C (BOP, SRO) TS (SRO)	Inadvertent Start of MDAFW Pump 1-01 and Inadvertent Opening of TDAFW Pump Steam Supply Valve 1-HS-2452-1 LCO 3.7.5, Auxiliary Feedwater (AFW) System
5	RD06 D12	M (RO,BOP, SRO)	Ejected Control Rod D12, Control Bank D
6	SS02A1 SS02A2	C (RO, SRO)	Main Steamlines Fail to Isolate on Containment Pressure HI-2
7	FW38B	C (BOP)	Steam Generator 1-02 FWIV Fails to Auto Close

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

Actual	Target Quantitative Attributes
7	Total malfunctions (5-8)
2	Malfunctions after EOP entry (1-2)
4	Abnormal events (2-4)
1	Major transients (1-2)
2	EOPs entered/requiring substantive actions (1-2)
0	EOP contingencies requiring substantive actions (0-2)
2	Critical tasks (2-3)

SCENARIO 1 SUMMARY

Event 1
The first event is a failure of Loop 3 N16 channel, 1-JI-431A/B high. The crew will enter ABN-704, Tc/N-16 Instrumentation Malfunction, Section 2.0, Tc/N-16 Instrumentation Malfunction. The crew will take actions to defeat the failed channel. The SRO will refer to Technical Specifications.

Event 2
The second event is a loss of the 6.9 KV incoming breaker 1B4-1. Crew response will be per ABN-602, Response to a 6900/480V System Malfunction, Section 6.0, Non-Safeguards 480V Bus uB1/ uB2/ uB3/ uB4 Fault. The crew will re-energize the bus from the alternate feeder breaker. EHC pump C will fail to auto start on bus power restoration and the crew will take actions to restart the pump.

Event 3
The third event is a failure of 1-LK-560, SG 2 FW BYP CTRL to 0% demand in automatic. The BOP may take manual control of the controller and restore feedwater flow to SG 2 per ODA-102 or per the guidance of ALM-0081A, window 2.12, SG 2 Level Deviation.

Event 4
The fourth event is a Train A AMSAC fault causing an auto start of MDAFWP 1-01 and inadvertent opening of the Train A steam supply, 1-HS-2452-1 to the TDAFWP. The BOP operator may take the failed steam supply, 1-HS-2452-1 to Stop or Pull-Out per ODA-102 and follow up with the appropriate ALM response. AFW flow from the TDAFWP and 1-01 MDAFWP can also be stopped by closure of the AFW flow control valves. The crew will follow up with actions from ABN-305, Auxiliary Feedwater System Malfunction, Section 6.0, Inadvertent Turbine Driven AFW Pump Start (Steam Supply VLV Fails Open). The SRO will refer to Technical Specifications.

Events 5, 6, & 7
The major will be an Ejected Control Rod. The crew will trip the Reactor, initiate Safety Injection, and perform the Immediate Actions of EOP-0.0A, Reactor Trip or Safety Injection.

The Reactor Trip is complicated by a failure of 1-HS-2135, FWIV 2 to automatically close. The valve must be manually closed by placing the Control Board handswitch in the close position.

The Main Steamline Break is complicated by a failure of the Main Steamlines to automatically isolate on HI-2 Containment Pressure of 6.2 psig. The MSLI must be manually performed by an operator on the Control Board.

The crew will transition from EOP-0.0A, Reactor Trip or Safety Injection to EOP-1.0A, Loss of Reactor or Secondary Coolant. Tripping RCPs within 5 minutes upon loss of subcooling is identified as Critical Task 1.

The crew will transition from EOP-1.0A, Loss of Reactor or Secondary Coolant to EOS-1.2A, Post LOCA Cooldown and Depressurization. Establishing a cooldown is identified as Critical Task 2.

Terminating Criteria
Scenario will be terminated when the crew has commenced a cooldown per EOS-1.2A, Post LOCA Cooldown and Depressurization, or at the discretion of the lead Examiner.

Risk Significance:

- Failure of risk significant systems prior to trip: MDAFWP 1-01 and TDAFWP Steam Supply
- Risk significant core damage sequence: Ejected Control Rod D12
- Risk significant operator actions: Stopping RCPs on loss of subcooling
  Manual closure of FWIV 2
  Manually actuate a MSLI

Critical Task Determination

Critical Task	Safety Significance	Cueing	Measurable Performance Indicators	Performance Feedback
CT-1 Trip reactor coolant pumps within 5 minutes upon a loss of Subcooling per EOP-0.0A, Reactor Trip or Safety Injection OR EOP-1.0A Loss of Reactor or Secondary Coolant.	Take one or more actions that would prevent a challenge to plant safety. FSAR II.K.3.5; WCAP-9584; WOG ERG Generic Issue for RCP Trip / Restart.	Procedurally driven from EOP-0.0A and EOP-1.0A Foldout pages. Availability of Subcooling indication both on meters and computer.	The operator will secure ALL RCPs using the handswitches on CB-05.	Indication of pump stop including light indication, flow and motor current.
CT-2 Initiate Cooldown of Reactor Coolant System Prior to Exiting EOS-1.2A, Post LOCA Cooldown and Depressurization.	Take one or more actions that would prevent a challenge to plant safety.	Procedurally driven from EOS-1.2A to commence cooldown to reduce the overall temperature of the RCS.	The operator will increase dumping steam from the SGs via the ARVs to reduce RCS temperature.	Lowering SG pressures and lowering RCS temperatures beginning with the cold leg temperatures.
NOTE: (Per NUREG-1021, Appendix D) If an operator or the Crew significantly deviates from or fails to follow procedures that affect the maintenance of basic safety functions, those actions may form the basis of a CT identified in the post-scenario review.				

	SIMULATOR OPERATOR INSTRUCTIONS for SIMULATOR SETUP	

INITIALIZE to IC-10 and LOAD 2018 NRC Scenario 1
Place EHC Fluid Pump B in Pull-out with a CAUTION tag and start EHC Fluid Pump C.

EVENT	TYPE	MALF #	DESCRIPTION	DEMAND VALUE	INITIATING PARAMETER
6	IMF	SS02A1	SSPS TR A Master Relay K504 Failure [Open, MSL ISO]	f:1	K0
		SS02A2	SSPS TR B Master Relay K504 Failure [Open, MSL ISO]	f:1	K0
7	IMF	FW38B	SG 2 Feedwater Isolation Valve Stuck [2135]	f:1	K0(4)
1	IMF	RP06C	Loop 3 N-16 Instrument Failure [JE-430]	f:120	K1
2	IOR	DIED 1B41	Loss of Bus 1B4 due to Failure of Incoming Breaker 1B4-1	f:0	K2
		DITCHS 6552	EHC Pump C fails to Auto Start	f:1	K2(1)
	IRF	RDR12	MG Set 2 Motor Breaker	f:2	K10
	IRF	RDR14	MG Set 2 Generator Breaker	f:2	K10 d:20
3	SET	ckSH_27_29_P_36	Fails Controller LC-560 Auto Input	Act=98	K3
		ckSH_27_29_P_36	Fails Controller LC-560 Auto Input	OUT06=10	K3
		cdLC-560	Adjust RESET time constant for LC-560 controller response if placed in AUTO	RESET_TIME=2	K3
4	IMF	FW13A	TDAFWP Supply Valve HV-2452-1 Fail Open	f:1	K4(2)
	IOR	DIFWHS 2450A	MDAFWP 1-01 Inadvertent Start	f:4	K4(3)
	IRF	AN9B_052	AMSAC TRBL Alarm	f:4	K4
5	IMF	RD06 D12	Ejected Rod – CBD Rod D12	f:1	K5
6	IMF	SS02A1	SSPS TR A Master Relay K504 Failure [Open, MSL ISO]	f:1	K0
		SS02A2	SSPS TR B Master Relay K504 Failure [Open, MSL ISO]		
7	IMF	FW38B	SG 2 Feedwater Isolation Valve Stuck [2135]	f:1	K0(4)

(1) {DITCHS6552.Value=4} DOR DITCHS6552 – allows manual start of EHC pump C
(2) {LOFWHS24521_2.Value=1} DMF FW13A f:1 – allows closure of 1-HS-2452-1 to stop TDAFWP
(3) {LOFWHS2450A_5.Value=0} DOR DIFWHS2450A – allows stopping MDAFWP 1-01
(4) {DIFWHS2135.Value=0} DMF FW38B – allows closing FW-2135 manually

Simulator Operator:	**INITIALIZE to IC-10 and LOAD 2018 RC Scenario 1** **ENSURE EHC FLUID PMP B, 1-HS-6551 is in Pull-Out with a YELLOW Caution Tag on the handswitch** **Ensure EHC Fluid Pump C is running, 1-HS-6552** **ENSURE all Simulator Annunciator Alarms are ACTIVE** **ENSURE all Control Board Tags are removed** **ENSURE Operator Aid reflects current boron conditions (1669 ppm BOL)** **ENSURE Rod Bank Update (RBU) is performed (CBC-227/CBD-112)** **ENSURE 60/90 buttons DEPRESSED on ASD** **ENSURE ASD speakers are ON to half volume** **ENSURE procedures in progress are on SRO desk:** **- COPY of IPO-003A, Power Operations, Section 5.1, Warmup and Synchronization of the Turbine Generator** **ENSURE Control Rods are in MANUAL with Bank C at 227 steps and Bank D at 112** **ENSURE PCS TT06 is set to "GTGC MODE2" and on scale** **ENSURE 1-PK-507, Steam Dump pot is set for 6.68 turns** **ENSURE 1-FK-110, Boric Acid Flow Control pot is set for 5.05 turns** **ENSURE 1-FK-111, Reactor Makeup Water Flow Control = 5.63** **Place MFP 1B Trip Oil Pressure Switches Isolated sign on CB-08** **ENSURE Alarms in service for CV-01 and CV-03 on Panel Overview** **PLACE Pink MANUAL Magnet (Rectangle) above 1/1-RBSS, Rod Bank Select Switch**
Control Room Annunciators in Alarm: **PCIP-1.1 – SR TRN A RX TRIP BLK** **PCIP-1.3 – AMSAC BLK TURB < 40% PWR C-20** **PCIP-1.4 – CNDSR AVAIL STM DMP ARMED C-9** **PCIP-1.7 – RX ≤ 50% PWR TURB TRIP PERM P-9** **PCIP-2.1 – SR TRN B RX TRIP BLK** **PCIP-2.4 - LO TURB PWR ROD WTHDRW BLK C-5** **PCIP-2.5 – SR RX TRIP BLK PERM P-6** **PCIP-3.5 – RX & TURB ≤ 10% PWR P-7** **PCIP-4.5 – RX < 48% PWR 3-LOOP FLO PERM P-8** **PCIP-4.6 – TURB < 10% PWR P-13** **ALB-6D-1.1 – SR HI VOLT FAIL** **ALB-6D-3.1 – SR SHTDN FLUX ALM BLK** **ALB-7B-4.8 – FWP A/B RECIRC VLV NOT CLOSED** **ALB-8A-1.10 – 1 OF 4 TURB STOP VLV CLOSE** **ALB-9A – Numerous Secondary Alarms**	

Operating Test :	NRC	Scenario #	1	Event #	1	Page	8	of	44
Event Description:	Loop 3 N-16 Instrument Failure (JE-430)								

Time	Position	Applicant's Actions or Behavior
Simulator Operator: When directed, EXECUTE Event 1 (Key 1). - RP06C, Loop 3 N-16 Instrument Failure (JE-430)		
Indications Available: **5C-1.5 – ANY N16 DEV HI / LO** **5C-2.5 – 1 OF 4 OT N16 HI** **5C-2.6 – 1 OF 4 OP N16 HI (comes in then clears)** **5C-3.5 – ANY T_{AVE} DEV HI / LO** **6D-1.10 – AVE T_{AVE} T_{REF} DEV** **6D-2.10 – AVE T_{AVE} HI** **6D-2.13 – 1 OF 4 OP N16 ROD STOP & TURB RUNBACK** **6D-3.14 – 1 OF 4 OT N16 ROD STOP & TURB RUNBACK** **1-TI-431A, CL 3 TEMP (NR) CHAN III indication higher than other three channels** **1-TI-432, RC LOOP 3 T_{AVE} CHAN III indication higher than other three channels** **1-JI-431A/B, RC LOOP 3 N16 PWR CHAN III indication higher than other three channels**		
	BOP	RESPOND to Annunciator Alarm Procedures.
	BOP	RECOGNIZE Loop 3 N-16 failed high.
	US	DIRECT performance of ABN-704, Tc / N-16 Instrumentation Malfunction, Section 2.0.
Examiner Note: The following steps are from ABN-704, Tc/N-16 Instrument Malfunction.		
NOTE: • If the failed channel was reading lower than the substituted channel, then AVE Tave will increase when the failed channel is defeated due to another channel being substituted for the failed signal to maintain accurate averaging. • Rod Control should remain in MANUAL until all channels are operable. This does not preclude placing rods in AUTO during rapidly changing transient conditions such as runbacks, etc. as long as rod control is returned to MANUAL when the plant is stabilized.		
	RO	VERIFY 1/1-RBSS, CONTROL ROD BANK SELECT Switch in MANUAL. [Step 2.3.1]
	RO	SELECT LOOP 3 on 1-TS-412T, T_{AVE} Channel Defeat. [Step 2.3.2]

Operating Test : NRC	Scenario # 1	Event # 1	Page 9 of 44
Event Description: Loop 3 N-16 Instrument Failure (JE-430)			

Time	Position	Applicant's Actions or Behavior
	RO/BOP	VERIFY Steam Dump System is NOT actuated and NOT armed. [Step 2.3.3]
	RO	RESTORE T_{AVE} to within 1ºF of T_{REF}. [Step 2.3.4]
	RO/BOP	SELECT LOOP 3 on 1/1-JS-411E, N16 Power Channel Defeat. [Step 2.3.5]
Simulator Operator:		**If/When contacted as Prompt Team or Duty Manager inform the crew that you will generate an Issue Report and have a Work Order generated to troubleshoot and repair the failed N-16 channel.**
	RO	ENSURE a valid N16 channel supplying recorder on 1/1-TS-411E, 1-TR-411 CHAN SELECT. [Step 2.3.6]
	RO/BOP	VERIFY Steam Dumps not armed by observing the following light DARK: • TURB LOAD REJ STM DMP ARMED C-7, not ARMED (PCIP – 3.4 DARK). [Step 2.3.7]
	US/BOP	VERIFY Steam Dumps were NOT blocked. [Step 2.3.8]
Examiner Note:		**The next two (2) steps are only performed following I&C maintenance.**
		Within 72 hours, CONTACT I&C to place Bistable Test Switches for TT-421 in CLOSE. [Step 2.3.9]
		VERIFY appropriate alarms and trip status lights ON per Attachment 3 and NOTE verification in Unit Log. [Step 2.3.10] • OBSERVE TSLB-5, Window 2.8 – RC LOOP 2 OT N16 TB-421C is LIT. • OBSERVE TSLB-5, Window 2.9 – RC LOOP 2 OP N16 TB-421D is LIT. • OBSERVE TSLB-9, Window 2.4 – OT N16 ROD STOP & TURB RUNBACK TB-421D is LIT. • OBSERVE TSLB-9, Window 2.5 – OP N16 ROD STOP & TURB RUNBACK JB-421C is LIT.
	US	EVALUATE Technical Specifications. [Step 2.3.11]

Operating Test :	NRC	Scenario #	1	Event #	1	Page	10	of	44
Event Description:	Loop 3 N-16 Instrument Failure (JE-430)								

Time	Position	Applicant's Actions or Behavior
		• LCO 3.3.1.E, Reactor Trip System Instrumentation (Functions 6 & 7). • CONDITION E - One channel inoperable. • ACTION E.1 - Place channel in trip within 72 hours, OR • ACTION E.2 - Be in MODE 3 within 78 hours.
	US	INITIATE a work request per STA-606. [Step 2.3.12]
	US	INITIATE a Condition Report per STA-421. [Step 2.3.13]
When Technical Specifications are addressed, or at Lead Examiner discretion, PROCEED to Event 2.		

Operating Test :	NRC	Scenario #	1	Event #	2	Page	11	of	44
Event Description:	Loss of 480V Bus 1B4 and EHC Fluid Pump C Fails to Auto Restart								

Time	Position	Applicant's Actions or Behavior
		Simulator Operator: When directed, EXECUTE Event 2 (Key 2). **- Loss of 480V Bus 1B4 and EHC Pump C Fails to Auto Restart.**
		Indications Available: **CS-1B4-1, INCOMING BKR 1B4-1 GREEN LIGHT LIT, RED LIGHT DARK** **10B - 4.12, 480V ANY NON-1E BUS VOLT LOSS** **9B – 2.13, EHC PMP A DISCH PRESS LO** **Various other alarms based loss of 1B4.**
	RO	RESPOND to Annunciator Procedure Alarms.
	RO	RECOGNIZE CS-1B4-1, Incoming Breaker 1B4-1 open and Bus 1B4 de-energized.
		Examiner Note: The crew should address the bus loss using ALM-0102A, Alarm Procedure 1-ALB-10B and ABN-602, Response To A 6900/480V System Malfunction. The following steps are from ABN-602, section 7.0.
	US	DIRECT performance of ABN-602, RESPONSE TO A 6900/480V SYSTEM MALFUNCTION, Section 7.0, NON-SAFEGUARDS 480V BUS uB1/uB2/uB3/uB4 FAULT.
		Simulator Operator: When contacted as Prompt Team or Duty Manager, inform the crew that Prompt Team Electrician has walked down 1B4 and no damage to 1B4 bus is evident.
		CAUTION: • Only ONE attempt to close a tripped breaker should be allowed; provided NO obvious equipment damage or fault is indicated. Further attempts should NOT be made until checked by Electrical Maintenance. • Offgoing 480V bus or MCC supply breaker should be opened prior to closing oncoming 480V bus or MCC supply breaker to prevent an interlock failure from allowing crosstie to a faulted bus. • Following overcurrent or instantaneous overcurrent relay operations, the CTs should be checked by Meter & Relay for proper operation. (ONE 97-806)
	BOP	CHECK all 480V non-safeguard buses - ENERGIZED. [Step 7.3.1]
		• DETERMINED Bus 1B4 is de-energized.

Operating Test :	NRC	Scenario #	1	Event #	2	Page	12	of	44
Event Description:	Loss of 480V Bus 1B4 and EHC Fluid Pump C Fails to Auto Restart								

Time	Position	Applicant's Actions or Behavior
	BOP	PERFORM the following: [Step 7.3.1 RNO]
		• Ensure cause determined and corrected or NO apparent cause identified. Contact Electrical Maintenance and Meter and Relay for support, as necessary. [Step 7.3.1.a RNO]
Simulator Operator:		**If contacted to investigate 1B4, Report damage and acrid odor present at Breaker, No damage apparent at Bus 1B4**
		• IF normal supply available, THEN: [Step 7.3.1.b RNO]
		• Determined CS-1B4-1, Incoming Breaker 1B4-1 – NOT Available
Examiner Note:		**The following steps will energize Bus 1B4 from its alternate source.**
		• IF normal supply NOT available, THEN: [Step 7.3.1.c RNO]
		• Ensure normal supply breaker - OPEN. [Step 7.3.1.c.1 RNO] • PLACE CS-1B4-1 to OPEN
		• CLOSE tie breaker. [Step 7.3.1.c.2 RNO] • PLACE BT-1B24 in CLOSE
		• Restore bus and MCC loads using Attachment 1 for guidance. [Step 7.3.1.d RNO]
Examiner Note:		**The following loads are listed on ABN-602, Attachment 1, 6900/480 V Switchgear Undervoltage Load Shedding, page 6 of 12, Step 3.h. CAUTION and NOTE below are from page 1 of the attachment.**
Simulator Operator:		**If contacted to Inspect Condenser VAC PMP 3, EHC Fluid Pump C, Control Rod M-G Set 2 or Instrument AIR Compressor X-01 (Attachment 1, Step h.), Report NO equipment damage evident.**
CAUTION:		Motor contactors for MOVs and motors powered from MCCs will drop out at approximately 70% of rated voltage and will not restart or continue to stroke when power is restored unless an auto or manual signal is present. A Control Board walkdown may be needed to ensure proper equipment operation.

Operating Test :	NRC	Scenario #	1	Event #	2	Page	13	of	44
Event Description:	Loss of 480V Bus 1B4 and EHC Fluid Pump C Fails to Auto Restart								

Time	Position	Applicant's Actions or Behavior
		NOTE: • Common MCCs automatically transfer to their alternate source, if available, and back to normal when power is restored. • Attachment 2 lists components started by Blackout Sequencer.
		Simulator Operator: After bus is re-energized, As Shift Manager, contact US and have the crew start the previously running equipment in the Control Room and inform the FSS will start the previously running equipment in the field
		Examiner Note: EHC Fluid Pump C may be started using the guidance of ODA-102, ABN-602, step 7.3.3, or ABN-602, Attachment 1, step 3.h.3
		• 1-HS-2958, CNDSR VAC PMP 3 [Attachment 1, Step 3.h.1]
		• 1-HS-6552, EHC FLUID PMP C [Attachment 1, Step 3.h.3]
		Simulator Operator: When contacted as FSS, to re-energize 1-02 Motor Generator, wait 2 minutes and EXECUTE KEY 10 to close MG Set 2 Motor Breaker (RDR12 to f:2) and MG Set 2 Generator Breaker (RDR14 to f:2), THEN inform complete.
		• CONTROL ROD M-G SET 2 [Attachment 1, Step 3.h.2]
		• INST AIR COMP X-01 (if powered from 1B4) [Attachment 1, Step 3.h.4]
		Verify proper Circulating Water Pump Operation. [Step 7.3.2]
		• Verify circulating water pumps - AT LEAST ONE RUNNING [Step 7.3.2.a]
		• Verify circulating water pumps - FOUR RUNNING [Step 7.3.2.b]
		Simulator Operator: If contacted, As Shift Manager, Inform crew that only 3 CWP are required for operations at this time of year.
		• Perform the following: • Start available circulating water pumps, as necessary, per SOP-310A/B. [Step 7.3.2.b RNO 1)]
		• Perform the following: • Ensure main condenser outlet valves throttled to maintain pump discharge pressure per SOP- 310A/B. [Step 7.3.2.b RNO 2)]
		Verify EHC Pumps - AT LEAST TWO OPERATING. [Step 7.3.3]

Operating Test : NRC	Scenario # 1	Event # 2	Page 14 of 44
Event Description: Loss of 480V Bus 1B4 and EHC Fluid Pump C Fails to Auto Restart			

Time	Position	Applicant's Actions or Behavior
		• 1-HS-6550, EHC FLUID PMP A - RUNNING • 1-HS-6551, EHC FLUID PMP B - OOS • 1-HS-6552, EHC FLUID PMP C - NOT RUNNING
		IF EHC Pumps required, THEN START an additional EHC Pump. [Step 7.3.3 RNO]
		• Determined EHC Fluid Pump C not running and • PLACES 1-HS-6552, EHC FLUID PMP C to START
		Verify Condenser Exhaust Vacuum Pumps - AT LEAST ONE OPERATING [Step 7.3.4]
		• 1-HS-2956, CNDSR VAC PMP 1- RUNNING • 1-HS-2957, CNDSR VAC PMP 2- RUNNING • 1-HS-2958, CNDSR VAC PMP 3 - STBY
		Verify condenser vacuum [Step 7.3.5]
		• Main condenser – GREATER THAN 26.5 IN HG AND STABLE • Auxiliary condenser – GREATER THAN 24 IN HG
		Verify 1-PI-6558, TURB L\O PMP DISCH PRESS - GREATER THAN 100 PSIG [Step 7.3.6]
		Check Main Turbine Turning Gear - OFF (On the "TG Lube Oil" Display) [Step 7.3.7]
		• Turning Gear Valve #1 (1-HV-6554A) - OPEN • Turning Gear Valve #2 (1-HV-6554B) - CLOSED
		Check BTRS – OFF [Step 7.3.8]
		Enter into issue reporting program IAW STA-421 [Step 7.3.9]
		Verify Sampling Requirement: [Step 7.3.10]
		• SG ARVS - REMAINED CLOSED • TDAFW Pump – REMAINED STOPPED [Step 7.3.10.a]
		Verify Reactor Power change - LESS THAN 15% RTP WITHIN ONE HOUR. [Step 7.3.10.b]
When EHC Fluid Pump C has been restarted or at Lead Examiner discretion, PROCEED to Event 3.		

Operating Test :	NRC	Scenario #	1	Event #	2	Page	15	of	44
Event Description:	Loss of 480V Bus 1B4 and EHC Fluid Pump C Fails to Auto Restart								

Time	Position	Applicant's Actions or Behavior

Operating Test :	NRC	Scenario #	1	Event #	3	Page	16	of	44
Event Description:	SG 2 Feedwater Bypass Controller 1-LK-560 Fails Closed in Automatic								

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**When directed, EXECUTE Event 3 (Key 3). - SG 2 Feedwater Bypass Controller Fails Closed in Auto**
Indications Available:		**1-LK-560, FW BYP CTRL 0% DEMAND, WHITE AND GREEN PB LIGHTS LIT 8A-2.12 – SG 2 LVL DEV**
	BOP	RESPOND to Annunciator Alarm Procedures.
Examiner Note:		**The operator may take manual control of 1-LK-560 and restore feedwater flow per the guidance of ODA-102.**
	BOP	RECOGNIZE SG 2 FW BYP Ctrl has 0% output and feedwater flow is below steam flow.
	BOP	PERFORM ALM action for Window 2.12, SG 2 LVL DEV
Examiner Note:		**The following steps are from ALM-0081A, 2.12, SG 2 LVL DEV**
		NOTE: 1-FCV-520, SG 2 FW FLO CTRL VLV and 1-LV-2163, SG 2 FW BYP CTRL VLV fail closed on loss of air or power. • 1-FCV-520 1-TC-19 FB1 Fuse 9 or 11 • 1-TC-20 FB1 Fuse 9 or 11 (light indication 1-TC-20) • 1-LV-2163 1-TC-19 FB1 Fuse 13 or 15 • 1-TC-20 FB1 Fuse 13 or 15 (light indication 1-TC-19)
Simulator Operator:		**When Contacted to investigate cause of Feedwater Bypass Control Valve failure for SG #2, Wait 2 minutes and Report " No apparent damage and no indications of air leakage at valve."**
	BOP	Monitor steam generator water level: [Step 1]
		• 1-LI-528, SG 2 LVL (NR) CHAN III • 1-LI-552, SG 2 LVL (NR) CHAN II • 1-LI-527, SG 2 LVL (NR) CHAN IV • 1-LI-529, SG 2 LVL (NR) CHAN I
		• If one channel indicates >5% difference between remaining operable channels, refer to ABN-710 [Step 1.A] – Determined all channels are NORMAL

Operating Test :	NRC	Scenario #	1	Event #	3	Page	17	of	44
Event Description:	SG 2 Feedwater Bypass Controller 1-LK-560 Fails Closed in Automatic								

Time	Position	Applicant's Actions or Behavior
	BOP	Stop all secondary system power changes. [Step 2]
	BOP	Verify a FWP in service [Step 3] – Determined FWP "A" is in service
		NOTE: FWP speed is programmed to maintain differential pressure between steam header and feedwater pump discharge header pressure at 80 psid from 0-20% power and ramps 80-181 psid from 20-100% power. The following computer points may aid the operator: • U5002A FW-MS HDR DP • U5003A DELTA PROGRAM-ACTUAL DP • P5446A FW STM FLOW SETPOINT
	BOP	Verify 1-PI-507, MS HDR PRESS and 1-PI-508, FWP DISCH HDR PRESS differential pressure is maintained on program. [Step 4]
		• If differential pressure is NOT at program, place 1-SK-509A, FWPT MASTER SPD CTRL in manual and adjust differential pressure. [Step 4.A] –Determined differential pressure is on program.
	BOP	Monitor main steam line pressure: [Step 5] • 1-PI-525A, MSL 2 PRESS CHAN II • 1-PI-524A, MSL 2 PRESS CHAN I • 1-PI-526A, MSL 2 PRESS CHAN III
		• If one channel indicates >60 psig difference between remaining operable channels, go to ABN-709 for Steam Line Pressure Instrument Malfunction. [Step 5.A] – Determined all steam pressure channels indicate NORMAL.
	BOP	Monitor 1-FI-522A, SG 2 STM FLO and 1-FI-523A, SG 2 STM FLO. [Step6]
		• If one steam line flow indicates higher or lower than the other, go to ABN-707 [Step 6.A]
Simulator Operator:		**If/When contacted as Prompt Team, acknowledge report and inform crew that you will generate Work Order to troubleshoot problem.**
	BOP	Monitor 1-FI-520A, SG 2 FW FLO and 1-FI-521A, SG 2 FW FLO [Step 7]
		• If one feed line flow indicates higher or lower than the other, go to ABN-708 [Step 7.A] – Determined feed line flows indicate NORMAL.

Operating Test :	NRC	Scenario #	1	Event #	3	Page	18	of	44
Event Description:	SG 2 Feedwater Bypass Controller 1-LK-560 Fails Closed in Automatic								

Time	Position	Applicant's Actions or Behavior
Examiner Note:		**If not previously performed using the guidance of ODA-102, the operator will take manual control of 1-LK-560 in the next step using the ALM guidance.**
	BOP	Verify steam generator water level is trending to 67% on 1-FR-520, SG 2 FW FLO/STM FLO/NR LVL [Step 8]
		• If level is NOT trending to 67%, transfer Steam Generator Water Level Control to manual and adjust level [Step 8.A] – Determined Level NOT trending to 67% and takes manual control of 1-LK-560 and restores SG 2 level to program.
	US	REFER to TS 3.3.1, 3.3.2 AND 3.3.3. [Step 9] – Determined TS listed do not apply to this failure.
At Lead Examiner discretion, PROCEED to Event 4.		

Operating Test :	NRC	Scenario #	1	Event #	4	Page	19	of	44
Event Description:	Inadvertent start of MDAFWP 1-01 and Opening of 1-HS-2452-1, TDAFWP Steam Supply								

Time	Position	Applicant's Actions or Behavior
		Simulator Operator: When directed, EXECUTE Event 4 (Key 4). Inadvertent start of MDAFWP 1-01 and Opening of 1-HS-2452-1, TDAFWP Steam Supply.
		Indications Available: **8B-2.6 - ANY TD AFWP D/POT LVL HI** **8B-4.5 - TD AFWP STM SPLY VLV LEAKING HV-2452-1/2** **9B-4.7 – AMSAC TRBL** **1-HS-2450A, MD AFWP 1, red PUMP and FAN lights LIT** **1-HS-2452-1, AFWPT STM SPLY VLV MSL 4 red light LIT, green light DARK** **SGs 1-01 & 1-02 AFW FLO Indicators indicating (550) GPM (1-FI-2463A/C and 1-FI-2465A/C)** **SGs 1-03 & 1-04 AFW FLO Indicators indicating (200) GPM (1-FI-2465A/C and 1-FI-2466A/C)** **MD AFWP 1 CURRENT indicating (~50) AMPS (1-II-2450)** **MD AFWP 1 DISCH PRESS indicating (1350) PSIG (1-PI-2453A)** **MD AFWP 1 DISCH FLO indicating (0) GPM (1-FI-2456A)**
	RO/BOP	RESPOND to Annunciator Alarm Procedures.
	BOP	RECOGNIZE Motor Driven Auxiliary Feedwater Pump 1-01 and Turbine Driven Auxiliary Feedwater pumps are running.
		Examiner Note: ABN and ALM guidance exist to address the opening of the TDAFWP steam supply valve. This guide contains both ABN and ALM procedures steps. The operator may also take actions to control MDAFWP 1-01 and the TDAFWP per the guidance of ODA-102 with concurrence from the Unit Supervisor.
		Examiner Note: The following steps are from ALM-0092A, Window 4.7 - AMSAC TRBL.
	BOP	Dispatch an operator to TBX-ESELAM-01 AMSAC cabinet to determine cause of alarm conditions. [Step 1]
	BOP	Notify I&C of any abnormal light indication. [Step 2]
	BOP	Ensure alarm condition is clear. [Step 3]
	BOP	Correct the condition or initiate a work request per STA-606. [Step 4]
	US	DIRECT performance of ABN-305, Auxiliary Feedwater System Malfunction and Alarm Procedure 1-ALB-8B.
		Examiner Note: The following steps are from ABN-305, Auxiliary Feedwater System Malfunction, Section 6.0, Inadvertent Turbine Driven AFW Pump Start (Steam Supply VLV Fails Open)

Operating Test :	NRC	Scenario #	1	Event #	4	Page	20	of	44
Event Description:	Inadvertent start of MDAFWP 1-01 and Opening of 1-HS-2452-1, TDAFWP Steam Supply								

Time	Position	Applicant's Actions or Behavior
	Simulator Operator:	**If contacted, REPORT that MD AFW Pump 1-01 and the TDAFWP are both running normally.**
	Simulator Operator:	**If contacted, to check relays in AMSAC, INFORM crew that System Engineer had bumped the 'A' AMSAC Cabinet during walkdown.**
	NOTE:	If the Turbine Driven AFW Pump Steam Supply Valve(s) (u-HS-2452-2 or u-HS-2452-1) are open due to a BOS actuation, the actions of ABN-601 are applicable for addressing the open steam supply valve(s).
	US/BOP	CLOSE affected steam supply valve by placing handswitch in – PULL OUT [Step 1]
		• 1-HS-2452-1, AFWPT STM SPLY VLV - MSL4 • IF affected steam supply valve is CLOSED, THEN GO TO Step 5.
	US/BOP	DISPATCH operator to locally isolate affected steam supply valve (SG 881' MSL ARV RM): [Step 5]
		• 1-HS-2452-1 • 1MS-0128, MSL 1-04 TO AFWPT SPLY VLV UPSTRM ISOL VLV
	Simulator Operator:	**When contacted to locally close 1MS-0128, MSL 1-04 TO AFWPT SPLY VLV UPSTRM ISOL VLV, acknowledge request.**
	US/BOP	VERIFY 1-HS-2452H, AFWPT TRIP & THROTTLE VLV, OPER and VLV red lights both lit. [Step 6]
	US	NOTIFY Chemistry that a release has occurred and for Chemistry to determine if a release permit is required per STA-603 [Step 7]
	US	REFER to Technical Specifications as necessary: [Step 8]
		• TS 3.7.5 for impact to AFW System for current AFW Pump and TD AFW Pump steam supply valve status. • TS 3.6.3 for impact to Containment Isolation Valve when 1-HV-2452-1 or 1-HV-2452-2 is inoperable • TS 3.8.1 if TDAFW Pump or steam supply valve is inoperable WITH an inoperable DG
	Examiner Note:	**The following steps are from ALM-0082A, 1-ALB-8B window 4.5, TD AFW STM SPLY VLV LEAKING HV-2452-1/2**

Operating Test :	NRC	Scenario #	1	Event #	4	Page	21	of	44
Event Description:	Inadvertent start of MDAFWP 1-01 and Opening of 1-HS-2452-1, TDAFWP Steam Supply								

Time	Position	Applicant's Actions or Behavior
		NOTE: 1-HS-2452-1, AFWPT STM SPLY VLV - MSL 4 and 1-HS-2452-2, AFWPT STM SPLY VLV - MSL 1 fail open on loss of air or power. • 1-HS-2452-1 1-TC-26, FB1 Fuse 17 or 19 • 1-HS-2452-2 1-TC-27, FB1 Fuse 17 or 19
	BOP	IF not performing AFWPT startup, THEN ensure 1-HS-2452-1, AFWPT STM SPLY VLV - MSL 4 and 1-HS-2452-2, AFWPT STM SPLY VLV - MSL 1 are closed. IF NOT closed, THEN place affected steam supply valve handswitch in PULL OUT. [Step 1]
		• DETERMINED 1-HS-2452-1, AFWPT STM SPLY VLV – MSL 4 open and takes handswitch to PULL OUT.
		CAUTION: The turbine driven auxiliary feed pump turbine supply lines should not remain pressurized during normal plant operation due to Environmental Qualification and High Energy Line Break design constraints.
	BOP	Monitor 1-SI-2452A, AFWPT SPD. [Step 2]
		• IF inadvertent START of the Turbine Driven AFW Pump has occurred, THEN go to ABN-305, "AFW System Malfunction" while continuing with this procedure [Step 2.A]
		CAUTION: • The turbine utilizes a shaft driven oil pump to supply bearing and governor assembly lubrication. The pump supplies cooling water to the oil cooler and utilizes pumped fluid for internal lubrication. Operation of pump at flows of <130 gpm for >20 minutes may damage the TDAFWP. • DO NOT operate the AFWPT at speeds below 1800 rpm for an extended period of time due to loss of oil flow to bearings.
	BOP	• IF speed is >10 rpm and <1800 rpm AND NOT increasing rapidly, THEN perform the following: [Step 2.B]
		• Trip turbine driven auxiliary feed pump. [Step 2.B.1] • 1-HS-2452F, AFWPT TRIP
		• Verify steam supply isolation bypass valves are closed. [Step 2.B.2] • 1MS-0711, MSL 1-01 TO AFWPT STM SPLY VLV BYP VLV

Operating Test : NRC	Scenario # 1	Event # 4	Page 22 of 44
Event Description: Inadvertent start of MDAFWP 1-01 and Opening of 1-HS-2452-1, TDAFWP Steam Supply			

Time	Position	Applicant's Actions or Behavior
		• 1MS-0712, MSL 1-04 TO AFWPT STM SPLY VLV BYP VLV
		• Monitor downstream pipe temperatures for indication of leakage. [Step 2.B.3]
		• Isolate the affected steam supply line. [Step 2.B.4] • 1MS-0128, MSL 1-04 TO AFWPT SPLY VLV UPSTRM ISOL VLV
	US	Refer to TS 3.7.5 and 3.6.3 [Step 3]
	US	Correct the condition or initiate a work request per STA-606 [Step 4]
Examiner Note: No procedural guidance exists for an inadvertent start of a MDAFW pump. If the crew decides to stop flow by closing the MD AFWP 1(2) FLO CTRL valve or stopping the MDAFW pump, no Tech. Spec. entry for this pump is required. If the crew decides to place MDAFWP 1-01 in PULL OUT with the steam supply to the TDAFWP in PULL OUT, both the MDAFWP and TDAFWP must be declared INOPERABLE per TS 3.7.5.		
	US	EVALUATE Technical Specifications (TDAFWP INOP)
		• LCO 3.7.5, Auxiliary Feedwater (AFW) System – MODES 1, 2, and 3.
		• CONDITION A – One steam supply to turbine driven AFW pump inoperable • ACTION A.1 – Restore steam supply to OPERABLE status – 7 days
Examiner Note: If MDAFW pump is taken to Pullout, then TS 3.7.5 condition C will apply.		
	US	EVALUATE Technical Specifications (TDAFWP and MDAFWP INOP)
		LCO 3.7.5, Auxiliary Feedwater (AFW) System – MODES 1, 2, and 3.
		• CONDITION C – Required Action and associated Completion Time for Condition A or B not met OR • Two AFW trains inoperable • ACTION C.1 – Be in MODE 3 – 6 hours AND • Action C.2 – Be in MODE 4 – 18 hours
When Technical Specifications have been addressed, or at Lead Examiner discretion, PROCEED to Event 5.		

Operating Test :	NRC	Scenario #	1	Event #	5,6,7	Page	23	of	44
Event Description:	Ejected Control Rod D12, MSIV Fail to Close and SG 2 FWIV Fails Open.								

Time	Position	Applicant's Actions or Behavior
		Simulator Operator: When directed, EXECUTE Events 5,6 and 7 (Key 5) **- RD06D12, Ejected Rod – CBD Rod D12** **- SS02A1, SSPS TR A Master Relay K504 Failure [Open, MSL ISO]** **- SS02A2, SSPS TR B Master Relay K504 Failure [Open, MSL ISO]** **- FW38B, SG 2 Feedwater Isolation Valve Stuck [2135]**
		Indications Available: **2A-2.8 – ANY CNTMT SMP PMP RUN** **2B-4.12 – CNTMT FN CLR 1 & 2 CNDS FILL RATE HI** **2B-3.12 – CNTMT FN CLR 3 & 4 CNDS FILL RATE HI** **5B-3.4 – PRZR 1 OF 4 PRESS LO** **5B-4.4 – PRZR 1 OF 4 SI PRESS LO** **5B-3.6 – PRZR LVL LO** **5C-1.2 – PRZR LVL DEV LO** **5C-3.3 – PRZR PRESS LO BACKUP HTRS ON**
	RO/BOP	RECOGNIZE Pressurizer level and pressure – LOWERING.
	US	DIRECT performance of EOP-0.0A, Reactor Trip or Safety Injection.
		Examiner Note: The following steps are from EOP-0.0A, Reactor Trip or Safety Injection.
	RO	VERIFY Reactor Trip: [Step 1]
		• VERIFY Reactor Trip Breakers – OPEN. [Step 1.a]
		• VERIFY Neutron flux – DECREASING. [Step 1.a]
		• IDENTIFY ALL Rods on Bottom except 1 Ejected Rod [Step 1.b]
	BOP	VERIFY Turbine Trip: [Step 2]
		• VERIFY all HP Turbine Stop Valves – CLOSED. [Step 2]
	BOP	VERIFY Power to AC Safeguards Buses: [Step 3]
		• VERIFY AC Safeguards Buses – AT LEAST ONE ENERGIZED. [Step 3.a]
		• VERIFY both AC Safeguards Buses – ENERGIZED. [Step 3.b]
	RO	CHECK SI Status: [Step 4]
		• Check if SI is Actuated: [Step 4.a]

Operating Test :	NRC	Scenario #	1	Event #	5,6,7	Page	24	of	44
Event Description:	Ejected Control Rod D12, MSIV Fail to Close and SG 2 FWIV Fails Open.								

Time	Position	Applicant's Actions or Behavior
		• SI actuation as indicated on the First Out Annunciator 1-ALB-6C.
		• SI Actuated blue status light - ON
		• VERIFY Both Trains SI Actuated: [Step 4.b]
		• SI Actuated blue status light - ON NOT FLASHING
CRITICAL TASK STATEMENT (CT1)		**Trip reactor coolant pumps within 5 minutes upon a loss of Subcooling per EOP-0.0A, Reactor Trip or Safety Injection OR EOP-1.0A, Loss of Reactor or Secondary Coolant.**
Subcooling less than 25°F Start Time: _____		
RCPs Tripped Stop Time: _____		
Examiner Note: EOP-0.0A, Attachment 2 steps performed by BOP are identified later in the scenario, starting on page 37		
CAUTION: A Safety Injection actuation will affect normal egress from the Containment Building. Attachment 9 of this procedure provides instructions to evacuate personnel from the Containment during a Safety Injection actuation.		
NOTE: Attachment 2 is required to be completed before FRGs are implemented.		
Examiner Note: FWIV on SG 1-02 will fail to auto close, this failure should be addressed during performance of Attachment 2 of EOP-0.0A		
	US/BOP	INITIATE Proper Safeguards Equipment Operation Per Attachment 2. [Step 5]
Examiner Note: Based on earlier events and the crews response, the MDAFWPs or the TDAFWP may be used to feed all four SGs.		

Operating Test :	NRC	Scenario #	1	Event #	5,6,7	Page	25	of	44
Event Description:	Ejected Control Rod D12, MSIV Fail to Close and SG 2 FWIV Fails Open.								

Time	Position	Applicant's Actions or Behavior
	RO	VERIFY AFW Alignment [Step *6]
		• VERIFY MDAFW Pumps – RUNNING [Step 6.a] (if not placed in PTL previously)
		• TDAFW Pump – RUNNING if necessary [Step 6.b]
		• VERIFY AFW total flow – GREATER THAN 460 GPM. [Step 6.c]
		• VERIFY AFW valve alignment - PROPER ALIGNMENT. [Step 6.d]
	RO	VERIFY Containment Spray NOT Required: [Step *7]
		• VERIFY 1-ALB-2B, Window 1.8, CS ACT – NOT ILLUMINATED. [Step 7.a]
		• VERIFY 1-ALB-2B, Window 4.11, CNTMT ISOL PHASE B ACT – NOT ILLUMINATED. [Step 7.a]
		• VERIFY Containment pressure – LESS THAN 18.0 PSIG. [Step 7.a]
		• VERIFY Containment Spray Heat Exchanger Outlet Valves – CLOSED. [Step 7.b]
		• VERIFY Containment Spray Pumps – RUNNING. [Step 7.c]
Examiner Note:		**The Crew should perform a manual Main Steam Line Isolation when containment pressure approaches 6 psig prior to reaching the automatic setpoint.**
	RO	CHECK if Main Steam lines should be ISOLATED: [Step *8]

		• VERIFY the following: [Step 8.a]
		  • Containment pressure – GREATER THAN 6.0 PSIG.
		  • Steam Line pressure – LESS THAN 610 PSIG.

		• Determined containment pressure is greater than 6 psig, main steam line isolation did not automatically occur and manually actuates MSLI.

		• VERIFY main steam isolation complete: [Step 8.b]
		  • Main Steam isolation valves
		  • Before MSIV drippot isolation valves

Operating Test :	NRC	Scenario #	1	Event #	5,6,7	Page	26	of	44
Event Description:	Ejected Control Rod D12, MSIV Fail to Close and SG 2 FWIV Fails Open.								

Time	Position	Applicant's Actions or Behavior
	RO	CHECK RCS Temperature: [Step *9]
		• VERIFY RCS Average Temperature – STABLE AT OR TRENDING TO 557°F. [Step 9] - Less than 557°F
		• STOP dumping steam. [Step 9.a RNO]
		• IF cooldown continues, THEN REDUCE total AFW flow as necessary to minimize cooldown. [Step 9.b RNO] • Maintaining a minimum of 460 gpm UNTIL narrow range level greater than 43% (50% ADVERSE CONTAINMENT) in at least one SG. • As necessary to maintain SG levels WHEN narrow range level greater than 43% (50% FOR ADVERSE CONTAINMENT) in at least one SG • IF TDAFW pump is not required to maintain greater than 460 gpm flow, THEN stop TDAFW pump.
	US/RO	• IF cooldown continues, THEN CLOSE Main Steam Isolation Valves. [Step 9.c RNO]
	RO	CHECK PRZR Valve Status: [Step 10]
		• VERIFY PRZR Safeties – CLOSED. [Step 10.a]
		• VERIFY Normal PRZR Spray Valves – CLOSED. [Step 10.b]
		• VERIFY PORVs – CLOSED. [Step 10.c]
		• VERIFY Power to at least 1 Block Valve – AVAILABLE. [Step 10.d]
		• VERIFY Block Valves – AT LEAST ONE OPEN. [Step 10.e]
Examiner Note: The RCPs may have been previously stopped based on the Fold Out Page of EOP-0.0A.		
CRITICAL TASK STATEMENT		**Trip reactor coolant pumps within 5 minutes upon a loss of Subcooling per EOP-0.0A, Reactor Trip or Safety Injection OR EOP-1.0A, Loss of Reactor or Secondary Coolant.**
Subcooling less than 25°F Start Time: _____		
RCPs Tripped Stop Time: _____		
	RO	CHECK if RCPs Should Be Stopped: [Step 11]

Operating Test :	NRC	Scenario #	1	Event #	5,6,7	Page	27	of	44
Event Description:	Ejected Control Rod D12, MSIV Fail to Close and SG 2 FWIV Fails Open.								

Time	Position	Applicant's Actions or Behavior
		• VERIFY RCS subcooling – LESS THAN 25°F (55°F FOR ADVERSE CONTAINMENT). [Step 11.a]
		• VERIFY ECCS pumps - AT LEAST ONE RUNNING [Step 11.b]
		• CCP -OR- • SI pump
CT-1		• Stop all RCPs. [Step 11.c]
	RO/BOP	CHECK if Any SG is Faulted: [Step 12]
		• CHECK pressures in all SGs: [Step 12.a]
		• ANY SG PRESSURE DECREASING IN AN UNCONTROLLED MANNER -OR- • ANY SG COMPLETELY DEPRESSURIZED
		• Go to Step 13 [Step 12.a RNO a]
	RO/BOP	CHECK If SG Tubes Are Not Ruptured: [Step 13]
		• Condenser off gas radiation – NORMAL (COG-182, 1RE-2959) • Main steamline radiation – NORMAL (MSL-178 through 181, 1RE-2325 through 2328) • SG blowdown sample radiation monitor – NORMAL (SGS-164, 1RE-4200) • No Steam Generator level increasing in an uncontrolled manner
	RO/BOP	CHECK If RCS Is Intact: [Step 14]
		• Containment pressure – LESS THAN 1.3 psig • Containment recirculation sump levels – NORMAL • Containment radiation – NORMAL GRID 4
		• Go to EOP-1.0A, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1

Operating Test :	NRC	Scenario #	1	Event #	5,6,7	Page	28	of	44
Event Description:	Ejected Control Rod D12, MSIV Fail to Close and SG 2 FWIV Fails Open.								

Time	Position	Applicant's Actions or Behavior
Examiner Note:		**EOP-1.0A, Loss of Reactor or Secondary Coolant, steps begin here.**
		CAUTION: Following a high energy line rupture inside containment, the operator should not rely upon steam generator water level indications in any depressurized steam generators.
		NOTE: As PRZR Temperature decreases the error on indicated PRZR level will increase. Attachment 2 may be used to determine actual PRZR level.
Examiner Note:		**RCPs may have already been tripped due to loss of subcooling per EOP-0.0A foldout page or at step 11 of EOP-0.0A.**
CRITICAL TASK STATEMENT		**Trip reactor coolant pumps within 5 minutes upon a loss of subcooling per EOP-0.0A, Reactor Trip or Safety Injection OR EOP-1.0A, Loss of Reactor or Secondary Coolant.**
Subcooling less than 25°F Start Time: _____		
RCPs Tripped Stop Time: _____		
	RO	CHECK If RCPs Should Be Stopped: [Step 1]
		• RCS subcooling - LESS THAN 25°F (55°F FOR ADVERSE CONTAINMENT) [Step 1.a]
		• ECCS pumps - AT LEAST ONE RUNNING [Step 1.b] • CCP or • SI Pump
CT-1		• Stop all RCPs. [Step 1.c]

Operating Test :	NRC	Scenario #	1	Event #	5,6,7	Page	29	of	44
Event Description:	Ejected Control Rod D12, MSIV Fail to Close and SG 2 FWIV Fails Open.								

Time	Position	Applicant's Actions or Behavior
	RO/BOP	CHECK if Any Steam Generator Is Faulted: [Step 2]

		• Check pressures in all SGs [Step 2.a]
		  • ANY SG PRESSURE DECREASING IN AN UNCONTROLLED MANNER
		  -OR-
		  • ANY SG COMPLETELY DEPRESSURIZED

		• Go to Step 3 [Step 2.a RNO a]
Examiner Note:		**Crew should maintain SG levels 50% – 60% narrow range level when containment pressure exceeds 5.0 psig (Adverse Containment)**
	BOP	CHECK Intact Steam Generator Levels: [Step *3]
		• Narrow range level – GREATER THAN 43% (50% FOR ADVERSE CONTAINMENT) [Step 3.a]
		• Control AFW flow to maintain narrow range level between 43% (50% FOR ADVERSE CONTAINMENT) and 60% [Step 3.b]
	BOP	CHECK Secondary Radiation NORMAL: [Step 4]
		• Condenser Off Gas radiation (COG-182, 1RE-2959)
		• Main steamline radiation (MSL-178 through 181, 1RE-2325 through 2328)
		• SG blowdown sample radiation monitor (SGS-164, 1RE-4200)
		CAUTION: If any PRZR PORV opens because of high PRZR pressure, Step 5b should be repeated after pressure decreases to less than the PORV setpoint.
	RO	CHECK PRZR PORVs and Block Valves: [Step *5]
		• Power to block valves – AVAILABLE [Step 5.a]
		• PORVs – CLOSED [Step 5.b]
		• Block valves - AT LEAST ONE OPEN [Step 5.c]
	US/RO	CHECK if ECCS Flow Should Be Reduced: [Step *6]

Operating Test :	NRC	Scenario #	1	Event #	5,6,7	Page	30	of	44
Event Description:	Ejected Control Rod D12, MSIV Fail to Close and SG 2 FWIV Fails Open.								

Time	Position	Applicant's Actions or Behavior

		• Secondary heat sink: [Step 6.a]
		  • Total AFW flow to intact SGs - GREATER THAN 460 GPM
		  -OR-
		  • Narrow range level in at least one intact SG - GREATER THAN 43% (50% FOR ADVERSE CONTAINMENT)

		• RCS subcooling - GREATER THAN 25°F(55°F FOR ADVERSE CONTAINMENT) [Step 6.b]
		• Go to Step 7. OBSERVE CAUTIONS PRIOR TO STEP 7 [Step 6.b RNO b]
		CAUTION: If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment.
		CAUTION: When time permits, Attachment 9 of EOP-0.0A, REACTOR TRIP OR SAFETY INJECTION should be performed to realign equipment after an SI signal has been reset.
	RO/BOP	RESET ESF Actuation Signals. [Step 7]
	RO/BOP	CHECK EDGs Running. [Step 7.a]
	RO/BOP	PLACE both EDG EMERG STOP/START handswitches in START. [Step 7.b]
	RO/BOP	RESET SI. [Step 7.c]
		• DEPRESS 1/1-SIRA, TRAIN A SI RESET pushbutton.
		• DEPRESS 1/1-SIRB, TRAIN B SI RESET pushbutton.

Operating Test :	NRC	Scenario #	1	Event #	5,6,7	Page	31	of	44
Event Description:	Ejected Control Rod D12, MSIV Fail to Close and SG 2 FWIV Fails Open.								

Time	Position	Applicant's Actions or Behavior
	RO/BOP	RESET SI Sequencers. [Step 7.d]
		• At SI Sequencer Train A Cabinet, DEPRESS SI SEQR RESET green pushbutton then PLACE ON/RESET toggle switch in RESET.
		• After ~ 2 seconds, PLACE ON/RESET toggle switch in ON.
		• At SI Sequencer Train B Cabinet, DEPRESS SI SEQR RESET green pushbutton then PLACE ON/RESET toggle switch in RESET.
		• After ~ 2 seconds, PLACE ON/RESET toggle switch in ON.
	RO/BOP	RESET Containment Isolation Phase A and Phase B. [Step 7.e]
		• DEPRESS 1/1-C1PARA, CNTMT ISOL – PHASE A RESET pushbutton.
		• DEPRESS 1/1-C1PARB, CNTMT ISOL – PHASE A RESET pushbutton.
		• DEPRESS 1/1-C1PBRA, CNTMT ISOL – PHASE B RESET pushbutton.
		• DEPRESS 1/1-C1PBRB, CNTMT ISOL – PHASE B RESET pushbutton.
	RO/BOP	RESET Containment Spray Signal. [Step 7.f]
		• DEPRESS 1/1-CSRA, TRAIN A CS RESET pushbutton.
		• DEPRESS 1/1-CSRB, TRAIN B CS RESET pushbutton.
		CAUTION: RCS pressure should be monitored. If RCS pressure decreases in an uncontrolled manner to less than 325 PSIG (425 PSIG FOR ADVERSE CONTAINMENT) the RHR pumps must be manually restarted to supply water to the RCS.
	US	CHECK If RHR Pumps Should Be Stopped: [Step *8]
		• Check RCS Pressure: [Step 8.a]
	RO/BOP	• VERIFY RCS pressure – GREATER THAN 325 psig (425 psig FOR ADVERSE CONTAINMENT). [Step 8.a.1)]
	RO/BOP	• VERIFY RCS pressure – STABLE OR INCREASING. [Step 8.a.2)]
	RO/BOP	• VERIFY RHR Pumps – RUNNING WITH SUCTION ALIGNED TO RWST. [Step 8.b]
	RO/BOP	• STOP RHR Pumps and PLACE in standby. [Step 8.c]

Operating Test :	NRC	Scenario #	1	Event #	5,6,7	Page	32	of	44
Event Description:	Ejected Control Rod D12, MSIV Fail to Close and SG 2 FWIV Fails Open.								

Time	Position	Applicant's Actions or Behavior
	RO/BOP	• RESET RHR Auto Switchover. [Step 8.d]
	US	CHECK RCS And SG Pressures: [Step 9]
	RO/BOP	• Check RCS Pressure - STABLE OR DECREASING
		-AND-
	RO/BOP	• Check Pressure in All SGs - STABLE OR INCREASING
	US	Check If Diesel Generators Should Be Stopped: [Step 10]
	RO/BOP	• Verify AC safeguard busses - ENERGIZED BY OFFSITE POWER [Step 10.a]
	RO/BOP	• Stop any unloaded diesel generator by placing DG EMER STOP/START handswitch in STOP [Step 10.b]
		NOTE: Verification of at least one flowpath from a RHR pump to the RCS via a SI pump or CCP is sufficient to verify cold leg recirculation capability.
	US	Initiate Evaluation Of Plant Status: [Step 11]
	US	• Verify cold leg recirculation capability: [Step 11.a]
	US	• Verify the following conditions for the train related RHR pump(s): [Step 11.a.1]
	RO/BOP	TRAIN A • RHR pump A – AVAILABLE • CCW to RHR pump A – AVAILABLE • 1/1-8811A, CNTMT SMP TO RHRP 1 SUCT ISOL VLV – AVAILABLE TRAIN B • RHR pump B – AVAILABLE • CCW to RHR pump B – AVAILABLE • 1/1-8811B, CNTMT SMP TO RHRP 2 SUCT ISOL VLV – AVAILABLE
	US	• Verify RHR valve(s) that supply SI pumps and CCPs – AVAILABLE [Step 11.a.2]
	RO/BOP	• 1/1-8804A, RHRP 1 TO CCP SUCT VLV -AND- • 1/1-8804B, RHRP 2 TO SIP SUCT VLV
	US	• Check auxiliary building and safeguards building radiation – NORMAL [Step 11.b]

Operating Test :	NRC	Scenario #	1	Event #	5,6,7	Page	33	of	44
Event Description:	Ejected Control Rod D12, MSIV Fail to Close and SG 2 FWIV Fails Open.								

Time	Position	Applicant's Actions or Behavior
Simulator Operator: When contacted as RP and Chemistry, acknowledge requests.		
	RO/BOP	• Check PC-11 monitors (GRID 4) – NORMAL -OR- • Notify Radiation Protection to take local radiation surveys.
	US	• Notify Chemistry to obtain RCS samples to assist in determining extent of the accident. [Step 11.c]
	US	• Evaluate plant equipment: [Step 11.d]
	US	• Consult Plant Staff to determine equipment that should be available or started to assist in recovery.
Simulator Operator: When contacted requesting Plant Staff assistance, acknowledge request		
	US	Check If RCS Cooldown And Depressurization Is Required: [Step 12]
		• RCS pressure - GREATER THAN 325 PSIG (425 PSIG FOR ADVERSE CONTAINMENT) [Step 12.a]
		• Go to EOS-1.2A, POST LOCA COOLDOWN AND DEPRESSURIZATION, Step 1. [Step 12.b]
Examiner Note: EOS-1.2A, Post LOCA Cooldown and Depressurization, Steps begin here. Steps in [brackets] are from the associated EOS-1.2A Attachments.		
CAUTION: If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment.		
CAUTION: When time permits Attachment 9 of EOP-0.0A, REACTOR TRIP OR SAFETY INJECTION should be performed to realign equipment after an SI signal has been reset.		
Examiner Note: Attachments 1D may be handed off to an Operator to perform.		
	RO/BOP	[1.D] CHECK If Diesel Generators Should Be Emergency Started: [Step 1]
	RO/BOP	• VERIFY Diesel Generator(s) – RUNNING. [Step 1.a]

Operating Test :	NRC	Scenario #	1	Event #	5,6,7	Page	34	of	44
Event Description:	Ejected Control Rod D12, MSIV Fail to Close and SG 2 FWIV Fails Open.								

Time	Position	Applicant's Actions or Behavior
		• Go to Step 2 [Step 1.a RNO a]
	RO/BOP	[1.D] VERIFY SI – RESET. [Step 2]
	RO/BOP	[1.D] VERIFY SI Sequencers – RESET. [Step 3]
	RO/BOP	[1.D] VERIFY Containment Isolation Phase A and Phase B – RESET. [Step 4]
	RO/BOP	[1.D] VERIFY Containment Spray Signal – RESET. [Step 5]
	RO/BOP	[1.D] ESTABLISH Instrument Air and Nitrogen to Containment. [Step 6]
		• ESTABLISH Instrument Air: [Step 6.a]
		• VERIFY Air Compressor – RUNNING.
		• ESTABLISH Instrument Air to Containment:
		• ESTABLISH Nitrogen: [Step 6.b]
		• VERIFY ACCUM 1●4 VENT CTRL, 1-HC-943 – CLOSED. [Step 6.b.1)]
		• OPEN SI/PORV ACCCUM N2 ISOL VLV 1/1-8880. [Step 6.b.2)]
	BOP	VERIFY all AC Buses – ENERGIZED BY OFFSITE POWER. [Step 7]
CAUTION: PRZR heaters should not be energized until PRZR water level indicates greater than minimum level recommended by Plant Staff to ensure heaters are covered.		
Simulator Operator: When contacted as Plant Staff requesting minimum PZR Level that ensures heaters are covered, acknowledge request.		
	RO	DEENERGIZE PRZR Heaters: [Step 8]
		• PLACE all PRZR heater switches in OFF position. [Step 8.a]

Time	Position	Applicant's Actions or Behavior
		• CONSULT Plant Staff for a recommended minimum indicated PRZR water level that will ensure heaters are covered. [Step 8.b]
		CAUTION: RCS pressure should be monitored. If RCS pressure decreases in an uncontrolled manner to less than 325 PSIG (425 PSIG FOR ADVERSE CONTAINMENT), the RHR pumps must be manually restarted to supply water to the RCS.
	US	CHECK If RHR Pumps Should Be Stopped. [Step 9]
		• RHR pumps – ANY RUNNING WITH SUCTION ALIGNED TO RWST. [Step 9.a]
		• Go to Step 10. [Step 9.a RNO a.]
	US	CHECK Intact SG Levels: [Step 10]
		• VERIFY narrow range level – GREATER THAN 43% (50% FOR ADVERSE CONTAINMENT): [Step 10.a]
		• CONTROL AFW flow to maintain narrow range level between 43% (50% FOR ADVERSE CONTAINMENT) and 60%. [Step 10.b]
		NOTE: Shutdown margin should be monitored during RCS cooldown.
		NOTE: After the low steamline pressure SI signal is blocked, main steamline isolation will occur if the high steam pressure rate setpoint is exceeded.
Examiner Note:		**IF Containment pressure reaches 18.2 PSIG, an Orange Path will exist for the Containment Safety Function. If this occurs the crew should preform FRZ-0.1A, Response to High Containment Pressure. FRZ-0.1A steps start on page 42.**
CRITICAL TASK STATEMENT		**Initiate Cooldown of Reactor Coolant System Prior to Exiting EOS-1.2A, Post LOCA Cooldown and Depressurization.**

Operating Test :	NRC	Scenario #	1	Event #	5,6,7	Page	36	of	44
Event Description:	Ejected Control Rod D12, MSIV Fail to Close and SG 2 FWIV Fails Open.								

Time	Position	Applicant's Actions or Behavior
	US	INITIATE RCS Cooldown to Cold Shutdown: [Step 11]
		• MAINTAIN cooldown rate in RCS Cold Legs – LESS THAN 100°F/HR. [Step 11.a]
		• CHECK PRZR pressure – LESS THAN 1960 PSIG. [Step 11.b]
		• BLOCK Low Main Steam Pressure SI signal when Pressurizer pressure – LESS THAN 1960 psig. [Step 11.c]
		• DUMP steam to condenser from intact SG(s). [Step 11.d]
Examiner Note:		**ARV's must be taken to ~ 20% open to get them off of their valve seats, then taken back to ~4% to limit Cooldown to <100°F/hr.**
CT-2		• DUMP steam to condenser from intact SG(s) atmospheric(s). [Step 11.d RNO]
When an RCS Cooldown is established at ≤ 100°F/hr, or at the discretion of the Lead Evaluator, TERMINATE the scenario.		

Time	Position	Applicant's Actions or Behavior
Examiner Note: These steps are performed by the BOP per EOP-0.0A, Attachment 2.		
CAUTION: If during performance of this procedure the SI sequencer fails to complete its sequence, Attachment 3 may be used to ensure proper equipment operation for major equipment.		
	BOP	VERIFY SSW Alignment: [Step 1]
		• VERIFY SSW Pumps – RUNNING. [Step 1.a]
		• VERIFY Diesel Generator Cooler SSW return flow. [Step 1.b]
	BOP	VERIFY Safety Injection Pumps – RUNNING. [Step 2]
	BOP	VERIFY Containment Isolation Phase A – APPROPRIATE MLB LIGHT INDICATION (RED WINDOWS). [Step 3]
	BOP	VERIFY Containment Ventilation Isolation – APPROPRIATE MLB LIGHT INDICATION (GREEN WINDOWS). [Step 4]
	BOP	VERIFY CCW Pumps – RUNNING. [Step 5]
	BOP	VERIFY RHR Pumps – RUNNING. [Step 6]
	BOP	VERIFY Proper CVCS Alignment: [Step 7]
		• VERIFY CCPs – RUNNING. [Step 7.a]
		• VERIFY Letdown Relief Valve Isolation: [Step 7.b]
		• VERIFY Letdown Orifice Isolation Valves – CLOSED. [Step 7.b.1)]
		• VERIFY Letdown Isolation Valves 1/1-LCV-459 & 1/1-LCV-460 – CLOSED. [Step 7.b.2)]
	BOP	VERIFY ECCS flow: [Step 8]
		• CCP SI flow indicators – CHECK FOR FLOW. [Step 8.a]

Time	Position	Applicant's Actions or Behavior
		• RCS pressure – LESS THAN 1700 PSIG (1800 PSIG FOR ADVERSE CONTAINMENT). [Step 8.b]
		• SIP discharge flow indicator – CHECK FOR FLOW. [Step 8.c]
		• RCS pressure – LESS THAN 325 PSIG (425 PSIG FOR ADVERSE CONTAINMENT). [Step 8.d]
		• Go to Step 9 of this attachment. [Step 8.d RNO d]
Examiner Note:		**The operator will have to manually close SG 1-02 FWIV, 1-HV-2135.**
	BOP	VERIFY Feedwater Isolation Complete: [Step 9]
		• Feedwater Isolation Valves – CLOSED.
		• DETERMINED FWIV 2, 1-HS-2135, did not close and manually closes FWIV 2.
		• Feedwater Isolation Bypass Valves – CLOSED.
		• Feedwater Bypass Control Valves – CLOSED.
		• Feedwater Control Valves – CLOSED.
	BOP	VERIFY Diesel Generators – RUNNING. [Step 10]
	BOP	VERIFY Monitor Lights for SI Load Shedding on 1-MLB-9 and 1-MLB-10 – LIT. [Step 11]
NOTE: The MLB indication for SI alignment includes components which may be in a different alignment to support unit conditions. MSIVs, MSLs BEF MSIV D/POT ISOL, TDAFWP STEAM SUPPLIES, TDAFWP RUN, MDAFWP FLO CTRL VLVs and TDAFWP FLO CTRL VLVs may be exceptions to the expected MLB indication.		
	BOP	VERIFY Proper SI alignment – PROPER MLB LIGHT INDICATION. [Step 12]

Time	Position	Applicant's Actions or Behavior

NOTE: Any previously removed missile shield(s) that affects the Control Room, Auxiliary, Safeguards or Fuel Building pressure boundary is required to be restored upon initiation of a Safety Injection Signal.

NOTE: When the SI sequencer has timed out,the Reactor Makeup Water Pump with its handswitch in Auto will restart.

BOP — VERIFY Components on Table 1 are Properly Aligned. [Step 13]

Location	Equipment	Description	Condition
CB-03	X-HS-5534	H2 PRG SPLY FN 4	STOPPED
CB-03	X-HS-5532	H2 PRG SPLY FN 3	STOPPED
CB-04	1/1-8716A	RHRP 1 XTIE VLV	OPEN
CB-04	1/1-8716B	RHRP 2 XTIE VLV	OPEN
CB-06	1/1-8153	XS LTDN ISOL VLV	CLOSED
CB-06	1/1-8154	XS LTDN ISOL VLV	CLOSED
CB-07	1/1-RTBAL	RX TRIP BKR	OPEN
CB-07	1/1-RTBBL	RX TRIP BKR	OPEN
CB-07	1/1-BBAL	RX TRIP BYP BKR	OPEN/DEENERGIZED
CB-07	1/1-BBBL	RX TRIP BYP BKR	OPEN/DEENERGIZED
CB-08	1-HS-2397A	SG 1 BLDN HELB ISOL VLV	CLOSED
CB-08	1-HS-2398A	SG 2 BLDN HELB ISOL VLV	CLOSED
CB-08	1-HS-2399A	SG 3 BLDN HELB ISOL VLV	CLOSED
CB-08	1-HS-2400A	SG 4 BLDN HELB ISOL VLV	CLOSED
CB-08	1-HS-2111C	FWPT A TRIP	TRIPPED
CB-08	1-HS-2112C	FWPT B TRIP	TRIPPED
CB-09	1-HS-2490	CNDS XFER PUMP	STOPPED (MCC deenergized on SI)
CV-01	X-HS-6181	PRI PLT SPLY FN 17 & INTK DMPR	STOPPED/DEENERGIZED

	CV-01	X-HS-6188	PRI PLT SPLY FN 18 & INTK DMPR	STOPPED/DEENERGIZED
	CV-01	X-HS-6195	PRI PLT SPLY FN 19 & INTK DMPR	STOPPED/DEENERGIZED
	CV-01	X-HS-6202	PRI PLT SPLY FN 20 & INTK DMPR	STOPPED/DEENERGIZED
	CV-01	X-HS-6209	PRI PLT SPLY FN 21 & INTK DMPR	STOPPED/DEENERGIZED
	CV-01	X-HS-6216	PRI PLT SPLY FN 22 & INTK DMPR	STOPPED/DEENERGIZED
	CV-01	X-HS-6223	PRI PLT SPLY FN 23 & INTK DMPR	STOPPED/DEENERGIZED
	CV-01	X-HS-6230	PRI PLT SPLY FN 24 & INTK DMPR	STOPPED/DEENERGIZED
	CV-01	X-HS-3631	UPS & DISTR RM A/C FN 1 & BSTR FN 42	STARTED
	CV-01	X-HS-3632	UPS & DISTR RM A/C FN 2 & BSTR FN 43	STARTED
	CV-01	1-HS-5600	ELEC AREA EXH FN 1	STOPPED/DEENERGIZED
	CV-01	1-HS-5601	ELEC AREA EXH FN 2	STOPPED/DEENERGIZED
	CV-01	1-HS-5602	MS & FW PIPE AREA EXH FN 3 & EXH DMPR	STOPPED/DEENERGIZED
	CV-01	1-HS-5603	MS & FW PIPE AREA EXH FN 4 & EXH DMPR	STOPPED/DEENERGIZED
	CV-01	1-HS-5618	MS & FW PIPE AREA SPLY FN 17	STOPPED/DEENERGIZED
	CV-01	1-HS-5620	MS & FW PIPE AREA SPLY FN 18	STOPPED/DEENERGIZED
	CV-03	X-HS-5855	CR EXH FN 1	STOPPED/DEENERGIZED
	CV-03	X-HS-5856	CR EXH FN 2	STOPPED/DEENERGIZED
	CV-03	X-HS-5731	SFP EXH FN 33	STOPPED/DEENERGIZED
	CV-03	X-HS-5733	SFP EXH FN 34	STOPPED/DEENERGIZED
	CV-03	X-HS-5727	SFP EXH FN 35	STOPPED/DEENERGIZED
	CV-03	X-HS-5729	SFP EXH FN 36	STOPPED/DEENERGIZED
<u>Examiner Note</u>: The next four steps would be performed on Unit 2.				

Operating Test : NRC	Scenario # 1	Event # EOP-0.0A, Att 2	Page 41 of 44
Event Description: EOP-0.0A, Attachment 2			

Time	Position	Applicant's Actions or Behavior

		CB-03	2-HS-5538	AIR PRG EXH ISOL DMPR	CLOSED
		CB-03	2-HS-5539	AIR PRG EXH ISOL DMPR	CLOSED
		CB-03	2-HS-5537	AIR PRG SPLY ISOL DMPR	CLOSED
		CB-03	2-HS-5536	AIR PRG SPLY ISOL DMPR	CLOSED
	BOP	NOTIFY Unit Supervisor attachment instructions complete AND to IMPLEMENT FRGs as required.			
EOP-0.0A, Attachment 2 steps are now complete.					

Operating Test :	NRC	Scenario #	1	Event #	FRZ-0.1A	Page	42	of	44
Event Description:	FRZ-0.1A, Response To High Containment Pressure								

Time	Position	Applicant's Actions or Behavior
		Simulator Operator: The following steps are from FRZ-0.1A, Response To High Containment Pressure
	US	DIRECT performance FRZ-0.1A, Response To High Containment Pressure.
	BOP	Check Containment Pressure - GREATER THAN 50 PSIG: [Step 1]
		IF proper Containment Spray alignment has been verified in EOP-0.0A, REACTOR TRIP OR SAFETY INJECTION, THEN return to procedure and step in effect. [Step 1 RNO]
	BOP	Verify Containment Isolation Phase A - APPROPRIATE MLB LIGHT INDICATION (RED WINDOWS) [Step 2]
	BOP	Verify Containment Ventilation Isolation - APPROPRIATE MLB LIGHT INDICATION (GREEN WINDOWS) [Step 3]
		NOTE: Component Cooling Water supply to the unit instrument air compressors isolates on a Phase B isolation signal.
	BOP	Check If Containment Spray Is Required: [Step 4]
		• Containment pressure – HAS INCREASED TO GREATER THAN 18.0 PSIG: [Step 4.a] • 1-ALB-2B window 1-8, CS ACT - ILLUMINATED -OR- • 1-ALB-2B window 4-11 CNTMT ISOL PHASE B ACT - ILLUMINATED -OR • Containment pressure - GREATER THAN 18.0 PSIG
		• Verify all RCPs - STOPPED. [Step 4.b]
		• Verify Containment Isolation Phase B Valves- CLOSED [Step 4.c] • Verify 1-MLB-4A3 and 4B3 - ORANGE LIGHTS LIT
		• Verify ECA-1.1A, LOSS OF EMERGENCY COOLANT RECIRCULATION is NOT in effect. [Step 4.d]
		• Verify containment spray pumps – RUNNING [Step 4.e]

Operating Test :	NRC	Scenario #	1	Event #	FRZ-0.1A	Page	43	of	44
Event Description:	FRZ-0.1A, Response To High Containment Pressure								

Time	Position	Applicant's Actions or Behavior
		• Verify spray system valve alignment - PROPER EMERGENCY ALIGNMENT PER ATTACHMENT 4 [Step 4.f] • Injection phase -OR • Recirculation phase
		• Verify containment spray flow.
	BOP	Verify Main Steamline Isolation Valves - CLOSED [Step 5]
		CAUTION: At least one SG must be maintained available for RCS cooldown. CAUTION: If all SGs are faulted, at least 100 gpm AFW flow should be maintained to each SG.
	RO	Check If Feed Flow Should Be Isolated To Any SG: [Step 6]
		• Check pressures in all SGs ANY SG PRESSURE DECREASING • IN AN UNCONTROLLED MANNER -OR- • ANY SG COMPLETELY DEPRESSURIZED [Step 6.a]
		• Isolate feed flow to affected SG(s): [Step 6.b] • Isolate main feedline • Isolate AFW flow
	RO	Return To Procedure And Step In Effect. [Step 7]

```
;2018 NRC Scenario 1
;IC-10, 2-3%, BOL
;EHC Pump B OOS Equipment CAUTION TAG on H/S with
;EHC Pump C running

;Loop 3 N-16 fails high
IMF RP06C f:120 k:1

;Loss of Bus 1B4 due to Loss of Incoming Breaker
;1B4-1, CS-1B4-1.  EHC pump C fails to Auto Start
IOR DIED1B41 f:0 k:2
IOR DITCHS6552 f:1 k:2
{DITCHS6552.Value=4} DOR DITCHS6552

;Re-energize 1-02 MG Set
IRF RDR12 f:2 k:10
IRF RDR14 f:2 d:20 k:10

;SG2 FW BYP CTRL, 1-LK-560 demand fails to 0% in
;AUTO.  Controller can be taken to manual and
;FW Flow restored to SG2
{Key[3]!=0} set ckSH_27_29_P_36.Act=98
{Key[3]!=0} set ckSH_27_29_P_36.OUT06=10
{Key[3]!=0} set cdLC-560.RESET_TIME=2

;SG2 FW BYP CTRL, 1-LK-560 demand fails to 0% in
;AUTO.  Controller can be taken to manual and
;FW Flow restored to SG2
;IOR LORXLK560_1 f:1 k:3
;{DIRXLK560_2.Value=1} DOR LORXLK560_1
;IOR LORXLK560_2 f:0 k:3
;{DIRXLK560_2.Value=1} DOR LORXLK560_2
;IOR DIRXLK560_2 f:1 k:3
;{DIRXLK560_4.Value=1} DOR DIRXLK560_2
;IOR DIRXLK560_4 f:1 k:3
;{DIRXLK560_3.Value=1} DOR DIRXLK560_4

;Inadvertant start of MDAFWP 1-01 and TDAFWP Steam
;supply valve 1-HS-2452-1 and AMSAC TRBL
IMF FW13A f:1 k:4
{LOFWHS24521_2.Value=1} DMF FW13A
IOR DIFWHS2450A f:4 k:4
{LOFWHS2450A_5.Value=0} DOR DIFWHS2450A
IRF AN9B_052 f:4 k:4

;Ejected Control Rod D12, Control Bank D
IMF RD06D12 f:1 k:5

;MSIVs Fail to Auto Close
IMF SS02A1 f:1
IMF SS02A2 f:1

;FWIV Fail to Auto Close SG 1-02
IMF FW38B f:1
{DIFWHS2135.Value=0} DMF FW38B
```

Appendix D	Scenario Outline	Form ES-D-1

Facility: CPNPP 1 & 2	Scenario No.: 3	Op Test No.: June 2018 NRC
Examiners:	Operators:	

Initial Conditions: 100% power EOL – RCS Boron is 6 ppm (by sample).

Turnover: Maintain steady state power conditions. Alternate Trains of Control Room Ventilation per SOP-802, Control Room Ventilation. All other OWI-409 equipment rotations are complete for Work Week 3.

Critical Tasks:
- **CT-1 -** Place EDG 1-01 in Pull-Out per ABN-602, Response to a 6900/480V System Malfunction before EDG 1-01 has run unloaded for a total 15 minutes without cooling water flow.
- **CT-2 -** Manually initiate Emergency Boration per ABN-107, Emergency Boration, due to a loss of DRPI, prior to exiting EOS-0.1A, Reactor Trip Response.
- **CT-3 -** After a Loss of all Onsite and Offsite Power, restore power from an Offsite source per ABN-601, Response to a 138/345 KV System Malfunction and ECA-0.0A, Loss of All AC Power prior to completion of SG Depressurization in ECA-0.0A.

Event No.	Malf. No.	Event Type*	Event Description
1		N (BOP)	Alternate Trains of Control Room Ventilation per SOP-802, Control Room Ventilation, Section 5.3.10 to Train A in service
2	RD03H8	C (RO, SRO) R (BOP) TS (SRO)	Dropped Rod – Control Rod H8 LCO 3.1.4, Rod Group Alignment Limits LCO 3.4.1, RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits (if applicable)
3	FW14A TC09G	C (BOP, SRO) R (RO) TS (SRO)	Heater Drain Pump 1-01 Trip, Main Turbine fails to Auto Runback – Manual Runback required LCO 3.1.6, Control Bank Insertion Limits
4	ED05H	C (RO, BOP, SRO) TS (SRO)	Phase-to-Phase Ground on Safeguard Bus 1EA1 LCO 3.4.1, RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits (if applicable) LCO 3.7.5, Auxiliary Feedwater (AFW) System LCO 3.8.9, Distribution Systems - Operating.
5	ED01	M (RO, BOP, SRO)	Loss of Offsite Power
6	EAR454	C (RO)	Loss of 1C1 to C14 (DRPI Failure)
7	EG07B	M (RO, BOP, SRO)	EDG 1-02 Overspeed Trip, Loss of Onsite Power after Emergency Boration complete

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

Actual	Target Quantitative Attributes
7	Total malfunctions (5-8)
2	Malfunctions after EOP entry (1-2)
4	Abnormal events (2-4)
2	Major transients (1-2)
2	EOPs entered/requiring substantive actions (1-2)
1	EOP contingencies requiring substantive actions (0-2)
3	Critical tasks (2-3)

SCENARIO 3 SUMMARY

Event 1
The BOP will perform a normal evolution to alternate Trains of Control Room Ventilation per SOP-802, Control Room Ventilation, Section 5.3.10, Alternating Trains of Control Room Ventilation. Control Room Ventilation will be alternated to Train A in service per OWI-409, Equipment Rotation Program in accordance with Work Week 3. All other equipment rotations have been completed for the week.

Event 2
The next event will be a Dropped Control Rod. The Control Rod in the center of the core, H8, will drop to the bottom of the core. The crew will respond in accordance with ABN-712, Rod Control System Malfunction, Section 3.0, Dropped or Misaligned Rod in Mode 1 or 2. The RO will place Control Rods in Manual per the ABN. When the SRO has referenced Technical Specifications and the crew is awaiting input from Core Performance as to which recovery method will be used, the next malfunction will be inserted.

Event 3
The next event is a trip of Heater Drain Pump 1-01. The Main Turbine will fail to automatically runback and the Control Rods will still be in Manual from the previous event. The crew will manually initiate a Main Turbine Runback to 700 MW and either manually drive Control Rods or place Control Rods in auto and allow them to insert. The crew will respond in accordance with ABN-302, Feedwater, Condensate, Heater Drain System Malfunction, Section 4.0, Heater Drain Pump Trip. The SRO will refer to Technical Specifications for Control Bank Insertion Limits

Event 4
The next event will be a Phase-to-Phase Ground on Safeguards Bus 1EA1. The crew will respond in accordance with ABN-602, Response to a 6900/480V System Malfunction, Section 2.0, 6.9 KV Bus Fault (Modes 1, 2, 3, and 4). The crew will maintain Reactor Power less than 100% by reducing Main Turbine load due to a start of the TDAFWP. The RO will be required to start CCP 1-02 as CCP 1-01 will be de-energized on the loss of 1EA1. The BOP operator must place DG 1-01 in Pull-Out within 15 minutes of the DG starting and running unloaded with no cooling water to satisfy the first Critical Task of the scenario. The SRO will refer to Technical Specifications.

Event 5 & 6
The first major event is a Loss of Offsite Power which causes a Reactor Trip and a Loss of DRPI. DG 1-02 will start and power Safeguards Bus 1EA2. The crew will enter EOP-0.0A, Reactor Trip or Safety Injection. The Reactor Operator must Emergency Borate due to the Loss of DRPI per ABN-107, Emergency Boration to satisfy the second Critical Task. The crew will transition to EOS-0.1A, Reactor Trip Response after completion of the Immediate Operator Actions of EOP-0.0A.

Event 7
The second major event will be a trip of DG 1-02 on overspeed. The DG will trip after the RO has completed Emergency Boration and the crew has transitioned to EOS-0.1A. The crew will respond in accordance with ECA-0.0A, Loss of All AC Power. The BOP and the US will attempt to restore power and when power cannot be restored the US will direct the BOP to perform actions of ABN-601, Response to a 138/345 KV System Malfunction, Section 6.0, Loss of All Offsite and Onsite AC Power. The US and the RO will continue performing actions of ECA-0.0A while the BOP separately performs actions of ABN-601. After preparations for power restoration of ABN-601 are complete, the Transmission Grid Operator will contact CPNPP and inform that Offsite Power is available.

Terminating Criteria
The scenario will be terminated when the crew has restored Offsite Power to CPNPP and satisfied the third Critical Task.

Risk Significance:

- Failure of risk important system prior to trip: 86-1 Lockout on Safeguards Bus 1EA1
  Control Rod H8 Drops to Core Bottom
- Risk significant core damage sequence: Loss of Offsite Power and a failure of either DG to power its associated Safeguards Bus continually
- Risk significant operator actions: Disabling DG 1-01 when running with no cooling water
  Emergency Boration for a Loss of DRPI
  Restoring Offsite Power after a complete Loss of Offsite and Onsite Power to the unit

Critical Task Determination

Critical Task	Safety Significance	Cueing	Measurable Performance Indicators	Performance Feedback
Place EDG 1-01 in Pull-Out per ABN-602, Response to a 6900/480V System Malfunction before EDG 1-01 has run unloaded for a total 15 minutes without cooling water flow.	Take one or more actions that would prevent a challenge to plant safety	DG 1-01 running with Voltage / Frequency indicated on CB-11 and no cooling water flow available from SSW Pump 1-01 because Safeguards Bus 1EA1 is de-energized.	Place CS-1DG1E, DG 1 EMER STOP/START handswitch in PULL-OUT at CB-11.	DG Voltage and Frequency will lower to 0 as indicated on F-1EG1, DG 1 FREQ and V-1EG1, DG 1 VOLT at CB-11 indicating the DG has been shutdown.
Manually initiate Emergency Boration per ABN-107, Emergency Boration, due to a loss of DRPI, prior to exiting EOS-0.1A, Reactor Trip Response.	Incorrect reactivity control (such as failure to initiate emergency boration or the SLC system or to manually insert control rods)	A complete Loss of Digital Rod Position Indication when Offsite Power is lost to the Unit. DRPI will be dark at CB-07 with no direct ability to verify all rods inserted into the core.	Initiate Emergency Boration per ABN-107, Att. 1, Emergency Boration through the Emergency Borate Valve 1-8104. The RO will verify a Charging Pump running, start a BA Transfer Pump, and open 1/1-8104.	Emergency Boration flow will be verified via 1-FI-183A, EMER BORATE FLO on CB-06.
After a Loss of all Onsite and Offsite Power, restore power from an Offsite source per ABN-601, Response to a 138/345 KV System Malfunction and ECA-0.0A, Loss of All AC Power prior to completion of SG Depressurization in ECA-0.0A.	Degraded emergency core cooling system (ECCS) or emergency power Capacity.	Safeguards Bus 1EA1 has an 86-1 Lockout and cannot be powered from the DG or Offsite Power. DG 1-02 will power Safeguards Bus 1EA2 prior to tripping on Overspeed and is unable to be re-started. Both Safeguards Busses will remain de-energized until an Offsite source of power is available to re-power Safeguards Bus 1EA2.	The BOP Operator will perform the necessary actions to prepare Safeguards 1EA2 to receive Offsite Power per ABN-601. Offsite Power will be restored via 138 KV to the XST1 Transformer. The BOP turn on the Synch Scope and Manually close the Alternate Feeder Breaker to 1EA2.	Safeguards Bus 1EA2 Voltage and Frequency as indicated on V-1EA2-1, BUS 1EA2 VOLT and F-1EA2, BUS 1EA2 FREQ on CB-11.

NOTE: (Per NUREG-1021, Appendix D) If an operator or the Crew significantly deviates from or fails to follow procedures that affect the maintenance of basic safety functions, those actions may form the basis of a CT identified in the post-scenario review.

	SIMULATOR OPERATOR INSTRUCTIONS for SIMULATOR SETUP				
Initialize to IC55 and LOAD 2018 NRC Scenario 3.					
EVENT	**TYPE**	**MALF #**	**DESCRIPTION**	**DEMAND VALUE**	**INITIATING PARAMETER**
2	IMF	RD03H8	Dropped Rod – Control Rod H8	f:1	K2
3	IMF	FW14A	Heater Drain Pump ‘B’ Trip	f:1	K3
	IMF	TC09G	Main Turbine Fails to Automatically Runback	f:1	K3
4	IMF	ED05H	Phase-to-Phase Ground on Safeguard Bus 1EA1	f:1	K4
	IRF	EAR081	De-energize Train A BO Sequencer	f:0	K15
	IRF	EAR522	De-energize Train A BO Sequencer	f:0	K15
	IRF	CVR04	Reactor Makeup Water pump 1	f:0	K16
	IRF	CVR07	Common Reactor Makeup Water pump 1	f:1	K16 + 10
5	IMF	ED01	Loss of Offsite Power	f:1	K5
6	IRF	EAR454	Loss of 1C1 to C14 (DRPI Failure)	f:0	K5
7	IMF	EG07B	DG 1-02 Overspeed Trip	f:1	K6
7	IRF	FWR071 FWR072 FWR073	Break Condenser Vacuum per ABN-601, Attachment 10	f:100	K7
7	IRF	EGR02	Vent Main Generator Hydrogen per ABN-601, Attachment 11	f:0	K8
7	IRF	CVR21 CVR22 CVR23 CVR24 CVR25 CCR10	ECA-0.0A, Step 10	f:0	K9 K9 + 15 K9 + 30 K9 + 45 K9 + 60 K9 + 75
7	IRF	FWR077 FWR078	ECA-0.0A, Step 12	f:0	K10 K10 + 15

7	IRF	EBR110 EBR111 EBR160 EBR161 EAR063 EAR064 EAR065 EAR066	ECA-0.0A, Attachment 2A, Section 4	f:0	K11 K11 K11 + 10 K11 + 10 K11 + 20 K11 + 20 K11 + 20 K11 + 20
7	IRF	EAR067 EAR068 EAR069 EAR070 EAR043 EAR044 EAR045 EAR046 EAR047 EAR048 EAR050 EAR253 EAR233	ECA-0.0A, Attachment 2A, Section 4	f:0	K11 + 20 K11 + 20 K11 + 20 K11 + 20 K11 + 30 K11 + 30 K11 + 30 K11 + 30 K11 + 30 K11 + 30 K11 + 30 K11 + 40 K11 + 50
7	IRF	EBR113 EBR115 EBR162 EBR163 EBR167 EAR251 EBR210 EBR240 EBR134 EBR135 EBR136 EBR139 EBR184 EBR185 EBR188	ECA-0.0A, Attachment 2B	f:0	K12 K12 + 10 K12 + 30 K12 + 30 K12 + 40 K12 + 50 K12 + 60 K12 + 70 K12 + 80 K12 + 80 K12 + 80 K12 + 80 K12 + 90 K12 + 90 K12 + 90
7	IRF	CHR13 CHR14	ECA-0.0A, Step 22, Attachment 3b	f:1	K13 K13 + 15
7	IRF	MSR15	Manually Isolate MSIVs	f:1	K14

Simulator Operator: **INITIALIZE to IC55 and LOAD 2018 NRC Scenario 3.**
ENSURE all Simulator Annunciator Alarms are ACTIVE.
ENSURE Delta I target parameter set for EOL on the PCS
ENSURE hard copy of Delta I at CB-07 is updated to EOL
ENSURE all Control board Tags are removed.
ENSURE Operator Aid Tags reflect current boron conditions (6 ppm)
ENSURE Rod Bank Update (RBU) is performed.
ENSURE Turbine Load Rate set at 10 Mwe/min.
ENSURE 60/90 buttons DEPRESSED on ASD
ENSURE ASD speakers are ON at half volume.
ENSURE Reactivity Briefing Sheet printout provided with Turnover.
ENSURE procedures in progress are on SRO desk:
- COPY of IPO-003A, Power Operations, Section 5.5, Operating at Constant Turbine Load.
ENSURE Control Rods are in AUTO with Bank D at 215 steps.

Control Room Annunciators in Alarm:

PCIP-1.1 – SR TRN A RX TRIP BLK
PCIP-1.2 – IR TRN A RX TRIP BLK
PCIP-1.4 – CNDSR AVAIL STM DMP ARMED C-9
PCIP-1.6 – RX ≥ 10% PWR P-10
PCIP-2.1 – SR TRN B RX TRIP BLK
PCIP-2.2 – IR TRN B RX TRIP BLK
PCIP-2.5 – SR RX TRIP BLK PERM P-6
PCIP-3.2 – PR TRN A LO SETPT RX TRIP BLK
PCIP-4.2 – PR TRN B LO SETPT RX TRIP BLK

Operating Test :	NRC	Scenario #	3	Event #	1	Page	8	of	54
Event Description:	Alternate Trains of Control Room Ventilation per SOP-802, Control Room Ventilation, Section 5.3.10 to Train A in service								

Time	Position	Applicant's Actions or Behavior
		Examiner Note: The following steps are from SOP-802, Control Room Ventilation System, Section 5.3.10, Alternating Trains of Control Room Ventilation.
	BOP	ENSURE both trains of Control Room ventilation are in the NORMAL MODE of operation. [Step A]
	BOP	SELECT the Control Room Ventilation Train to be used [Step B] • Train A
	BOP	VERIFY both train intake dampers are open. [Step C] • X-HS-5837A, CR N. INTK DMPR 14 (TRN A) • X-HS-5838A, CR S. INTK DMPR 15 (TRN B)
	BOP	START the selected train makeup supply fan and VERIFY the suction AND discharge dampers open: [Step D] Train A – X-HS-5825A, CR MU AIR SPLY FN 37 & SUCT DMPR 16 • X-HV-5825A, DMPR 16 (on X-HS-5825A) • X-HV-5825B, DMPR 17 (on X-HS-5825D)
		NOTE: The fan will trip if the damper fails to open within 10 seconds after fan start.
	BOP	START both exhaust fans for the selected train AND VERIFY the associated suction dampers open: [Step E] Train A • X-HS-5855, CR EXH FN 1 (X-PV-5855 on X-HS-5855A) • X-HS-5857, CR KTCHN & TOIL EXH FN 3 & SUCT DMPR 27 (X-HV-5857)
		NOTE: One train of the Control Room Ventilation System must be in operation at all times.

Operating Test :	NRC	Scenario #	3	Event #	1	Page	9	of	54
Event Description:	Alternate Trains of Control Room Ventilation per SOP-802, Control Room Ventilation, Section 5.3.10 to Train A in service								

Time	Position	Applicant's Actions or Behavior
	BOP	SELECT the Control Room Ventilation Train to be shutdown. [Step F] • Train B
	BOP	STOP both exhaust fans for the selected train AND VERIFY the associated suction damper closes. [Step G] Train B • X-HS-5856, CR EXH FN 2 (X-PV-5856 on X-HS-5856A) • X-HS-5858, CR KTCHN & TOIL EXH FN 4 & SUCT DMPR 28 (X-HV-5858)
	BOP	STOP the makeup supply fan for the selected train AND VERIFY the associated suction and discharge dampers close. [Step H] 2) X-HS-5828A, CR MU AIR SPLY FN 38 & SUCT DMPR 19 (TRN B) • X-HV-5828A, DMPR 19 (on X-HS-5828A) • X-HV-5828B, DMPR 20 (on X-HS-5828D)
	BOP	THROTTLE the selected train's CR exhaust fan suction damper by holding the handswitch in CLOSE or OPEN to obtain greater than or equal to 0.125 inch water gage pressure on X-PI-5855, CR PRESS, or X-PI-5856, CR PRESS. [Step I] • X-HS-5855A, CR EXH FN 1 SUCT DMPR 5 (TRN A)
	BOP	ENSURE the selected train is in operation by observing light indication of Attachment 3. [Step J]
When Control Room Ventilation has been alternated to Train A in service, or at Lead Examiner discretion, PROCEED to Event 2.		

Operating Test :	NRC	Scenario #	3	Event #	2	Page	10	of	54
Event Description:	Dropped Rod – Control Rod H8								

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**When directed, EXECUTE Event 2 (Key 2). - RD03H8, Dropped Rod – Control Rod H8**
Indications Available: **6D-3.4 – PR CHAN DEV** **6D-3.5 – DRPI ROD DEV** **6D-3.7 – ANY ROD AT BOT** **6D-1.10 – AVE T_{AVE} - T_{REF} DEV (30 seconds later)** **6D-4.10 – QUADRANT PWR TILT (60 seconds later)** **Control Rod H8 Rod Bottom Light LIT**		
Examiner Note:		**The Crew may reduce power to 1100 MWe per ABN Step 2 RNO OR reduce power by means of a 50 MW load reduction.**
	RO	REFER to Annunciator Alarm Procedures.
	RO	RECOGNIZE only one dropped rod at position H8.
Examiner Note:		**The following steps are to perform a 50 MW load reduction.**
	RO	ENSURE 1/1-RBSS Control Rod Bank Select Switch in AUTO.
	BOP	PERFORM the following to LOWER Turbine Load:
		• DEPRESS "50 MWe" Manual Runback button.
		• CLICK on "O/I" button.
		• CLICK on "Execute" then VERIFY Manual Runback in progress.
	US	DIRECT implementation of ABN-712, Rod Control System Malfunction, Section 3.0, Dropped or Misaligned Rod in Mode 1 or 2.
Examiner Note:		**The following steps are from ABN-712, Rod Control System Malfunction, Section 3.0, Dropped or Misaligned Rod in Mode 1 or 2**
	RO	VERIFY Number of Rods Misaligned from Step Counter by > 12 Steps – LESS THAN OR EQUAL TO ONE. [Step 3.3.1]

Time	Position	Applicant's Actions or Behavior
	RO	CHECK Reactor – CRITICAL AND ≤ 100% power on highest reading NI AND No Reactor Startup in progress. [Step 3.3.2]
		• REDUCE Turbine load to less or equal to 1100 MWe. [Step 3.3.2 RNO]
	BOP	• OPEN the "LOAD TARGET" OSD.
		• VERIFY open OSD is "LOAD TARGET".
		• SELECT "Blue Bar" and ENTER desired LOAD (1100).
		• ACCEPT.
		• VERIFY value in "Blue Bar" is desired Load Target (1100).
		• EXECUTE.
		• VERIFY "Load Target" changes to desired load (1100 MWe).
		• CLOSE the "LOAD TARGET" OSD.
		• SET Turbine load RATE to 100 MWe/min.
		• OPEN the "LOAD RATE" OSD.
		• VERIFY open OSD is "LOAD RATE".
		• SELECT "Blue Bar" and ENTER desired LOAD RATE (100).
		• ACCEPT.
		• VERIFY value in "Blue Bar" is desired Load Rate (100).
		• EXECUTE.
		• VERIFY "Load Rate" changes to desired load (100 MWe/min).
		• CLOSE the "LOAD RATE" OSD.
	RO	ENSURE 1/1-RBSS, CONTROL ROD BANK SELECT – NOT IN AUTO. [Step 3.3.3]
	RO	VERIFY Reactor – STABLE. [Step 3.3.4]
		• VERIFY T_{AVE} - T_{REF} – WITHIN 1°F.
		• VERIFY Reactor Power – STABLE.
		• CONTROL T_{AVE} AND Reactor Power by controlling the following, as necessary: [Step 3.3.4 RNO]

Time	Position	Applicant's Actions or Behavior
		• Turbine Power / Boration / Dilution / Steam Dumps / Steam Generator Atmospheric Relief Valves
	RO	VERIFY Axial Flux Difference (AFD) – WITHIN LIMITS. [Step 3.3.5]
Simulator Operator: If/When contacted as the SM to provide additional personnel to perform OPT-302, acknowledge the request and report that another operator will perform OPT-302.		
	RO	Verify "QUADRANT PWR TILT" Alarm (6D-4.10) – DARK [Step 3.3.6]
	US/RO	Within ONE Hour, Determine Cause of Abnormal Rod Position. [Step 3.3.7]
	US	• ENSURE TS 3.1.4 requirements implemented per LCOAR [Step 3.3.7 RNO]
	US	• LCO 3.1.4, Rod Group Alignment Limits.
		• CONDITION B – One rod not within alignment limits. • ACTION B.1 – Restore rod to within alignment limits, OR • ACTION B.2.1.1 – Verify SDM to be within the limits provided in the COLR within 1 hour OR • ACTION B.2.1.2 – Initiate boration to restore SDM to within limit within 1 hour, AND • ACTION B.2.2 – Reduce THERMAL POWER to ≤ 75% RTP within 3 hours, AND • Verify SDM to be within the limits provided in the COLR once per 12 hours, AND • ACTION B.2.4 – Perform SR 3.2.1.1 and SR 3.2.1.2 within 72 hours, AND • ACTION B.2.5 – Perform SR 3.2.2.1 within 72 hours, AND • ACTION B.2.6 – Re-evaluate safety analyses and confirm results remain valid for duration of operation under these conditions within 5 days.
Examiner Note: If Pressurizer Pressure drops below 2220 psig with 4 operable pressure channels, the crew should enter LCO 3.4.1.A for Departure from Nucleate Boiling (DNB). If entered, the LCO can be exited once pressure is restored.		

Operating Test :	NRC	Scenario #	3	Event #	2	Page	13	of	54
Event Description:	Dropped Rod – Control Rod H8								

Time	Position	Applicant's Actions or Behavior
	US	• LCO 3.4.1 RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits
		• CONDITION A – One or more RCS DNB parameters not within limits. • ACTION A.1 – Restore RCS DNB parameter(s) to within limit within 2 hours.
	US/RO	CHECK Plant Parameters Indicate ACTUAL Dropped or Misaligned Rod: [Step 3.3.8] • Tave • AFD • QPTR • NIS • REVIEW Plant Computer CET map for any abnormal indications.
	US	PERFORM the following: [Step 3.3.9] • INITIATE Condition Report per STA-421 • DIRECT Chemistry to perform shiftly analysis for fuel defects until plant restored to stable conditions
		NOTE: • Either of two realignment methods may be used. The DRPI method is less accurate but may allow quicker realignment with less rod movement. The referencing method is more accurate but requires stepping affected rod full out and may have more adverse effect on flux shape. • A rod may be recovered within the first 6 hours of the event with no restrictions on rod recovery rate or plant operation (EVAL-2006-0003933-04).
		Simulator Operator: If/When contacted as the SM / Reactor Engineering / Plant Management report personnel will come to the Control Room to discuss Control Rod recovery method.
	US	CONTACT Reactor and System Engineering and Plant Management prior to realigning Rods.

Operating Test :	NRC	Scenario #	3	Event #	2	Page	14	of	54
Event Description:	Dropped Rod – Control Rod H8								

Time	Position	Applicant's Actions or Behavior
		• DETERMINE if any rod recovery restrictions apply • DETERMINE recovery method
When US contacts Reactor Engineering for Control Rod Recovery method AND Technical Specifications have been addressed, or at Lead Examiner discretion, PROCEED to event 3.		

Operating Test :	NRC	Scenario #	3	Event #	3	Page	15	of	54
Event Description:	Heater Drain Pump 1-01 Trip, Main Turbine fails to Auto Runback – Manual Runback required								

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**When directed, EXECUTE Event 3 (Key 3).** **- FW14A, Heater Drain Pump 1-01 Trip,** **- TC09G, Main Turbine fails to Auto Runback – Manual Runback required**
Indications Available:		**9A-1.2 – HDP 1/2 OVRLOAD / TRIP** **8B-2.8 – CNDS LP HTR BYP TRBL** **8B-3.8 – CNDS LP HTR BYP VLV OPEN PV-2286** **8B-4.8 – TURB GLND STM CNDSR CNDS FLO HI** **6D-1.9 – ANY TURB RUNBACK EFFECTIVE (when Manual Runback initiated)** **6D-1.10 – AVE T_{AVE}-T_{REF} DEV (when Manual Runback initiated)** **1-HS-2602, HDP 1 TRIP light LIT** **Steam Dump System Group 1 Valves OPEN**
	RO/BOP	RESPOND to Annunciator Alarm Procedures.
	BOP	RECOGNIZE trip of Heater Drain Pump 'A' with no Automatic Turbine Runback.
	US	DIRECT performance of ABN-302, Feedwater, Condensate, Heater Drain System Malfunction, Section 4.0, Heater Drain Pump Trip.
Examiner Note:		**The following steps are from ABN-302, Feedwater, Condensate, Heater Drain System Malfunction, Section 4.0, Heater Drain Pump Trip.**
Examiner Note:		**Diamond steps (◊) are Initial Operator Actions.**
CAUTION:		Using Load Target to reduce load without rods in AUTO can result in excessive TAVE-TREF mismatch before C-7 activates. This mismatch may cause an SI when steam dumps trip open.
NOTE:		• Diamond step 1 denotes Initial Operator Actions. • Automatic runback to 70% is approximately 812 MW.

Operating Test :	NRC	Scenario #	3	Event #	3	Page	16	of	54
Event Description:	Heater Drain Pump 1-01 Trip, Main Turbine fails to Auto Runback – Manual Runback required								

Time	Position	Applicant's Actions or Behavior
	◊ RO/BOP ◊	VERIFY automatic plant response. [Step 4.3.1]
	◊ RO ◊	• VERIFY Control Rods in – AUTO.
	◊ BOP ◊	• VERIFY Turbine Runback – IN PROGRESS.
	◊ RO/BOP ◊	• If Turbine Power is > approximately 800 MWe, PERFORM the following: [Step 4.3.1 RNO].
	◊ RO ◊	• ENSURE 1/1-RBSS, CONTROL ROD BANK SELECT in AUTO. [Step 4.3.1.a RNO].
	◊ BOP ◊	• ENSURE Turbine Runback to 700 MWE initiated. [Step 4.3.1.b RNO]
		• DEPRESS "700 MWe" MANUAL RUNBACK button.
		• CLICK on "0/1" button.
		• CLICK on "Execute" then VERIFY Manual Runback in progress.
Simulator Operator: When contacted, REPORT an instantaneous ground overcurrent 50N relay on the breaker for Heater Drain Pump 1-01. Motor is hot with no indication of fire.		
	BOP	VERIFY Main Feed Flow to Steam Generators. [Step 4.3.2]
		• Main Feed Pump – AT LEAST ONE RUNNING. [Step 4.3.2.a]
		• Main Feedwater pump suction pressure – GREATER THAN 250 PSIG. [Step 4.3.2.b]
NOTE: Differential pressure between feedwater and steamline may decrease following a Turbine Runback. The following computer points may aid the operator: • U5002A FW-MS HDR DP • U5003A DELTA PROGRAM-ACTUAL DP • P5446A FW STM FLOW SETPOINT		

Operating Test : NRC	Scenario # 3	Event # 3	Page 17 of 54
Event Description: Heater Drain Pump 1-01 Trip, Main Turbine fails to Auto Runback – Manual Runback required			

Time	Position	Applicant's Actions or Behavior
		• Feedwater header pressure – MAINTAINED GREATER THAN MAIN STEAM HEADER PRESSURE. [Step 4.3.2.c]
		• Main Feedwater – ALIGNED. [Step 4.3.2.d]
	BOP	VERIFY Steam Generator water level – STABLE OR TRENDING TO NORMAL OPERATING RANGE. [Step 4.3.3]
		NOTE: Control Rod insertion should be allowed to continue even if ΔI is outside the band. Continued rod insertion is required to return Tave to Tref as soon as possible so that steam demand is reduced.
	BOP	VERIFY T_{AVE} – TRENDING TO T_{REF}. [Step 4.3.4] • 1-TI-412A, AVE TAVE – TREF DEV
		CAUTION: Reactor power must be established at a value within the capability of available feedwater. Auxiliary feedwater pumps can supply approximately 6% reactor power.
	RO/BOP	STABILIZE Reactor power using one or more of the following: [Step 4.3.5]
		• Control Rods • Steam Dumps • Boration • Turbine Load
	BOP	VERIFY Steam Generator Feedwater Flow Control Valves – IN AUTO. [Step 4.3.6] • 1-FK-510, SG 1 FW FLO CTRL • 1-FK-520, SG 2 FW FLO CTRL • 1-FK-530, SG 3 FW FLO CTRL • 1-FK-540, SG 4 FW FLO CTRL
	RO	VERIFY the following: [Step 4.3.7]

Operating Test :	NRC	Scenario #	3	Event #	3	Page	18	of	54
Event Description:	Heater Drain Pump 1-01 Trip, Main Turbine fails to Auto Runback – Manual Runback required								

Time	Position	Applicant's Actions or Behavior
		• Control Rods – ABOVE ROD INSERTION LIMIT. [Step 4.3.7.a]
		• VERIFY SDM or initiate boration to restore SDM within 1 hour and restore Rods above insertion limits with 2 hours per TS 3.1.6 [Step 4.3.7.a RNO]
		• ∆ Flux – (AFD) WITHIN LIMITS. [Step 4.3.7.b]
Examiner Note:		**Events during this scenario will result in exceeding the Rod Insertion Limits (RIL). The RO should inform the SRO when ALB-6D, Window 2.7 – ANY CONTROL ROD BANK AT LO-LO LIMIT is LIT. Technical Specifications must be referenced.**
	US	EVALUATE Technical Specifications.
		• LCO 3.1.6.A, Control Bank Insertion Limits.
		• CONDITION A - Control bank insertion limits not met. • ACTION A.1.1 - Verify SDM to be within the limits provided in the COLR within one hour, OR • ACTION A.1.2 - Initiate Boration to restore SDM to within limit within one hour, AND • ACTION A.2 - Restore control bank(s) to within limits within 2 hours.
	BOP	WHEN steam dumps have closed, THEN reset steam dump arming signal (C-7 interlock). [Step 4.3.8]
		• 43/1-SD, STM DMP MODE SELECT
	BOP	VERIFY 1-HS-2286, Low Pressure Feedwater Heater Bypass Valve – CLOSED. [Step 4.3.9]
Simulator Operator:		**As Shift Manager, when contacted about NODAL Gaps update, acknowledge request.**
	US	NOTIFY QSE Generation Controller and update GAPS to "Create Current Condition" for the down power. [Step 4.3.10]

Operating Test :	NRC	Scenario #	3	Event #	3	Page	19	of	54
Event Description:	Heater Drain Pump 1-01 Trip, Main Turbine fails to Auto Runback – Manual Runback required								

Time	Position	Applicant's Actions or Behavior
	US	INITIATE repairs per STA-606. [Step 4.3.11]
	US	Check Chemistry Sampling Requirement: [Step 4.3.12]
		• SG ARVS - REMAINED CLOSED -AND- • TDAFW Pump – REMAINED STOPPED [Step 4.3.12.a]
		Verify Reactor Power change - LESS THAN 15% RTP WITHIN ONE HOUR. [Step 4.3.12.b]
	BOP	Reset Turbine Runback per ABN-401 [Step 4.3.13]
Examiner Note:		**The following steps are from ABN-401, Main Turbine Malfunction, Section 8.0, Turbine Reloading after Runback.**
	BOP	VERIFY alarm 6D-1.9, ANY TURB RUNBACK EFFECTIVE – DARK. [Step 8.3.1]
	BOP	In the Load Control Section, ENSURE Load Rate Setpoint Controller is SET to support reload or current plant conditions. [Step 8.3.2]
	BOP	In the Load Control Section, ENSURE Load Target Setpoint Controller is set for actual MWe. [Step 8.3.3]
	BOP	If Manual Runback was used, TURN OFF the appropriate Subloop Controller on the TG Control Display in the MANUAL RUNBACKS Section. [Step 8.3.4]
	BOP	VERIFY Runback is RESET. [Step 8.3.5]
	BOP	VERIFY Runback – GREATER THAN 15% WITHIN ONE HOUR and CONTACT Chemistry. [Step 8.3.6]
	BOP	CONTROL Turbine Load as required per IPO-003A. [Step 8.3.7]

Operating Test :	NRC	Scenario #	3	Event #	3	Page	20	of	54
Event Description:	Heater Drain Pump 1-01 Trip, Main Turbine fails to Auto Runback – Manual Runback required								

Time	Position	Applicant's Actions or Behavior
		When Technical Specifications have been addressed, and the runback has been reset, or at Lead Examiner's discretion, PROCEED to Event 4.

Operating Test :	NRC	Scenario #	3	Event #	4	Page	21	of	54
Event Description:	Phase-to-Phase Ground on Safeguard Bus 1EA1								

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**When directed, EXECUTE Event 4 (Key 4).** **- ED05H, Phase-to-Phase Ground on Safeguard Bus 1EA1**
Indications Available:		**10B-1.5 – 6.9 KV BUS 1EA1 LOR TRIP** **10B-2.6 – 6.9 KV BUS 1EA1 / 1EA2 VOLT LOSS** **10B-3.6 – 6.9 KV BUS 1EA1 / 1EA2 NOT PWRD FROM PREF OFFSITE PWR** **10B-4.5 – 6.9 KV / 480 V ANY 1E SECOND LVL UNDERVOLT** **Multiple Safeguards Bus Loss of Voltage alarms**
	RO/BOP	RESPOND to Annunciator Alarm Procedures.
	RO/BOP	RECOGNIZE loss of Safeguards Bus 1EA1.
	US	DIRECT performance of ABN-602, Response to a 6900/480V System Malfunction, Section 2.0, Safeguard 6.9 KV Bus Fault (Modes 1, 2, 3, and 4).
Examiner Note:		**The following steps are from ABN-602, Response to a 6900/480V System Malfunction, Section 2.0, Safeguard 6.9 KV Bus Fault (Modes 1, 2, 3, and 4).**
Examiner Note:		**Due to the loss of 1EA1, CCP 1-01 will lose power. CCP 1-02 does NOT have an Auto Start signal present. The US should direct the RO to manually start CCP 1-02 as it is an Initial Operator Action of ABN-105, Chemical and Volume Control System, Section 3.0, Charging Pump Trip. This ABN may NOT be executed at this specific time; however, the Initial Actions should be completed to ensure Charging Flow is re-initiated.**

Operating Test :	NRC	Scenario #	3	Event #	4	Page	22	of	54
Event Description:	Phase-to-Phase Ground on Safeguard Bus 1EA1								

Time	Position	Applicant's Actions or Behavior
	RO	START Centrifugal Charging Pump 1-02. • PLACE 1/1-APCH2, CCP 2 is START and VERIFY Charging flow on 1-FI-121A, CHRG FLO on CB-06
		CAUTION: • Only ONE attempt to close a tripped breaker should be allowed; provided NO obvious equipment damage or fault is indicated. Further attempts should NOT be made until checked by Electrical Maintenance. • When a 6.9 KV safeguard bus fault prevents running a SSWP, DG run time should be limited to approximately 15 minutes unloaded, 1 minute loaded to prevent damage due to loss of cooling. • Following overcurrent or instantaneous overcurrent relay operations, the CTs should be checked by Meter & Relay for proper operation. (ONE 97-806) • After approximately 120 seconds BOS Operator Lockout (OL) signal automatically resets, as indicated by associated BOS OL light OFF and RMUW pump restart when BOS has timed out. Should an OL not automatically reset, resetting the sequencer may correct the condition.
	US	Check Unit MODE – 1, 2, 3 OR 4 [Step 2.3.1].
	BOP	Check 6.9 KV safeguard bus – AT LEAST ONE ENERGIZED [Step 2.3.2]

Operating Test :	NRC	Scenario #	3	Event #	4	Page	23	of	54
Event Description:	Phase-to-Phase Ground on Safeguard Bus 1EA1								

Time	Position	Applicant's Actions or Behavior

CAUTION:
- If power is greater than 10%. MDAFW should be allowed to run until the sequencer times out. The pumps will be stopped in Section 8.0, if not required. DO NOT throttle AFW above 10% power.
- The AFWP flow control and isolation valves are required to be fully open when above 10% power per TS 3.7.5.

NOTE:
- An emergency start will allow DG breaker to automatically close on a phase to ground bus fault (LOR 86-2/uEA1 or 86-2/uEA2).
- DG breaker will not automatically or manually close when a phase to phase bus fault (LOR 86-1) is present.
- An Operator Lockout signal from Blackout Sequencer (BOS) opens TDAFWP steam supply valves. The BOS also starts associated train MDAFWP. It may be necessary to limit AFW flow to prevent excessive RCS cooldown, or other adverse condition. Placing the TDAFW Pump in PULL-OUT with one safeguards bus de-energized will result in two inoperable AFW Pumps per TS 3.7.5. Throttling any train of AFW above 10% power renders the train INOPERABLE.
- Attachment 4 contains steps to deenergize the sequencer if the bus will not be needed. This would restore common equipment available to the other unit (e.g CRACs, UPS).

Examiner Note: The TDAFWP will start when the Blackout Sequencer Operator Lockout is initiated. The start of the TDAFWP may be addressed by the crew later as ABN-602 is the highest priority at this time.

Simulator Operator: When contacted as FSS, to check out TDAFW Pump and Train B equipment, acknowledge request.

	BOP	Check 6.9 KV safeguards buses – BOTH ENERGIZED [Step 2.3.3]
		• Perform the following: • Maintain Reactor Power ≤ 100% [Step 2.3.3 RNO 1)]
		• IF adequate feed flow available, THEN place affected TDAFWP steam supply valve handswitch in AUTO after CLOSE if BOS OL cleared or PULL-OUT if BOS OL not clear [Step 2.3.3 RNO 2)]

Operating Test :	NRC	Scenario #	3	Event #	4	Page	24	of	54
Event Description:	Phase-to-Phase Ground on Safeguard Bus 1EA1								

Time	Position	Applicant's Actions or Behavior
	US	DIRECT TDAFWP be secured by placing Steam Supply valve in AUTO after STOP if BOS OL cleared OR PULL-OUT if BOS OL not clear
	BOP	• PLACE 1-HS-2452-1, AFWPT STM SPLY VLV MSL 4 in AUTO after STOP or PULL-OUT based on condition of BOS OL
		• IF power < 10%, THEN control AFW flow as necessary [Step 2.3.3 RNO 3)]
		• Check for fault condition locally (86-1/86-2) [Step 2.3.3 RNO 4)]
	US	DISPATCH an operator to locally check for fault condition.
Simulator Operator: If contacted to restart Vent Chiller #2, Insert CHR02 to RST then to ON		
NOTE: Step 3 RNO 6 should be performed for loss of a safeguards bus when the associated DG is not needed immediately. Placing the affected DG in PULL-OUT may be performed prior to this step and should be verified as part of Step 3 performance.		
Simulator Operator: When contacted about the cause of the bus loss, REPORT an 86-1 Lockout Actuation on 1EA1.		
		• IF bus needed immediately, THEN GO TO Step 4 [Step 2.3.3 RNO 5)]
		• IF DG running AND SSW not available, THEN place the affected DG in PULL-OUT to shutdown the DG [Step 2.3.3 RNO 6)]
CRITICAL TASK		**Place EDG 1-01 in Pull-Out per ABN-602, Response to a 6900/480V System Malfunction before EDG 1-01 has run unloaded for a total 15 minutes without cooling water flow.**
	US	DIRECT BOP operator to PLACE CS-1DG1E, DG 1 EMER STOP/START handswitch in PULL-OUT
CT-1	BOP	PLACE CS-1DG1E Emergency Diesel Generator 1-01 Control Switch in

Operating Test :	NRC	Scenario #	3	Event #	4	Page	25	of	54
Event Description:	Phase-to-Phase Ground on Safeguard Bus 1EA1								

Time	Position	Applicant's Actions or Behavior
		PULL OUT to shutdown the Diesel Generator.
Simulator Operator:		**As the SM, contact the US and REPORT another operator will perform ABN-602, Attachment 4, Restoration from a 6.9 KV Safeguard Bus Fault.**
	US	• IF bus lockout actuated AND bus NOT needed immediately, THEN restore affected bus per Attachment 4 AND GO TO Step 5 [Step 2.3.3 RNO 7)]
	US	INITIATE Attachment 4 to restore Safeguards Bus 1EA1.
Simulator Operator:		**When contacted to De-energized Train A BOS, execute Key 15 to insert EAR018 and EAR522 to OFF**
	RO/BOP	MONITOR Blackout Sequencer status: [Step 2.3.5]
		• Affected bus – ENERGIZED [Step 2.3.5.a]
		• Ensure all affected equipment – PULL OUT (Use Attachment 4, Step 6 for guidance, if necessary) [Step 2.3.5.a RNO a]
		• Component Cooling Water Pump 1-01.
		• HVAC Chiller 1.
		• Motor Driven AFW Pump 1-01.
		• Containment Spray Pumps 1-01 and 1-03.
		• Residual Heat Removal Pump 1-01.
		• Safety Injection Pump 1-01.
		• Centrifugal Charging Pump 1-01.
		• Station Service Water Pump 1-01.
		• Transformer T1EB3.
		• Transformer T1EB1.
	RO/BOP	• Monitor Blackout Sequencer – OPERATED [Step 2.3.5.b] • OUTPUT-STEP TIME lights – ALL DARK OR

Operating Test :	NRC	Scenario #	3	Event #	4	Page	26	of	54
Event Description:	Phase-to-Phase Ground on Safeguard Bus 1EA1								

Time	Position	Applicant's Actions or Behavior
		• Automatic lockouts AL light - DARK
	RO/BOP	• Align necessary equipment to unaffected train, using Attachment 2 for guidance [Step 2.3.5.b RNO b]
		• Component Cooling Water Pump 1-02. (Auto Start)
		• **CRDM Vent Fan 1-02.**
		• Station Service Water Pump 1-02. (Already running)
		• Containment Fan Coolers 1-02 and 1-04. (Already running)
		• **Neutron Detector Well Fan Cooler 10.**
		• Chill Water Recirc Pumps 1-02 and 1-04. (1-01 and 1-03 Already running)
		• **CR A/C FN 3.**
		• Instrument Air Compressor 1-02. (Auto Start)
		• **UPS & DISTR RM Fan A/C 2 (CV-01) (X-HS-3632)**
		• RMUWP X-01
		• Vent Chiller X-02
	RO/BOP	• Verify all required equipment actuated per Attachment 2 [Step 2.3.5.c]
Examiner Note: Step 2.3.5.d is Not Applicable since the Blackout Sequencer did not operate.		
Examiner Note: As FSS, when dispatched to align RMUW Pump X-01 to Unit 1 and status of Vent Chiller X-02, wait 2 minutes, then Execute Key 16. REPORT Vent Chiller X-02 checked de-energized and RMUW pump X-01 aligned to Unit 1.		
		• Recover from blackout sequencer operation per Section 8 while continuing [Step 2.3.5.d]
Examiner Note: As the SM, contact the US and REPORT additional operators will perform ABN-602, Section 8.0 as personnel become available.		
	US/BOP	Check 138 KV/345 KV voltages [Step 2.3.6] • 138 KV, 135 – 144 KV

Operating Test :	NRC	Scenario #	3	Event #	4	Page	27	of	54
Event Description:	Phase-to-Phase Ground on Safeguard Bus 1EA1								

Time	Position	Applicant's Actions or Behavior
		• 345 KV, 340 – 361 KV
	US/BOP	Check 6.9 KV and 480V safeguard bus voltages [Step 2.3.7] • 6.9 KV, 6480 – 7150V • 480V, 455 – 508V
	RO/BOP	Check all MCCs and loads restored to normal configuration [Step 2.3.8]
		• Ensure SFP cooling in operation [Step 2.3.8.a]
	US	DETERMINE LIMITING CONDITION FOR OPERATION (MODE 1, 2, 3, OR 4) [STEP 2.3.9]
		• Check TS: [Step 2.3.9.a] • 3.8.1 • 3.8.4 • 3.8.7 • 3.8.9 • 3.4.4 • 3.4.5 • 3.4.6
		• LCO 3.7.5.C, Auxiliary Feedwater (AFW) System.
		• CONDITION C - Two AFW trains inoperable. • ACTION C.1 - Be in MODE 3 within 6 hours, AND • ACTION C.2 - Be in MODE 4 within 18 hours.
		• LCO 3.4.1.A RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits.
		• CONDITION A - One or two required battery Chargers on one train inoperable. • ACTION A.1 - Restore RCS DNB parameter(s) to within limit within 2 hours.
		• LCO 3.8.9.A, Distribution Systems - Operating.
		• CONDITION A - One AC electrical power distribution subsystem inoperable. • ACTION A.1 - Restore AC electrical power distribution subsystem to

Operating Test :	NRC	Scenario #	3	Event #	4	Page	28	of	54
Event Description:	Phase-to-Phase Ground on Safeguard Bus 1EA1								

Time	Position	Applicant's Actions or Behavior
		OPERABLE status within 8 hours.
	US	Perform OPT-215 to complete within one hour, as applicable. [Step 2.3.9.b]
	BOP	Reset CVI, if necessary [Step 2.3.10]
	US	Check RV-5100 [Step 2.3.11]
	US	Notify Chemistry to determine if release permit required for TDAFW operation [Step 2.3.12]
	US	Refer to EPP-201 [Step 2.3.13]
	US	Enter into issue reporting program IAW STA-421 [Step 2.3.14]
When Technical Specifications have been addressed, or at Lead Examiner discretion, PROCEED to Event 5, 6, and 7		

Operating Test :	NRC	Scenario #	3	Event #	5 & 6	Page	29	of	54
Event Description:	Loss of Offsite Power, Loss of 1C1 to C14 (DRPI Failure)								

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**When directed, EXECUTE Event 5 (Key 5).** **- ED01, Loss of Offsite Power** **- EAR454, Loss of 1C1 to 1C14 (DRPI Failure)**
Indications Available:		**Numerous Reactor Trip and Loss of Offsite Power Alarms.**
	RO/BOP	RECOGNIZE Reactor Trip due to Loss of Offsite Power.
	US	DIRECT performance of EOP-0.0A, Reactor Trip or Safety Injection
Simulator Operator:		**When Unit 1 trips, Announce Unit 2 Reactor Trip.**
Examiner Note:		**When the Loss of Offsite Power occurs DG 1-02 will start and power Safeguards Bus 1EA2. The crew will enter EOP-0.0A, Reactor Trip or Safety Injection. The following steps are from EOP-0.0A.**
Simulator Operator:		**When contacted about the status of Off-Site Power inform the crew as the Generation Controller that power has only been lost to CPNPP and power restoration work is in progress.**
	RO	VERIFY Reactor Trip: [Step 1]
		• VERIFY the following: [Step 1.a]
		• VERIFY Reactor Trip Breakers – OPEN.
		• VERIFY Neutron flux – DECREASING.
		• VERIFY all Control Rod Position Rod Bottom Lights – DARK. [Step 1.b]
Examiner Note:		**All DRPI indication will be lost due to the Loss of Offsite Power. The crew will be required to Emergency Borate 3600 gallons of 7000 ppm boric acid for a Loss of DRPI if verification of "All Rod Bottom Lights – ON" is not made prior to the loss of DRPI. The RO will be required to use Boric Acid Transfer Pump 1-02 to Emergency Borate. The steps for Emergency Boration are included after the first four steps of EOP-0.0A.**

Operating Test :	NRC	Scenario #	3	Event #	5 & 6	Page	30	of	54
Event Description:	Loss of Offsite Power, Loss of 1C1 to C14 (DRPI Failure)								

Time	Position	Applicant's Actions or Behavior
	BOP	VERIFY Turbine Trip: [Step 2]
		• VERIFY all HP Turbine Stop Valves – CLOSED. [Step 2]
Simulator Operator:		**When contacted as the SM to provide extra personnel to execute ABN-601, acknowledge request and report that an extra person will be provided when one becomes available.**
	BOP	VERIFY Power to AC Safeguards Buses: [Step 3]
		• VERIFY AC Safeguards Buses – AT LEAST ONE ENERGIZED. [Step 3.a]
		• RECOGNIZES that Safeguards Bus 1EA2 is energized from the Train B DG
		• VERIFY AC Safeguards Busses – BOTH ENERGIZED [Step 3.b]
	US	• RESTORE power to de-energized AC Safeguards Bus per ABN-601, RESPONSE TO A 138/345 KV SYSTEM MALFUNCTION or ABN-602, RESPONSE TO A 6900/480 VOLT SYSTEM MALFUNCTION when time permits. [Step 3.b. RNO b]
	RO	CHECK SI Status: [Step 4]
		• CHECK If SI Is Actuated: [Step 4.a]
		• SI actuation as indicated on the First Out Annunciator 1-ALB-6C [Step 4.a]
		• SI Actuated blue status light – ON [Step 4.a]
		• SI Actuation verified by using Alternate Indications – RWST Auto Swapover Blue lights LIT
		• CHECK if SI is required: [Step 4.a RNO a]
		• Steam Line Pressure less than 610 psig
		• Pressurizer Pressure less than 1820 psig
		• Containment Pressure greater than 3.0 psig
		• IF SI is NOT required, THEN go to EOS-0.1A, REACTOR TRIP RESPONSE, Step 1
Examiner Note:		**The following steps are from ABN-107, Emergency Boration, Attachment 1, Emergency Boration Through Emergency Borate Valve 1-8104**

Operating Test :	NRC	Scenario #	3	Event #	5 & 6	Page	31	of	54
Event Description:	Loss of Offsite Power, Loss of 1C1 to C14 (DRPI Failure)								

Time	Position	Applicant's Actions or Behavior
CRITICAL TASK		**Manually initiate Emergency Boration per ABN-107, Emergency Boration, due to a loss of DRPI, prior to exiting EOS-0.1A, Reactor Trip Response.**
	RO/BOP	Ensure a charging pump is running: [Step 1] • 1/1-APCH2, CCP 2
CT-2		Start a boric acid transfer pump: [Step 2] • 1/1-APBA2, BA XFER PMP 2 – AUTO (AFTER START)
CT-2		Open 1/1-8104, EMER BORATE VLV [Step 3]
		Verify flow on 1-FI-183A, EMER BORATE FLO [Step 4]
		Verify flow on 1-FI-121A, CHRG FLOW [Step 5]
		IF EMER BORATE FLOW OR CHRG FLOW can NOT be verified, THEN initiate Emergency Boration Flow per another method of ABN-107 [Step 6]
		WHEN desired to terminate emergency boration (Reference Attachment 7 of ABN-107), THEN GO TO Step 8 of ABN-107 [Step 7]
Examiner Note:		**The following steps are from EOS-0.1A, Reactor Trip Response**
Simulator Operator:		**After the crew has executed the first two steps of EOS-0.1A, Reactor Trip Response AND the lineup to Emergency Borate has been completed, EXECUTE Event 7 (Key 6) – EDG 1-02 Overspeed Trip**
CAUTION:		If SI actuation occurs during this procedure, EOP-0.0A, REACTOR TRIP OR SAFETY INJECTION shall be performed.
Examiner Note:		**Operator may reset ARV's to 1092 PSIG, in AUTO, to control temperature. They may use engraved Job Aid located next to controllers or TDM-501A, to determine the potentiometer setpoint of 8.40 turns.**

Operating Test :	NRC	Scenario #	3	Event #	5 & 6	Page	32	of	54
Event Description:	Loss of Offsite Power, Loss of 1C1 to C14 (DRPI Failure)								

Time	Position	Applicant's Actions or Behavior
	RO	CHECK RCS Temperature - [Step 1]
		• CHECK RCPs – ANY RUNNING [Step 1.a]
		• RCS AVERAGE TEMPERATURE STABLE AT OR TRENDING TO 557°F [Step 1.b]

		• IF temperature greater than 557°F and increasing, THEN dump steam:
		  • To atmosphere using SG atmospherics.
		  • PLACED ARV controllers in MANUAL, sweep potentiometer and set to 8.40 turns (1092 psi) then place controller back in AUTO.
		  • 1PK-2325, SG 1 ATMOS RLF VLV CTRL
		  • 1PK-2326, SG 2 ATMOS RLF VLV CTRL
		  • 1PK-2327, SG 3 ATMOS RLF VLV CTRL
		  • 1PK-2328, SG 4 ATMOS RLF VLV CTRL

		NOTE: When establishing feedwater to SGs, at least two SGs should be used.
	BOP	CHECK FW Status: [Step 2]
		• VERIFY reactor trip breakers – OPEN [Step 2.a]
		• CHECK RCS average temperatures – LESS THAN 564°F [Step 2.b]
		• VERIFY Feedwater Isolation – ISOLATION COMPLETE [Step 2.c]
		• VERIFY total AFW flow to SGs – GREATER THAN 460 GPM [Step 2.d]
When the crew has completed two steps in EOS-0.1A AND Emergency Boration has been completed, EXECUTE Event 7 (Key 6).		

Operating Test :	NRC	Scenario #	3	Event #	7	Page	33	of	54
Event Description:	EDG 1-02 Overspeed Trip, Loss of Onsite Power after Emergency Boration complete								

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**When directed, EXECUTE Event 7 (Key 6).** **- EG07B, EDG 1-02 Overspeed Trip, Loss of Onsite Power after Emergency Boration complete**
Indications Available:		**V-1EG2, DG 2 VOLT drops to 0 volts** **F-1EG2, DG 2 FREQ drops to 0 Hz** **10B-2.6 – 6.9 KV BUS 1EA1/1EA2 VOLT LOSS**
Examiner Note:		**When DG 1-02 trips on overspeed, the crew will transition to ECA-0.0A, Loss of All AC Power due to BOTH Safeguards Busses being de-energized. ECA-0.0A, Loss of All AC Power steps begin here.**
		NOTE: CSF Status Trees should be monitored for information only. FRGs should not be implemented.
	RO	VERIFY Reactor Trip: [Step 1]
		• VERIFY Reactor Trip Breakers – AT LEAST ONE OPEN. [Step 1]
		• VERIFY Neutron flux – DECREASING. [Step 1]
	BOP	VERIFY Turbine Trip: [Step 2]
		• VERIFY all HP Turbine Stop Valves – CLOSED. [Step 2]
	RO	CHECK If RCS Is Isolated: [Step 3]
	RO	• CHECK Letdown Isolation Valves – CLOSED. [Step 3.a]
		• 1/1-LCV-459 and 1/1-LCV-460
Examiner Note:		**The Letdown Isolation Valves are interlocked with the Letdown Orifice Isolation Valves. The Letdown Isolation Valves cannot be closed until the Letdown Orifice Isolation Valves are closed.**

Operating Test :	NRC	Scenario #	3	Event #	7	Page	34	of	54
Event Description:	EDG 1-02 Overspeed Trip, Loss of Onsite Power after Emergency Boration complete								

Time	Position	Applicant's Actions or Behavior
	RO	• CLOSE Letdown Isolation Valves. [Step 3.a RNO]
		• PLACE 1/1-8149A AND 1/1-8149B, Letdown Orifice Isolation Valves in CLOSE.
		• PLACE 1/1-LCV-459 AND 1/1-LCV-460, Letdown Isolation Valves in CLOSE. [Step 3.a RNO]
	RO	• CHECK Pressurizer Power Operated Relief Valves – CLOSED. [Step 3.b]
	RO	• CHECK Excess Letdown Isolation Valves – CLOSED. [Step 3.c]
		• 1/1-8153 and 1/1-8154
Examiner Note:		**The operator may place 1-HS-4165A and 1-HS-4167A in CLOSE, but action is NOT required as the valves are already in the CLOSED position.**
	RO	• CHECK Primary Sample System Isolation Valves – CLOSED. [Step 3.d]
		• 1/1-4165A and 1/1-4167A
	RO/BOP	VERIFY AFW Flow – GREATER THAN 460 GPM. [Step 4]
Simulator Operator:		**IF/WHEN contacted about the Train B DG, wait 3 minutes and inform crew the DG overspeed trip mechanism is damaged; prompt team has been contacted to investigate.**
Examiner Note:		**The Unit Supervisor will recognize Safeguards Bus 1EA1 has a LOR actuated and only perform the applicable portions of Step 5 on DG 1-02. IF the crew receives the DG 1-02 damage report prior to performing Step 5, THEN Steps 5.a. and 5.b. may not be completed.**
	BOP	RESTORE Power to Any AC Safeguards Bus: [Step 5]
		• ENERGIZE safeguards bus 1EA2 with DG 1-02 [Step 5.a]
		• VERIFY DG 1-02 – NOT RUNNING [Step 5.a.1)]
		• START DG 1-02 as follows: [Step 5.a.1) RNO 1)]

Operating Test :	NRC	Scenario #	3	Event #	7	Page	35	of	54
Event Description:	EDG 1-02 Overspeed Trip, Loss of Onsite Power after Emergency Boration complete								

Time	Position	Applicant's Actions or Behavior
		• PERFORM an Emergency Start. [Step 5.a.1) RNO 1)A)]
		• IF the Diesel Generator is NOT running, THEN perform a Normal Start. [Step 5.a.1) RNO 1)B)]
		• IF the Diesel Generator is NOT running, THEN place the DG EMER STOP/START handswitch in PULL-OUT AND go to Step 5.b. [Step 5.a.1) RNO 1)C)]
		• ENERGIZE Safeguards Bus 1EA1 with Diesel Generator 1-01 [Step 5.b] **(This step should not be performed as Safeguards Bus 1EA1 has a LOR actuated on the bus)**
		• CHECK AC safeguards busses – AT LEAST ONE ENERGIZED [Step 5.c]
	BOP	• ENERGIZE AC safeguards bus per ABN-601, RESPONSE TO A 138/345 KV SYSTEM MALFUNCTION while continuing in this procedure. [Step 5.c. RNO c.1)]
	US	• GO to Step 6. OBSERVE CAUTIONS PRIOR TO STEP 6. [Step 5.c. RNO c.2)

Examiner Note: **The BOP is directed to ABN-601, Response to a 138/345 KV System Malfunction, Section 6.0, Loss of All Offsite and Onsite AC Power. Those steps are located at the end of the scenario, starting at page 44.**

Simulator Operator: **Approximately 5 minutes after the initial DG 1-02 damage report, inform the crew that Prompt Team has inspected DG 1-02 and estimates 6-8 hours to repair the damaged Overspeed Trip Mechanism.**

CAUTION: A loss of all AC power will result in a loss of normal plant lighting, possible loss of security door card readers and possible increases in area temperatures. Review plant conditions prior to having operator perform local actions. Notify Plant Staff of intentions if time permits.

Operating Test :	NRC	Scenario #	3	Event #	7	Page	36	of	54
Event Description:	EDG 1-02 Overspeed Trip, Loss of Onsite Power after Emergency Boration complete								

Time	Position	Applicant's Actions or Behavior
		CAUTION: A loss of all AC power will affect normal egress from the Containment Building. Attachment 9 of EOP-0.0A, REACTOR TRIP OR SAFETY INJECTION provides instruction to evacuate personnel from Containment during a Loss of All AC Power.
	US	MONITOR AC Safeguards Bus Status: [Step 6]
		• AC safeguards busses – AT LEAST ONE ENERGIZED [Step 6.a]
		• GO to Step 7. [Step 6.a. RNO a]
		• Go to Step 29. [Step 6.b] **(This step is a Continuous Action Step and will be used later in the scenario when an APDG is powering a safeguards bus.)**
Examiner Note:		**At this point, Safety Injection will not be actuated. When SI actuates, the crew will return to Steps 7.b, c, & d and perform reset of SI and SI Sequencers.**
	RO	CHECK Safety Injection Signal Status: [Step 7]
		• SI – HAS BEEN ACTUATED. [Step 7.a]
		• WHEN SI is actuated, THEN PERFORM Steps 7.b, 7.c, & 7.d. [Step 7.a RNO a.1)]
		• GO to Step 8. OBSERVE CAUTION PRIOR TO STEP 8. [Step 7.a RNO a.2)]
	RO	• VERIFY Reactor Trip Breakers – OPEN. [Step 7.b]
	RO/BOP	• RESET Safety Injection. [Step 7.c]
		• DEPRESS 1/1-SIRA, TRAIN A SI RESET pushbutton.
		• DEPRESS 1/1-SIRB, TRAIN A SI RESET pushbutton.
	RO/BOP	• RESET Safety Injection Sequencers. [Step 7.d]
		• At SI Sequencer Train A Cabinet, DEPRESS SI SEQR RESET green pushbutton then PLACE ON/RESET toggle switch in RESET.

Time	Position	Applicant's Actions or Behavior
		• PLACE ON/RESET toggle switch in ON.
		• At SI Sequencer Train B Cabinet, DEPRESS SI SEQR RESET green pushbutton then PLACE ON/RESET toggle switch in RESET.
		• PLACE ON/RESET toggle switch in ON.
Simulator Operator:		**When contacted to locally break Condenser vacuum, EXECUTE remote functions FWR071, FWR072, & FWR073 to open Auxiliary and Main Condenser Vacuum Breaker Isolation Valves (Key 7).**
Examiner Note:		**When Safety Injection and the SI Sequencers are properly RESET, Annunciator 1-ALB-2B, Window 2.8 – SFGD SEQR TRN A/B AUTO TEST TRBL, will RESET.**
CAUTION:		An SSW pump should be kept available to automatically load on its AC safeguards bus to provide diesel generator cooling.
	RO/BOP	PLACE Following Equipment Switches in PULL-OUT: [Step 8]
		• Safety Injection Pumps
		• Containment Spray Pumps
		• Containment Spray Heat Exchanger Outlet Valves
		• Containment Fan Coolers
		• Component Cooling Water Pumps
		• Safety Chilled Water Recirc Pumps
		• Residual Heat Removal Pumps
		• Centrifugal Charging Pumps
		• Motor Driven Auxiliary Feedwater Pumps
		• Control Room Air Conditioning Units without power available (no actions required)

Time	Position	Applicant's Actions or Behavior
		• Ventilation Chilled Water Recirc Pumps without power available (no actions required)
	US	DISPATCH Personnel to Locally Restore AC power per ABN-601, Response to a 138/345 KV System Malfunction or ABN-602 Response to a 6900/480 V System Malfunction while continue with this procedure. [Step 9]
Simulator Operator:		**When contacted, EXECUTE remote functions CVR21 thru 25 to isolate RCP Seal Water flow and EXECUTE remote function CCR10 to isolate Thermal Barrier Cooler cooling water (key 9).**
	US	DISPATCH Personnel to Locally Isolate RCP Seals. [Step 10]
		• 1/1-8100, RCP Seal Water Return Isolation Valve [Step 10.a]
		• 1CS-8369A, RCP Seal Injection Throttle Valve [Step 10.b]
		• 1CS-8369B, RCP Seal Injection Throttle Valve
		• 1CS-8369C, RCP Seal Injection Throttle Valve
		• 1CS-8369D, RCP Seal Injection Throttle Valve
		• 1-HV-4709, Thermal Barrier Cooler CW Return Isolation Valve [Step 10.c]
Simulator Operator:		**IF/WHEN contacted about status of APDGs, wait 3 minutes and report APDGs are in their normal standby condition. WHEN contacted about the status of UNIT 2 ELAP conditions, report UNIT 2 has power to BOTH safeguards busses from their Emergency Diesel Generators.**
Simulator Operator:		**When contacted about the status of Off-Site Power inform the crew as the Generation Controller that power restoration to CPNPP is imminent.**
Simulator Operator:		**As Shift Manager, report Unit 2 has DGs powering both Safeguard busses.**
		Determine Site ELAP Conditions: [Step 11]

Operating Test :	NRC	Scenario #	3	Event #	7	Page	39	of	54
Event Description:	EDG 1-02 Overspeed Trip, Loss of Onsite Power after Emergency Boration complete								

Time	Position	Applicant's Actions or Behavior

		• Check Unit 1 AC safeguard power will be restored within 4 hours [Step 11.a]
		  • Any DG will be made available
		  • Any APDG will be made available
		  • Any Switchyard Source will be made available

		• CHECK Unit 2 does NOT meet ELAP conditions. [Step 11.b]
Simulator Operator:		**When contacted, EXECUTE remote functions FWR077 and FWR078 to CLOSE Condensate Storage Tank Discharge Valves (Key 10).**
	RO/BOP	VERIFY Condensate Storage Tank Isolated from Hotwell: [Step 12]
		• Locally ENSURE CST Discharge Valves – CLOSED. [Step 12.a]
		• 1-HV-2484 and 1-HV-2485
	RO/BOP	CHECK SG Status: [Step 13]
		• VERIFY the following alignment: [Step 13.a]
		• Main Steam Isolation Valves – CLOSED.
		• Main Feedwater Control and Bypass Valves – CLOSED.
		• Blowdown and Sample Isolation Valves – CLOSED.
		• Upstream Main Steam Drippot Isolation Valves – CLOSED.
Simulator Operator:		**When contacted to Manually Isolate the MSIVs, EXECUTE remote functions MSR15 (Key 14).**
	RO/BOP	• DISPATCH personnel to locally isolate air to MSIVs. [Step 13.b]
CAUTION:		A faulted or ruptured SG that is isolated should remain isolated. Steam supply to the TDAFW pump must be maintained from at least one SG.

Operating Test :	NRC	Scenario #	3	Event #	7	Page	40	of	54
Event Description:	EDG 1-02 Overspeed Trip, Loss of Onsite Power after Emergency Boration complete								

Time	Position	Applicant's Actions or Behavior
		Simulator Operator: When the crew reaches Step 14 of ECA-0.0A, contact the US as the Grid Controller and inform that Offsite Power has been restored to the 138 KV Switchyard (XST1) to CPNPP. The BOP should then PROCEED to Step 23 of ABN-601. DELETE Malfunction ED01 and ensure power is available to Transformer XST1.
	RO/BOP	CHECK If Any SG Is Faulted: [Step 14]
		• CHECK any SG Pressure – DECREASING IN AN UNCONTROLLED MANNER. [Step 14.a]
		• CHECK any SG – COMPLETELY DEPRESSURIZED. [Step 14.a]
	US	• GO to Step 15. [Step 14.a. RNO a]
	RO/BOP	CHECK if SG Tubes are Ruptured: [Step 15]
		• CHECK Steam Generator Level – INCREASING IN AN UNCONTROLLED MANNER. [Step 15.a]
	US	• CONTINUE with Step 15. OBSERVE CAUTION and NOTE Prior to Step 16. [Step 15.a. RNO a]
	RO/BOP	CHECK CST Level: [Step 16]
		• CST Level – GREATER THAN 26% [Step 16.a]
		• CST Level – GREATER THAN 10% [Step 16.b]

CAUTION: Damage to a Turbine Driven AFW Pump may result from continuous operation (more than 20 minutes) at flows less than 130 gpm.

Operating Test :	NRC	Scenario #	3	Event #	7	Page	41	of	54
Event Description:	EDG 1-02 Overspeed Trip, Loss of Onsite Power after Emergency Boration complete								

Time	Position	Applicant's Actions or Behavior
		NOTE: The TDAFW pump flow control valve (1-HV-2459, 2460, 2461, and 2462) accumulators have only a thirty (30) minute air supply. These are fail open valves. If flow needs to be adjusted, then refer to Attachment 6 to attain local control.
		Simulator Operator: If contacted to manually control flow from the TDAFWP to the Steam Generators per Attachment 6, TDAFW Pump Flow Control, use remote functions FWR064 – 067 to throttle TDAFWP flow as necessary.
	RO/BOP	CHECK Intact SG Levels: [Step 17]
		• SG Narrow Range Level – GREATER THAN 43% (50% for ADVERSE CONTAINMENT). [Step 17.a]
		• CONTROL AFW flow to maintain narrow range level between 43% (50% for ADVERSE CONTAINMENT) and 60%.[Step 17.b]
		Examiner Note: When contacted to perform initial DC load shedding per Attachment 2.A of ECA-0.0A, EXECUTE remote (Key 11).
	RO/BOP	CHECK DC Bus Loads: [Step 18]
		• INITIATE Shedding of DC Loads per Attachment 2.A. [Step 18.a]
		• CHECK ELAP – HAS BEEN DECLARED [Step 18.b]
		• Perform the following: [Step 18.b. RNO b]
		• IF Voltage is less than 110 Volts, THEN determine necessity of shedding additional DC loads per Attachment 2.C. [Step 18.b. RNO b.1)]
		• GO to Step 19. [Step 18.b. RNO b.2)]
		CAUTION: SG pressures should not be decreased to less than 240 psig to prevent injection of accumulator nitrogen into the RCS.

Time	Position	Applicant's Actions or Behavior
		CAUTION: SG narrow range level should be maintained greater than 43% (50% FOR ADVERSE CONTAINMENT) in at least one intact SG. If level cannot be maintained, SG depressurization should be stopped until level is restored in at least one intact SG.
		NOTE: Depressurization of SGs will result in SI actuation. SI should be reset to permit manual loading of equipment on AC safeguards bus.
		NOTE: PRZR level may be lost and reactor vessel upper head voiding may occur due to depressurization of SGs. Depressurization should not be stopped to prevent these occurrences.
	RO/BOP	DEPRESSURIZE Intact SGs to 310 PSIG. [Step 19]
		• CHECK SG Narrow Range Level – GREATER THAN 43% (50% for ADVERSE CONTAINMENT) in at least one SG. [Step 19.a]
		• Manually DUMP steam using SG atmospheric(s) to maintain cooldown rate in RCS cold legs – LESS THAN 100°F/HR. [Step 19.b]
		• CHECK SG pressures – LESS THAN 310 PSIG [Step 19.c]
		• WHEN SG pressures decrease to less than 310 psig, THEN perform Steps 19d, 19e and 19f. [Step 19.c. RNO c.1)]
		• GO to Step 20. [Step 19.c. RNO c.2)]
Examiner Note:		**Based on timing the crew may move on to Step 20, however, Steps 19d and 19e should be performed when SG pressures are below 310 psig. Step 19f should NOT be performed as ELAP should NOT be declared.**
		• Manually CONTROL SG atmospheric(s) to maintain SG pressures at 310 psig. [Step 19.d]
		• CHECK ELAP – HAS BEEN DECLARED. [Step 19.e]
		• GO to Step 20. [Step 19.e. RNO e]

Operating Test :	NRC	Scenario #	3	Event #	7	Page	43	of	54
Event Description:	EDG 1-02 Overspeed Trip, Loss of Onsite Power after Emergency Boration complete								

Time	Position	Applicant's Actions or Behavior
Examiner Note: When power is restored to a Safeguards Bus via Offsite Power, then a transition to ECA-0.0A, Step 29 should be made.		
	US	When Power Is Restored to Any Safeguards Bus, CONTINUE Recovery Actions Starting with Step 29. [CONTINUOUS ACTION STEP 6.b]
	US	CHECK If AC Safeguards Power Is Restored: [Step 29]
		• CHECK AC safeguards busses – AT LEAST ONE ENRGIZED [Step 29.a]
		• CHECK ELAP implementation status: [Step 29.b]
		• ELAP – HAS BEEN DECLARED [Step 29.b.1)]
		• GO to Step 30. [Step 29.b.1) RNO 1)]
		STABILIZE SG Pressures: [Step 30]
		• Manually CONTROL SG atmospheric(s). [Step 30.a]
The following pages are actions of ABN-601 that will be performed by the BOP. When Offsite Power has been restored to Bus 1EA2 per ABN-601, or at Lead Examiner's discretion, TERMINATE the scenario.		

Operating Test :	NRC	Scenario #	3	Event #	N/A	Page	44	of	54
Event Description:	ABN-601, Section 6.0								

Time	Position	Applicant's Actions or Behavior
Examiner Note:		**The following steps are from ABN-601, Section 6.0. These steps are performed in preparation for restoring onsite and/or offsite power.**
		CAUTION: Loads shall not be placed on offsite power without the TGM Transmission Grid Controller's concurrence.
		NOTE: Security card readers are equipped with a one hour battery pack. Entry into areas after this time may require use of hard keys which may be obtained from the Key Control Facility (KCF) located at PAP. In addition, loss of normal lighting and ventilation may require use of portable lighting or heat stress equipment while performing local actions.
	BOP	CHECK the unit in MODES 1, 2, 3, or 4. [Step 6.3.1]
		NOTE: • Immediately following shutdown, there is a delay of approximately 2 minutes before the DG will accept a Normal start. This time delay is associated with the DG pneumatic logic board and may be over-ridden with an Emergency Start. • Performance of an Emergency Start will allow the DG breaker to automatically close on a phase to ground bus fault (LOR 86-2/uEA1 or 86-2/uEA2). The DG breaker will not automatically close and can not be manually closed on a phase to phase bus fault (LOR 86-1/uEA1 or 86-1/uEA2). • When a fault exists on the 6.9 KV safeguard bus, the SSW pump will not be running to supply cooling water to the DG. The time this condition exists should be minimized (approximately 15 minutes) to prevent damage to the DG.
	BOP	RESTORE Power to any 6.9 KV Safeguard Bus per ECA-0.0A. [Step 6.3.2]
	BOP	INITIATE Attachment 15, Secondary System Shutdown Following a Loss of Power. [Step 6.3.3]
Examiner Note:		**The following steps are from ABN-601, Attachment 15. The BOP may pass off the entire Attachment to the Field Support team.**

Operating Test :	NRC	Scenario #	3	Event #	N/A	Page	45	of	54
Event Description:	ABN-601, Section 6.0								

Time	Position	Applicant's Actions or Behavior
		NOTE: The following system operations should be used as a guide for securing the secondary systems and restoration of buses in the event of a loss of all normal power. TPCW flow should be restored as soon as possible to cool the turbine/generator lube oil/seal oil systems to prevent expansion into the turbine/generator regions.
	BOP	ENSURE Turbine – TRIPPED. [Step 1]
Simulator Operator: If contacted to manually close MSIV, EXECUTE Key 15 to insert MSR15		
	BOP	CLOSE Main Steam Isolation Valves as follows: [Step 2]
		• CLOSE Main Steam Isolation Valves. [Step 2.a]
		• DISPATCH operator to locally isolate MSIVs air solenoids. [Step 2.b]
		• LOCALLY drain MSIV upstream drip pots. [Step 2.c]
		• VERIFY Feedwater Isolation Bypass Valves upstream manual isolations – CLOSED. [Step 2.d]
	BOP	VERIFY Emergency DC Seal Oil Pump – RUNNING. [Step 3] • Field actions – FSS Contacted
Examiner Note: Additional actions in ABN-601, Attachment 15 will be performed by the Field Support team. ABN-601, Section 6.0 steps are continued here.		
	BOP	CHECK AC Safeguard Bus Status: [Step 6.3.4]
		• VERIFY at least one 6.9KV Safeguard Bus – ENERGIZED [Step 6.3.4.a]
		• Locally START DGs per Attachment 1, Restoration of a Diesel Generator AND GO TO Step 5. [Step 6.3.4.a.RNO]

Operating Test :	NRC	Scenario #	3	Event #	N/A	Page	46	of	54
Event Description:	ABN-601, Section 6.0								

Time	Position	Applicant's Actions or Behavior
		NOTE: • If CPNPP loses voltage on all switchyard buses AND incoming transmission lines, it must be assumed that there is a system wide blackout. Per the Black Start Plan, Transmission personnel should be dispatched to prepare the switchyard for re-energization. To ensure a timely response, the TGM Transmission Grid Controller will need an accurate status of the CPNPP switchyard, facilities, **AND** Emergency Diesel Generators. The Black Start Plan will normally energize the 138 KV transmission system first (See Attachment 18), **therefore actions necessary to assess XST1 status should be given highest priority.** • The Emergency Notification System is part of the site PBX system. On loss of power, the PBX system is backed up by a four hour battery power supply. There are also telephone circuits available which are powered from offsite (Somervell County) and radio communications with battery backup. Alternate or backup options for communications are specified in EPP-202 and/or Position Assistance Documents. Distribution Panel 1C1 supplies the Center Desk receptacles which provide power to the Fax machine, computers and copy machine. These items may not be available for emergency response.
	BOP	CHECK Switchyard Bus Status – ALL ENERGIZED. [Step 6.3.5]
		• V-E BUS, 345 KV E. BUS VOLT (CB-12) - BETWEEN 340 KV and 361 KV.
		• V-W BUS, 345 KV W. BUS VOLT (CB-12) - BETWEEN 340 KV and 361 KV.
		• V/ST1, START XFMR XST1 138 KV FDR VOLT (CB-12) - BETWEEN 135 KV and 144 KV.
		• ENSURE applicable portions of Attachment 20, Alignment of the Black Start Corridor are initiated, if necessary while continuing with this procedure. [Step 6.3.5. RNO]
	BOP	VERIFY Main Turbine and Feedwater Pump Turbine Emergency DC Lube Oil Pumps – RUNNING. [Step 6.3.6]
	US/SM	REFER to EPP-201 and STA-501. [Step 6.3.7]

Time	Position	Applicant's Actions or Behavior
		CAUTION: Train A and B UPS A/C units are powered from common MCCs. Although a UPS A/C unit may have power available, a loss of CCW will result in a trip of the UPS A/C compressors due to a high condenser pressure. The UPS A/C units should be checked locally to verify the compressors are operating.
	BOP	Locally VERIFY UPS room fan coil units – OPERATING. [Step 6.3.8]
		Simulator Operator: When/IF dispatched to verify Train B UPS A/C Unit is running, wait 3 minutes and report that it is running.
		CAUTION: When power is available to any AC safeguards bus, recovery actions should continue starting with Step 23.
	BOP	PLACE breaker handswitches in PULL-OUT: [Step 6.3.9]
		• CS-1EA1-1, INCOMING BKR 1EA1-1
		• CS-1EA1-2, INCOMING BKR 1EA1-2
		• CS-1EG1, DG 1 BKR 1EG1
		• CS-1EA2-1, INCOMING BKR 1EA2-1
		• CS-1EA2-2, INCOMING BKR 1EA2-2
		• CS-1EG2, DG 2 BKR 1EG2
	BOP	OPEN the following breakers: [Step 6.3.10]
		• CS-T1EB1, XFMR BKR T1EB1
		• CS-1EB1-1, INCOMING BKR 1EB1-1
		• CS-T1EB3, XFMR BKR T1EB3
		• CS-1EB3-1, INCOMING BKR 1EB3-1
		• CS-T1EB2, XFMR BKR T1EB2
		• CS-1EB2-1, INCOMING BKR 1EB2-1

Time	Position	Applicant's Actions or Behavior
		• CS-T1EB4, XFMR BKR T1EB4
		• CS-1EB4-1, INCOMING BKR 1EB4-1
		NOTE: The Alternate Power Generators are limited to 3 MWs total power.
	BOP	INITIATE actions to restore power to at least one AC safeguards bus from any available source including the following attachments as needed: [Step 6.3.11]
		• Restoration of the Diesel Generator – Attachment 1
		• Restoration of XST1 – Attachment 2
		• Restoration of XST2 OR XST2A – Attachment 3
		• Restoration of the 345 KV Transformer Feeder Line – Attachment 4
		• Restoration from a 6.9 KV Safeguards Bus Fault – Attachment 5
		• SOP-614A/B Alternate Power Generator Operation (if connected)
	BOP	PLACE the following non-safeguards breaker handswitches in PULL-OUT: [Step 6.3.12]
		• CS-1A1-2 INCOMING BKR 1A1-2
		• CS-1A2-2 INCOMING BKR 1A2-2
		• CS-1A3-2 INCOMING BKR 1A3-2
		• CS-1A4-2 INCOMING BKR 1A4-2
	BOP	OPEN the following breakers: [Step 6.3.13]
		• CS-T1B1 XFMR BKR T1B1
		• CS-1B1-1 INCOMING BKR 1B1-1
		• CS-T1B2 XFMR BKR T1B2
		• CS-1B2-1 INCOMING BKR 1B2-1
		• CS-T1B3 XFMR BKR T1B3
		• CS-1B3-1 INCOMING BKR 1B3-1

Operating Test :	NRC	Scenario #	3	Event #	N/A	Page	49	of	54
Event Description:	ABN-601, Section 6.0								

Time	Position	Applicant's Actions or Behavior
		• CS-T1B4 XFMR BKR T1B4
		• CS-1B4-1 INCOMING BKR 1B4-1
Simulator Operator:		**When the crew reaches Step 14 of ECA-0.0A, contact the US as the Grid Controller and inform that Offsite Power has been restored to the 138 KV Switchyard (XST1) to CPNPP. The BOP should then PROCEED to Step 23 of ABN-601. DELETE Malfunction ED01 and ensure power is available to Transformer XST1.**
	BOP	When off-site power is available to the 345 KV Switchyard, INITIATE actions to restore power to the AC non-safeguards buses from any available source. [Step 6.3.14]
		• Restoration of the 345 KV Transformer Feeder Line – Attachment 4
		• Restoration 1ST – Attachment 6
		• Restoration 2ST – Attachment 7
		• Restoration from a 6.9 KV Non-Safeguards Bus Fault – Attachment 8
CAUTION: Various safeguard and non-safeguard instrument power supplies will be load shed during subsequent steps. Since instrument loops normally maintain 4 ma output to provide zero (0) indication on the meter, de-energized instruments can usually be identified by below 0 indication.		
Simulator Operator:		**When contacted to locally break Condenser vacuum, EXECUTE remote functions FWR071, FWR072, & FWR073 to open Auxiliary and Main Condenser Vacuum Breaker Isolation Valves (Key 7).**
Simulator Operator:		**When contacted to initiate venting of hydrogen from the Main Generator per Attachment 11, wait 5 minutes and execute EGR02 to OFF (Key 8), then report.**

Operating Test :	NRC	Scenario #	3	Event #	N/A	Page	50	of	54
Event Description:	ABN-601, Section 6.0								

Time	Position	Applicant's Actions or Behavior
		CAUTION: Reduce generator hydrogen pressure to <2 psig within two hours of starting the DC Seal Oil Backup Pump to prevent excessive loss of hydrogen pressure through the seals. (CR-2013-001103)
		Simulator Operator: When contacted to locally isolate air to the MSIVs, EXECUTE remote functions MSR15 (Key 14).
		Simulator Operator: IF/WHEN contacted about the status of damage to XST1, wait 3 minutes and report there is no visible damage to XST1.
	BOP	CHECK if AC Power is Available to RE-ENERGIZE the Safeguards Buses: [Step 6.3.23]
		• XST1 OR XST2 OR XST2A – ENERGIZED [Step 6.3.23.a] OR • Diesel Generator – NORMAL VOLTAGE AND FREQUENCY (6500-7100 Volts, 59.9-60.1 Hz)
	BOP	• ENSURE the following Equipment Switches are in PULL-OUT Position: [Step 23.b]
		• SI pumps
		• CSPs
		• Containment Fan Coolers
		• CCW pumps
		• Safety Chilled Water pumps
		• RHR pumps
		• CCPs
		• MDAFW pumps
		• Any DE-ENERGIZED Control Room A/C Units
		• Any DE-ENERGIZED Ventilation Chilled Water Recirc pumps
	BOP	RE-ENERGIZE the 6.9 KV Safeguard Bus: [Step 24]

Time	Position	Applicant's Actions or Behavior
	BOP	• VERIFY the following breakers on the bus to be ENERGIZED – AVAILABLE [Step 24.a]
		1EA2
		• CS-T1EB2 XFMR BKR T1EB2
		• CS-1EB2-1 INCOMING BKR 1EB2-1
		• CS-T1EB4 XFMR BKR T1EB4
		• CS-1EB4-1 INCOMING BKR 1EB4-1
	BOP	• ALIGN the 480V buses for energization: [Step 24.b]
		• CS-T1EB2 XFMR BKR T1EB2 - CLOSED
		• CS-1EB2-1 INCOMING BKR 1EB2-1 - CLOSED
		• CS-T1EB4 XFMR BKR T1EB4 - CLOSED
		• CS-1EB4-1 INCOMING BKR 1EB4-1 - CLOSED
CAUTION: WHEN Unit 1 and Unit 2 buses must be ENERGIZED from the same source with unstable grid conditions, THEN the buses SHOULD be ENERGIZED at least thirty (30) seconds apart. Loads SHALL NOT EXCEED 10 MW per transformer without the TGM Transmission Grid Controller's concurrence. Loads SHALL NOT be placed on offsite power without the TGM Transmission Grid Controller's concurrence.		
NOTE: Prior to energizing the 6.9 Safeguard bus, INFORM the TGM he will be picking up 2 MW of load.		
CRITICAL TASK		**After a Loss of all Onsite and Offsite Power, restore power from an Offsite source per ABN-601, Response to a 138/345 KV System Malfunction and ECA-0.0A, Loss of All AC Power prior to completion of SG Depressurization in ECA-0.0A.**
	BOP	• ENERGIZE the 6.9 KV Safeguard Bus from the available power supply by closing the supply breaker. [Step 24.c]
CT-3		• IF available supply is an off-site source, THEN PERFORM the following: 1) TURN the synchroscope ON for the selected supply breaker – SS-1EA2-2, BKR 1EA2-2 SYNCHROSCOPE

Operating Test :	NRC	Scenario #	3	Event #	N/A	Page	52	of	54
Event Description:	ABN-601, Section 6.0								

Time	Position	Applicant's Actions or Behavior
CT-3		2) Manually CLOSE the supply breaker – CS-1EA2-2, INCOMING BKR 1EA2-2 3) TURN the synchroscope OFF
When Offsite Power has been restored to Bus 1EA2 per ABN-601, or at Lead Examiner's discretion, TERMINATE the scenario.		

```
;2018 NRC Scenario 3
;IC-55, 100%, EOL
;Ensure EOL Reactivity Briefing Sheet and AFD on
;CB07.  No OOS Equipment

;Alternate Trains of CR HVAC – Normal
;Swap from Train B to Train A per OWI-409
;and SOP-802. Currently Work Week3 and all
;other Equipment Rotations are complete

;Control Rod H8 dropped
IMF RD03H8 f:1 k:2

;HDP 1-02 Trip / Fail to Runback / Manual Rod
;Insertion
IMF FW14A f:1 k:3
IMF TC09G f:1 k:3

;Loss of 1EA1 [86-1]
IMF ED05H f:1 k:4

;ABN-602, Step 5.A RNO uses Attachment 4 step 1,
;De-energize Train A Blackout Sequencer
IRF EAR081 f:0 k:15
IRF EAR522 f:0 k:15

;Loss of Offsite Power
IMF ED01 f:1 k:5

;Loss of 1C1 to C14 (DRPI Failure)
IRF EAR454 f:0 k:5

;DG 1-02 Overspeed Trip
IMF EG07B f:1 k:6

;Attachment 10, ABN-601 to Break
;Main & Auxiliary Condenser Vacuum
IRF FWR071 k:7 f:100
IRF FWR072 k:7 f:100
IRF FWR073 k:7 f:100

;Attachment 11, ABN-601 to Vent
;Main Generator H2 Pressure
IRF EGR02 k:8 f:0

;ECA-0.0A Step 10
IRF CVR21 k:9 f:0
IRF CVR22 k:9 f:0 d:15
IRF CVR23 k:9 f:0 d:30
IRF CVR24 k:9 f:0 d:45
IRF CVR25 k:9 f:0 d:60
IRF CCR10 k:9 f:0 d:75

;ECA-0.0A Step 12
IRF FWR077 k:10 f:0
IRF FWR078 k:10 f:0 d:15
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;ECA-0.0A Attachment 2A Section 4
IRF EBR110 k:11 f:0
IRF EBR111 k:11 f:0
IRF EBR160 k:11 f:0 d:10
IRF EBR161 k:11 f:0 d:10
IRF EAR063 k:11 f:0 d:20
IRF EAR064 k:11 f:0 d:20
IRF EAR065 k:11 f:0 d:20
IRF EAR066 k:11 f:0 d:20
IRF EAR067 k:11 f:0 d:20
IRF EAR068 k:11 f:0 d:20
IRF EAR069 k:11 f:0 d:20
IRF EAR070 k:11 f:0 d:20
IRF EAR043 k:11 f:0 d:30
IRF EAR044 k:11 f:0 d:30
IRF EAR045 k:11 f:0 d:30
IRF EAR046 k:11 f:0 d:30
IRF EAR047 k:11 f:0 d:30
IRF EAR048 k:11 f:0 d:30
IRF EAR050 k:11 f:0 d:30
IRF EAR253 k:11 f:0 d:40
IRF EAR233 k:11 f:0 d:50

;ECA-0.0A Attachment 2B
IRF EBR113 k:12 f:0
IRF EBR115 k:12 f:0 d:10
IRF EBR162 k:12 f:0 d:30
IRF EBR163 k:12 f:0 d:30
IRF EBR167 k:12 f:0 d:40
IRF EAR251 k:12 f:0 d:50
IRF EBR210 k:12 f:0 d:60
IRF EBR240 k:12 f:0 d:70
IRF EBR134 k:12 f:0 d:80
IRF EBR135 k:12 f:0 d:80
IRF EBR136 k:12 f:0 d:80
IRF EBR139 k:12 f:0 d:80
IRF EBR184 k:12 f:0 d:90
IRF EBR185 k:12 f:0 d:90
IRF EBR188 k:12 f:0 d:90

;ECA-0.0A Step 22, Attachment 3b
IRF CHR13 k:13 f:1
IRF CHR14 k:13 f:1 d:15

;Manually isolate the MSIVs
IRF MSR15 k:14 f:1

;RMUWP X-01 to Unit 1
IRF CVR04 f:0 k:16
IRF CVR07 f:1 k:16 d:10
```

Appendix D	Scenario Outline	Form ES-D-1

Facility:	CPNPP 1 & 2		Scenario No.:	4	Op Test No.: CPNPP 2018 NRC
Examiners:			Operators:		

Initial Conditions: Unit 1 is stable at 100% Reactor Power. BOL (IC15), Boron is 1138 ppm (by sample).

Turnover: Maintain Unit Load and Availability. A severe thunderstorm watch is in effect for all North Texas until 23:00 tonight. The previous shift has completed applicable sections of ABN-907, Acts of Nature, Section 5.0, Severe Weather.

Critical Tasks: CT-1 Identify and Isolate Faulted Steam Generator Prior to Exiting EOP-2.0A, Faulted Steam Generator Isolation.

CT-2 Initiate Cooldown of the Reactor Coolant System in accordance with ECA-3.1A, Prior to Commencing ECCS Flow Reduction.

Event No.	Malf. No.	Event Type*	Event Description
1	MS13D	C (BOP,SRO)	PT-2328, MSL 4 Pressure Transmitter Fails High
2	NI05E	C (RO, SRO) TS (SRO)	PR Channel NI-43 Fails High (LCO 3.3.1)
3	CR01	C (RO, SRO) TS (SRO)	Fuel Failure (LCO 3.4.16)
4	LQY-553	C (BOP, SRO) TS (SRO)	SG 1-03 FCV (FCV-530) Oscillations (LCO 3.3.1, 3.3.2)
5	MS01C SG01C	M (RO,BOP, SRO)	SG 1-03 Faulted/Ruptured IRC
6	CS02E CS02G CS09A DICSHS4764 DICSHS4765	C (RO, BOP, SRO)	Train A CSPs Fail to Sequence on SI Train A CSPs Fail to Actuate on Hi-3 Unable to manually start pumps
7	CS07B	C (RO, SRO)	1-HS-4777, CS HX 2 Out Vlv Fails to Auto Open
8	DISGHS2399A	C (BOP)	SG 1-03 Blowdown Iso Vlv Fails to Close on MSLI

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

Actual	Target Quantitative Attributes
8	Total malfunctions (5-8)
3	Malfunctions after EOP entry (1-2)
4	Abnormal events (2-4)
2	Major transients (1-2)
3	EOPs entered/requiring substantive actions (1-2)
1	EOP contingencies requiring substantive actions (0-2)
2	Critical tasks (2-3)

SCENARIO 1 SUMMARY

Event 1
The first event is a failure high of Steam Line Pressure Transmitter PT-2328 causing SG 1-04 Atmospheric Relief Valve to open. The BOP will verify steam line pressure is below the lift pressure of 1125 psig and take manual control of 1-PK-2328 and close the ARV. The crew will take the actions of ABN-709, STEAM LINE PRESSURE, STEAM HEADER PRESSURE, TURBINE 1st-STAGE PRESSURE AND FEED HEADER PRESSURE INSTRUMENT MALFUNCTION

Event 2
The second event is a failure high of Power Range Nuclear Instrument NI-43. The Reactor Operator will verify no transient in progress and place Rod Control in manual to stop unnecessary rod motion. The crew will take the actions of ABN-703, POWER RANGE INSTRUMENTATION MALFUNCTION. The SRO will refer to Technical Specifications.

Event 3
The third event is a 0.5% Fuel failure. N16 Instrumentation will begin increasing due to the failure. The crew will respond per ABN-102, HIGH REACTOR COOLANT ACTIVITY. The SRO will refer to Technical Specification 3.4.16.

Event 4
The fourth event is an oscillation of feedwater controller FCV-530 in automatic. The BOP will diagnose improper control response, place 1-FK-530 in manual and control feedwater flow to restore SG 3 level to program. The crew will take the actions of ABN-710, STEAM GENERATOR LEVEL INSTRUMENTATION MALFUNCTION. The SRO will refer to Technical Specifications.

Events 5, 6, 7 & 8
The major will be a Fault and Tube Rupture on SG 1-03. The crew will respond to the reactor trip and Safety Injection, perform the Immediate Actions of EOP-0.0A, REACTOR TRIP OR SAFETY INJECTION. The crew will transition through EOP-2.0A, FAULTED STEAM GENERATOR ISOLATION

The Reactor Trip is complicated by a failure of SG 3 BLDN HELB ISOL VLV to automatically close. The valve must be manually closed by placing the Control Board handswitch, 1-HS-2399A, in the close position.

The Safety Injection Actuation is complicated by a Train A Containment Spray System failure. Train A Containment Spray will remain unavailable throughout the scenario regardless of actions taken by the crew.

Containment Spray Actuation is complicated by the Train B CS Hx Outlet Valve failing to auto open on HI-3 containment pressure. Train B containment spray flow can be established by manually opening 1-HS-4777 from the main control board.

The crew will transition from EOP-0.0A, REACTOR TRIP OR SAFETY INJECTION to EOP-2.0A, FAULTED STEAM GENERATOR ISOLATION. Isolating the Faulted/Ruptured SG is identified as Critical Task 1.

The crew will transition from EOP-2.0A, FAULTED STEAM GENERATOR ISOLATION to , EOP-3.0A, STEAM GENERATOR TUBE RUPTURE and into ECA-3.1A, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED. Initiating an RCS Cooldown per ECA-3.1A, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED is identified as Critical Task 2.

Terminating Criteria

Scenario will be terminated when the crew has commenced a cooldown per EOS-1.2A, Post LOCA Cooldown and Depressurization, or at the discretion of the lead Examiner.

Risk Significance:

- Failure of risk significant systems prior to trip: 0.5% Fuel failure
- Risk significant core damage sequence: Faulted/Ruptured SG
- Risk significant operator actions: Establish Containment Spray flow from Train B.
  Isolate Faulted/Ruptured SG

Critical Task Determination

Critical Task	Safety Significance	Cueing	Measurable Performance Indicators	Performance Feedback
CT-1 Identify and Isolate Faulted Steam Generator Prior to Exiting EOP-2.0A, Faulted Steam Generator Isolation.	Take one or more actions that would prevent a challenge to plant safety.	Procedurally driven from EOP-2.0A to isolate the faulted SG to prevent further RCS cooldown and mass and energy release.	The operator will close the SG 3 BLDN HELB ISOL VLV from the handswitch on CB08.	Valve position will change.
CT-2 Initiate Cooldown of the Reactor Coolant System in accordance with ECA-3.1A, Prior to Commencing ECCS Flow Reduction.	Take one or more actions that would prevent a challenge to plant safety.	Procedurally driven from ECA-3.1A to commence cooldown to reduce the overall temperature of the RCS.	The operator will increase dumping steam from the SGs via the Steam Dumps to reduce RCS temperature.	Lowering SG pressures and lowering RCS temperatures beginning with the cold leg temperatures.
NOTE: (Per NUREG-1021, Appendix D) If an operator or the Crew significantly deviates from or fails to follow procedures that affect the maintenance of basic safety functions, those actions may form the basis of a CT identified in the post-scenario review.				

	SIMULATOR OPERATOR INSTRUCTIONS for SIMULATOR SETUP	

INITIALIZE to IC-15 and LOAD 2018 NRC Scenario 4

EVENT	TYPE	MALF #	DESCRIPTION	DEMAND VALUE	INITIATING PARAMETER
6	IMF	CS02E	CS Pump 1 Si Sequence Fail to Start	f:1	K0
		CS02G	CS Pump 3 Si Sequence Fail to Start		
		CS09A	Auto CS Train A Actuation Failure		
6	IOR	DICSHS 4764	CSP 1, 1-HS-4764	f:1	K0
		DICSHS 4765	CSP 3, 1-HS-4765		
7	IMF	CS07B	Cntmt Spray Hx 2 Outlet Valve Stuck [4777]	f:1	K0(3)
8	IOR	DISGHS 2399A	SG 1-03 SGBD HELB Isol Fails to Close on SI	f:2	K0(4)
1	IMF	MS13D	SG Pressure Transmitter Failure [PT-2328]	f:1300	K1
2	IMF	NI05E	PR N43 Channel Failure	f:200	K2
3	IMF	CR01	Percent Failed Fuel	f:0.5	K3
4	IOR	LOANTS LB5_22	Overrides TSLB-5, window 2.6, SG 3 LVL LO-LO LB-553B - Off	f:0	K4
	IRF	RXR121	LT553 NMT Circuit Card	f:1	K4(1)(2)
5	IMF	MS01C	SG 3 Steam Line Break Inside Cntmt	f:9.5	K5
	IMF	SG01C	SG 3 Tube Leak	f:300	K5
6	IMF	CS02E	CS Pump 1 Si Sequence Fail to Start	f:1	K0
		CS02G	CS Pump 3 Si Sequence Fail to Start		
		CS09A	Auto CS Train A Actuation Failure		
6	IOR	DICSHS4 764	CSP 1, 1-HS-4764	f:1	K0
		DICSHS4 765	CSP 3, 1-HS-4765		
7	IMF	CS07B	Cntmt Spray Hx 2 Outlet Valve Stuck [4777]	f:1	K0(3)
8	IOR	DISGHS 2399A	SG 1-03 SGBD HELB Isol Fails to Close on SI	f:2	K0(4)

(1) Create Oscillation on LQY-553 Test Input
set LQY-553-Input.Amplitude=2;
set LQY-553-Input.Period=0.5;
set LQY-553-Input.Y_Offset=14;
(2) {Key[4] !=0} scn 2018 NRC Exam\2018 NRC Scenario 4a
(3) {DICSHS4777.Value=4} DMF CS07B
(4) {DISGHS2399A.Value=0} DOR DISGHS2399A+53

Simulator Operator:	**INITIALIZE to IC-15 and LOAD NRC Scenario 4** **ENSURE all Simulator Annunciator Alarms are ACTIVE** **ENSURE all Control Board Tags are removed** **ENSURE Operator Aid reflects current boron conditions (1138 ppm BOL)** **ENSURE Rod Bank Update (RBU) is performed** **ENSURE 60/90 buttons DEPRESSED on ASD** **ENSURE ASD speakers are ON to half volume** **ENSURE procedures in progress are on SRO desk: IPO-003A, Power Operations, Section 5.5, Operating At Constant Turbine Load** **ENSURE Control Rods are in AUTO with Control Bank D at 215 and all other Banks at 228 steps** **ENSURE PCS TT06 is set to "GTGC PWROPS" and on scale** **ENSURE 1-PK-507, Steam Dump pot is set for 6.86 turns** **ENSURE 1-FK-110, Boric Acid Flow Control = 4.85 turns** **ENSURE 1-FK-111, Reactor Makeup Water Flow Control = 5.63 turns** **ENSURE Alarms in service for CV-01 and CV-03 on Panel Overview** **ENSURE DELTA I set for BOL Target on PCS and CB07 hard copy**
Control Room Annunciators in Alarm: **PCIP-1.1 – SR TRN A RX TRIP BLK** **PCIP-1.2 – IR TRN A RX TRIP BLK** **PCIP-1.4 – CNDSR AVAIL STM DMP ARMED C-9** **PCIP-1.6 – RX ≥ 10% PWR P-10** **PCIP-2.1 – SR TRN B RX TRIP BLK** **PCIP-2.2 – IR TRN B RX TRIP BLK** **PCIP-2.5 – SR RX TRIP BLK PERM P-6** **PCIP-3.2 – PR TRN A LO SETPT RX TRIP BLK** **PCIP-4.2 – PR TRN B LO SETPT RX TRIP BLK**	

Operating Test :	NRC	Scenario #	4	Event #	1	Page	9	of	43
Event Description:	Steam Line Pressure Transmitter PT-2328 Fails High								

Time	Position	Applicant's Actions or Behavior
Simulator Operator: When directed, EXECUTE Event 1 (Key 1). - MS13D, SG Pressure Transmitter Failure [PT-2328]		
Indications Available: **1-PI-2328, MSL 4 PRESS failed high** **1-ZL-2328, SG 4 ATMOS RLF VLV red OPEN light LIT** **Y6846D, SG 4 ATMOS RLF VLV Plant Computer alarm**		
	BOP	RESPOND to Dynamic Alarm Display (DAD) Alarm.
	BOP	RECOGNIZE PT-2328 failed high and SG 4 Atmospheric Relief Valve is open.
	US	DIRECT performance of ABN-709, Steam Line Pressure, Steam Header Pressure, Turbine 1st-Stage Pressure, and Feed Header Pressure Instrument Malfunction, Section 2.0.
Examiner Note: The following steps are from ABN-709, Steam Line Pressure, Steam Header Pressure, Turbine 1st-Stage Pressure, and Feed Header Pressure Instrument Malfunction. The operator may take manual control of 1-PK-2328 and close the ARV as soon as the failure is identified as allowed by Operations Guideline 3 and ODA-102 after verbalizing the actions to the Unit Supervisor.		
	US	CHECK ONE Main Steamline Pressure Channel indicating - GREATER THAN 60 psig difference between remaining channels. [Step 2.3.1]
	BOP	• IDENTIFIED 1-PI-2328, MSL 4 PRESS indicating 1300 psig with greater than a 60 psig difference between remaining channels.
	US	VERIFY Steam Generator Atmospheric Relief Valve – CLOSED. [Step 2.3.2]
	BOP	• IF pressure is less than 1125 psig, THEN manually CLOSE affected atmospheric relief valve [Step 2.3.2.a RNO]
	BOP	• IDENTIFIED pressure less than 1125 PSIG, PLACED 1-PK-2328, SG 4 ATMOS RLF VLV CTRL in MANUAL and 0% DEMAND to CLOSE Valve.
	US	• NOTIFY Chemistry that a release has occurred and for Chemistry to determine if a release permit is required per STA-603. [Step 2.3.2.b RNO]
	US	• GO TO Step 11 [Step 2.3.2.c RNO]

Operating Test :	NRC	Scenario #	4	Event #	1	Page	10	of	43
Event Description:	Steam Line Pressure Transmitter PT-2328 Fails High								

Time	Position	Applicant's Actions or Behavior
Simulator Operator: When contacted as the Shift Manager or Chemistry directly, after 5 minutes report last Unit 1 SG samples were all less than minimum detectable activity (MDA).		
	US	REFER to Technical Specifications per Attachment 6. [Step 2.3.11]
	US	• Determined no Technical Specifications apply.
	US	INITIATE a Condition Report per STA-421, as applicable. [Step 2.3.12]
Simulator Operator: When contacted as Prompt Team or Duty Manager inform the crew that you will generate an Issue Report and have a Work Order generated to troubleshoot and repair the failed pressure transmitter.		
At Lead Examiners discretion, PROCEED to Event 2.		

Operating Test :	NRC	Scenario #	4	Event #	2	Page	11	of	43
Event Description:	Power Range Channel N43 Fails High								

Time	Position	Applicant's Actions or Behavior
Simulator Operator: When directed, EXECUTE Event 2 (Key 2). - PR N43 Channel Failure.		
Indications Available: **6D-1.3 – 1 OF 4 HI SETPT PR FLUX HI** **6D-3.3 – 1 OF 4 PR FLUX RATE HI** **6D-3.4 – PR CHAN DEV HI** **6D-2.14 – OP HI FLUX ROD STOP C-2** **1-NI-43B, PR POWER CHAN III indication fails high**		
	RO	RESPOND to Annunciator Procedure Alarms.
	RO	RECOGNIZE Power Range Nuclear Instrument N-43 detector failure.
Examiner Note: The following steps are from ABN-703, Power Range Instrumentation Malfunction, Section 2.0.		
	US	DIRECT implementation of ABN-703, Power Range Instrumentation Malfunction, Section 2.0.
	RO	VERIFY rapid Control Rod insertion – NOT REQUIRED. [Step 2.3.1]
		• VERIFY Reactor and Turbine Power – MATCHED. [Step 2.3.1.a]
		• VERIFY T_{AVE} less than 3°F above $T_{REF.}$ [Step 2.3.1.a]
		• PLACE Rod Control in MANUAL. [Step 2.3.1.b]
	RO	VERIFY Reactor Power < 75% rated thermal power. [Step 2.3.2]
	US	• INITIATE actions to comply with Technical Specification SR 3.2.4.2. [Step 2 RNO]
Examiner Note: The following steps are performed at the NIS Cabinets.		
	BOP	• At Detector Current Comparator Drawer, SELECT Rod Stop Bypass Switch to N-43. [Step 2.3.3.a]
	BOP	• At Comparator and Rate Drawer, SELECT Comparator Channel Defeat Switch to N-43. [Step 2.3.3.b]

Operating Test :	NRC	Scenario #	4	Event #	2	Page	12	of	43
Event Description:	Power Range Channel N43 Fails High								

Time	Position	Applicant's Actions or Behavior
	BOP	• At Detector Current Comparator Drawer, SELECT Upper Section Switch to N-43. [Step 2.3.3.c]
	BOP	• At Detector Current Comparator Drawer, SELECT Lower Section Switch to N-43. [Step 2.3.3.d]
	BOP	• At Detector Current Comparator Drawer, SELECT Power Mismatch Bypass Switch to N-43. [Step 2.3.3.e]
	RO/BOP	• At the Power Range A Drawer, SELECT Rate Mode Switch momentarily to RESET for N-43. [Step 2.3.3.f]
	RO/BOP	• PLACE 1/1-JS-411E, N16 PWR CHAN DEFEAT Switch to LOOP 3. [Step 2.3.3.g]
	RO/BOP	• PLACE 1/1-TS-412T, T_{AVE} CHAN DEFEAT Switch to LOOP 3. [Step 2.3.3.g]
	RO/BOP	PLACE 1/1-TS-411E, 1-TR-411 Channel Select to an OPERABLE channel. [Step 2.3.4]
Examiner Note: Control rods will be placed in manual as a result of the NIS failure and should remain in manual unless needed for a rapidly moving transient such as a runback, then returned to manual after the plant has been stabilized.		
NOTE: Rod Control should remain in MANUAL until all channels are operable.This does not preclude placing rods in AUTO during rapidly changing transient conditions such as runbacks, etc. as long as rod control is returned to MANUAL when the plant is stabilized.		
Examiner Note: The crew should conduct a reactivity brief to restore control rods to 215 steps. Rods should not be withdrawn in excess of 5 steps in a single withdrawl.		
	RO	RESTORE T_{AVE} to within 1ºF of $T_{REF.}$ [Step 2.3.5]
NOTE: P-10 permissive is interlocked with Source Range instruments. During a unit shutdown if P-10 permissive is in incorrect state, SR detectors cannot be re-energized. This affects SR RX Trip and SR Flux DBLG protection.		

Operating Test :	NRC	Scenario #	4	Event #	2	Page	13	of	43
Event Description:	Power Range Channel N43 Fails High								

Time	Position	Applicant's Actions or Behavior
	US/RO	VERIFY Within 1 hour of instrument malfunction, interlocks in – Required State: [Step 2.3.6]
		• RX & TURB ≤ 10% PWR P-7 (PCIP – 3.5) – DARK. [Step 2.3.6.a]
		• RX ≤ 48% PWR 3-LOOP FLO PERM P-8 (PCIP – 4.5) – DARK. [Step 2.3.6.a]
		• RX ≤ 50% PWR TURB TRIP PERM P-9 (PCIP – 1.7) – DARK. [Step 2.3.6.a]
		• RX ≥ 10% PWR P-10 (PCIP – 1.6) – LIT. [Step 2.3.6.a]
	US/RO	• RECORD verification in Unit Log. [Step 2.3.6.b]
CAUTION: QUADRANT POWER TILT alarms (u-ALB-6D, 4.10) should be considered inoperable when any Power range channel is inoperable.		
	US/RO	CHECK Quadrant Power Tilt Ratio within limits: [Step 2.3.7]
		• CHECK Power Range Channels– ONE OR MORE INOPERABLE [Step 2.3.7.a]
		• CHECK Reactor Power – GREATER THAN 50%. [Step 2.3.7.b]
		• REFER to TS 3.2.4, Table 3.3.1-1, Items 2, 3 (ACTIONS D and E) and TR 13.2.33. [Step 7.c]
Examiner Note: Steps 8 and 9 to trip bistables and verify trip status will not be performed during simulator scenario.		
	US	EVALUATE Technical Specifications. [Step 2.3.10]
		• LCO 3.3.1.D, Reactor Trip System Instrumentation (Function 2.a, Power Range Neutron Flux High)
		• CONDITION D - One Power Range Neutron Flux-High channel inoperable. • ACTION D.1.1 - Perform SR 3.2.4.2 within 12 hours from discovery of THERMAL POWER> 75% RTP, AND • ACTION D.1.2 - Place channel in trip within 72 hours, OR • ACTION D.2 - Be in MODE 3 within 78 hours.

Operating Test :	NRC	Scenario #	4	Event #	2	Page	14	of	43
Event Description:	Power Range Channel N43 Fails High								

Time	Position	Applicant's Actions or Behavior
		• LCO 3.3.1.E, Reactor Trip System Instrumentation (Function 3.a, Power Range Neutron Flux Rate High Positive Rate)
		• CONDITION E - One channel inoperable. • ACTION E.1 - Place channel in trip within 72 hours, OR • ACTION E.2 - Be in MODE 3 within 78 hours.
		• LCO 3.3.1.S, Reactor Trip System Instrumentation (Function 18.e, Power Range Neutron Flux, P-10)
		• CONDITION S - One or more required channel(s) inoperable. • ACTION S.1 - Verify interlock is in the required state for existing unit conditions within 1 hour, OR • ACTION S.2 - Be in MODE 3 within 7 hours.
		• LCO 3.3.1.T, Reactor Trip System Instrumentation. (Function 18.b, c, & d, Power Range Neutron Flux, P-7, P-8, & P-9)
		• CONDITION T - One or more required channel(s) inoperable. • ACTION T.1 - Verify interlock is in the required state for existing unit conditions within 1 hour. • ACTION T.2 - Be in MODE 2 within 7 hours.
	US	INITIATE a Condition Report per STA-421, as applicable. [Step 2.3.11]
After Technical Specifications have been addressed by the Unit Supervisor or at the Lead Examiners discretion, PROCEED to Event 3.		

Operating Test :	NRC	Scenario #	4	Event #	3	Page	15	of	43
Event Description:	0.5% Failed Fuel								

Time	Position	Applicant's Actions or Behavior
Simulator Operator: When directed, EXECUTE Event 3 (Key 3). - 0.5% Failed Fuel		
Indications Available: **N16 Power Channel I, 1-JI-411B increasing** **N16 Power Channel II, 1-JI-421B increasing** **N16 Power Channel III, 1-JI-431B increasing** **N16 Power Channel IV, 1-JI-441B increasing** **Ave Tave-Tref Dev, 1-TI-412A increasing** **T0597A, RCS Auct Hi N16 Pwr alarms on the PCS** **PPA120, 1-RE-6259A Penet Area Rm 77S alarms** **FFL160, 1-RE-0406 Failed Fuel alarms**		
Examiner Note: Observable malfunction effects may be delayed for 1-2 minutes following insertion into the scenario.		
	RO	RESPOND to N16 power channels increasing with no change in steam flow or NIS power.
Examiner Note: The following steps are from ABN-102, High Reactor Coolant Activity		
Examiner Note: The crew may perform 50MW Load reduction(s) to maintain all channels of power indication below 100% indicated. Rod Control may be returned to automatic prior to performance of manual 50MW Load reduction(s). When the plant has stabilized after the transient, Rod Control should be returned to manual. The steps below describe operator actions to perform a 50 MW load reduction. (no procedure is required)		
	US	DETERMINED all channels of N16 indicating >100% power and orders a 50MW Load Reduction.
	RO	DETERMINED control rods are in manual and places control rods in automatic • 1/1-RBSS, CONTROL ROD BANK SELECT placed in AUTO
	BOP/RO	OPENS the Load Reduction 50 MW OSD • VERIFIES the Load Reduction 50 MW OSD is open • SELECTS the "0/1" button • EXECUTE • CLOSE the Load Reduction 50 MW OSD

Operating Test :	NRC	Scenario #	4	Event #	3	Page	16	of	43
Event Description:	0.5% Failed Fuel								

Time	Position	Applicant's Actions or Behavior
	US/RO/ BOP	VERIFIED the following: • turbine load lowering, • control rods stepping "IN" in response to RCS temperature • ALB-6D, 1.9 – ANY TURB RUNBACK EFFECTIVE alarms
Examiner Note: The crew may perform additional 50MW Load reduction(s) to maintain all channels of power indication below 100% indicated.		
Simulator Operator: When/If contacted as Radiation Protection or Chemistry, acknowledge the communication.		
NOTE: • Reactor Coolant System transients such as power changes, temperature changes, pressure changes, and starting and stopping RCPs can cause temporary increases in RCS activity. • Monitor spiking and return to normal is not a real indication of failed fuel and as such does not require sampling. A steady or sustained increase over time would be a real indication of failed fuel/RCS activity problems.		
	US	REQUEST additional reactor coolant specific activity samples be taken in accordance with CHM-111 for isotopic content analysis per Technical Specification 3.4.16, SURVEILLANCE REQUIREMENTS. [Step 2.3.1]
	US	NOTIFY Chemistry to review chemistry data and Core Performance Engineering to review chemistry data and core follow trends. Chemistry will determine if a "CRUD" burst has occurred. Core Performance Engineering will determine if the source of RCS activity is failed fuel and the extent of failed fuel, if any. [Step 2.3.2]
	US	INCREASE letdown flow to 120-140 gpm as follows: [Step 2.3.3]
		• No action required as CCP in service with 120 gpm Letdown aligned.
	US	NOTIFY Radiation Protection that radiation levels may increase in Auxiliary and Safeguards Buildings AND on any ARMs. [Step 2.3.4]
	US	MAKE a plant announcement via Gaitronics of indication of an increase in RCS Activity AND a possibility of increased radiation in Auxiliary and Safeguards Buildings. [Step 2.3.5]

Operating Test :	NRC	Scenario #	4	Event #	3	Page	17	of	43
Event Description:	0.5% Failed Fuel								

Time	Position	Applicant's Actions or Behavior
		Examiner Note: TIME COMPRESSION may be used for the following Simulator Operator communication of RCS activity levels if the crew is waiting for results to determine if indications are from a fuel failure or crud burst.
		Simulator Operator: If contacted as Chemistry, report that Dose Equivalent I-131 is 63 uCi/gm and Dose Equivalent Xe-133 is 715 uCi/gm.
		NOTE: A rapid increase of RCS fission product isotopes during steady state operation may indicate fuel cladding damage. (e.g., Xe-133, Kr-85M, Cs-137, Cs-136, Sr-84, Sr-90, Iodine).
	US	IF Core Performance Engineering Review of the chemistry data indicates failed fuel, THEN PROCEED as follows: [Step 2.3.6]
		• REFER to EPP-201. [Step 2.3.6.a]
		• REFER to Technical Specifications 3.4.16. [Step 2.3.6.b]
		• LCO 3.4.16, RCS DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133 specific activity shall be within limits
		• CONDITION A - DOSE EQUIVALENT I-131 not within limit. • ACTION A.1 – Verify DOSE EQUIVALENT I-131 </= 60 uCi/gm - Once per 4 hours AND • ACTION A.2 – Restore DOSE EQUIVALENT I-131 to within limit – within 48 hours.
		• LCO 3.4.16, RCS DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133 specific activity shall be within limits
		• CONDITION B - DOSE EQUIVALENT XE-133 not within limit. • ACTION B.1 – Restore DOSE EQUIVALENT XE-133 to within limit – within 48 hours.
		• REVIEW logs for any known RCS to Secondary Leakage. [Step 2.3.6.c]

Operating Test :	NRC	Scenario #	4	Event #	3	Page	18	of	43
Event Description:	0.5% Failed Fuel								

Time	Position	Applicant's Actions or Behavior
		NOTE: • An increase of RCS activated corrosion products may indicate a "CRUD" burst. (e.g., Fe-59, Co-58, Co-60, Mn-54, Mn-56, Cr-51, and Zr-95). • The stepping or tripping of control or shutdown rods should be kept to a minimum when reactor coolant CRUD levels are high to reduce the potential for CRDM mis-stepping due to CRUD contamination of CRDM latch assemblies (CR 2009-008942).
	US	IF RCS activity increase is believed to be result of RCS transient OR "CRUD" burst, THEN REFER to Technical Specification 3.4.16. [Step 2.3.7]
	US	IF RCS activity is increasing slowly during steady state operation, THEN NOTIFY Chemistry to calculate a decontamination factor (DF) for fission and activation products listed above for CVCS mixed bed ion exchanger in use AND NOTIFY Shift Manager of results. [Step 2.3.8]
	US	IF resin depletion is indicated, THEN TRANSFER to standby CVCS mixed bed ion exchanger per SOP-103A/B. [Step 2.3.9]
	US	COLLECT information from recent operating history for the following: [Step 2.3.10]
		• Loose Parts Alarms - RCS
		• RCP Vibration Alarms/Trends
		• Power Transients
		• Chemistry Changes
		• CVCS Operations/Demineralizer Operations, etc.
	US	INITIATE a Condition Report per STA-421, as applicable. [Step 2.3.11]
At Lead Examiner discretion, PROCEED to Event 4.		

Operating Test :	NRC	Scenario #	4	Event #	4	Page	19	of	43
Event Description:	SG 1-03 Level Channel 553 oscillations								

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**When directed, EXECUTE Event 4 (Key 4). SG 1-03 FCV (FCV-530) Oscillations.**
Indications Available:		**8A-3.6 – SG 3 LVL LO 8A-3.12 – SG 3 LVL DEV 8A-3.14 – SG 3 1 OF 4 LVL LO-LO 1-LI-553, SG 3 LVL (NR) CHAN II oscillating**
	BOP	RESPOND to Annunciator Alarm Procedures.
	BOP	RECOGNIZE SG 3 level is fluctuating and take manual control of 1-FK-530 to restore SG 3 level to program.
Examiner Note:		**Several Alarm Response procedures exist that provide guidance to correct the oscillations occurring on SG 1-03. The operator may also take actions to control 1-FK-530 per the guidance of ODA-102 or Operations Guideline 3 with concurrence from the Unit Supervisor and prior to entry into ABN-710.**
	US	DIRECT performance of ABN-710, Steam Generator Level Instrumentation Malfunction
Examiner Note:		**The following steps are from ABN-710, Steam Generator Level Instrumentation Malfunction, Section 2.0, Steam Generator Level Instrumentation Malfunction.**
	US	VERIFY controlling level channel - FAILED. [Step 2.3.1]
	BOP	• Determined 1-LI-553, SG 3 LVL (NR) CHAN II is the controlling channel.
	US	Manually CONTROL the following, as necessary to maintain SG – AT PROGRAMMED LEVEL [Step 2.3.2]
	BOP	• Takes manual control of 1-FK-530, SG 3 FW FLO CTRL
	US/BOP	VERIFY instruments on common instrument line - NORMAL [Step 2.3.3]
	BOP	• VERIFIES Steam Flow transmitter FT-533 indicating normally. [ABN-710, Att. 1]

Operating Test :	NRC	Scenario #	4	Event #	4	Page	20	of	43
Event Description:	SG 1-03 Level Channel 553 oscillations								

Time	Position	Applicant's Actions or Behavior
		CAUTION: • Turbine Trip AND Feedwater Isolation will occur if 2 or more of the 3 HI-HI level bistables for the SAME steam generator are TRIPPED. [C] • IF preferred level control channel has failed (551, 552, 553, or 554) AND automatic steam generator water level control is restored using alternate level control channel, THEN Step 9 must be completed within 72 hours for required channel protection coincidence.
	US	VERIFY ALL other HI-HI level bistable windows on TSLB-3 for affected SG – DARK [Step 2.3.4]
		• OBSERVE TSLB-3, Window 1.4 – SG 3 LVL HI-HI LB-539A is DARK.
		• OBSERVE TSLB-3, Window 3.4 – SG 3 LVL HI-HI LB-538A is DARK.
		• OBSERVE TSLB-3, Window 4.4 – SG 3 LVL HI-HI LB-537A is DARK.
		NOTE: Preferred level control channel switch positions are LQY-551, 552, 553, and 554. Alternate level control channel switch positions are LY-519, 529, 539, and 549. IF an alternate level control channel that is selected for control has failed, THEN the preferred level control channel may be substituted for "alternate" in the following steps.
	BOP	VERIFY automatic SG level control – DESIRED: [Step 2.3.5]
		• OBSERVE alternate level control channel 1-LI-539A indication NORMAL. [Step 2.3.5.a]
		• DETERMINE automatic level control desired by Unit Supervisor. [Step 2.3.5.b]
Examiner Note:		**The crew will place 1-FK-530 back in automatic, which will respond normally on the Alternate channel. The failure will cause level instrument 1-LI-553 to continue to oscillate erratically.**
	BOP	SELECT Alternate Channel: [Step 2.3.6]
		• PLACE 1-LS-539C, SG 3 LVL CHAN SELECT to the LY-539 position.
	BOP	VERIFY affected SG level is stable at program level: [Step 2.3.7]
		• OBSERVE Feedwater and Steam flows – MATCHED.
		• OBSERVE Steam Generator Level – STABLE AT PROGRAM.

Operating Test :	NRC	Scenario #	4	Event #	4	Page	21	of	43
Event Description:	SG 1-03 Level Channel 553 oscillations								

Time	Position	Applicant's Actions or Behavior
		NOTE: There is a 15-20 sec lag for input from the alternate channel to be seen by the level control circuit. The level deviation alarm should clear or the operator should wait 15-20 seconds before placing the control valves in automatic after selecting the alternate channel.
	BOP	PLACE 1-FK-530, SG 3 FW FLO CTRL in AUTO and MONITOR operation. [Step 2.3.8]
	BOP	• DETERMINED FCV-530 responding normally in automatic control.
	US	REFER to Technical Specifications as necessary: [Step 2.3.11]
		• LCO 3.3.1.E, Reactor Trip System Instrumentation. (Function 14, Steam Generator Water Level Low-Low)
		• CONDITION E - One channel inoperable. • ACTION E.1 - Place channel in trip within 72 hours, OR • ACTION E.2 – Be in MODE 3 within 78 hours.
		• LCO 3.3.2.D, ESFAS Instrumentation.
		• CONDITION D - One channel inoperable. • ACTION D.1 - Place channel in trip within 72 hours, OR • ACTION D.2.1 – Be in MODE 3 within 78 hours AND • ACTION D.2.2 – Be in MODE 4 within 84 hours
		• LCO 3.3.2.I, ESFAS Instrumentation. (Function 5.b, SG Water Level High-High P-14)
		• CONDITION I - One channel inoperable. • ACTION I.1 - Place channel in trip within 72 hours, OR • ACTION I.2 – Be in MODE 3 within 78 hours.
	US	INITIATE a work request per STA-606. [Step 2.3.12]
	US	Refer to TS 3.7.5 and 3.6.3 [Step 3]

Operating Test :	NRC	Scenario #	4	Event #	4	Page	22	of	43
Event Description:	SG 1-03 Level Channel 553 oscillations								

Time	Position	Applicant's Actions or Behavior
	US	INITIATE a SMART Form per STA-421. [Step 2.3.13]
When Technical Specifications have been addressed, or at Lead Examiner discretion, PROCEED to Event 5.		

Operating Test :	NRC	Scenario #	4	Event #	5,6,7 and 8	Page	23	of	43
Event Description:	SG 3 Faulted/Ruptured, Train A and B CNTMT Spray actuation failures, HV-2399A fails to auto close								

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**When directed, EXECUTE Events 5,6,7 and 8 (Key 5)** **- MS01C, MSLB on SG 1-03** **- SG01C, SG 1-03 Tube Rupture** **- Train A Containment Spray unavailable** **- Train B Containment Spray Hx Outlet Valve Fails to Auto Open** **- SG 1-03 SGBD HELB Isolation Valve Fails to Auto Close**
Indications Available: **6C-3.7 – MSL PRESS LO SI ACT** **6C-4.7 – CNTMT PRESS HI SI ACT** **6C-2.1 – RX > 50% PWR TURB TRIP** **2B-4.12 – CNTMT FN CLR 1 & 2 CNDS FILL RATE HI** **2B-3.12 – CNTMT FN CLR 3 & 4 CNDS FILL RATE HI** **5B-1.6 – PRZR LO PRESS PORV 456 BLK** **5B-2.6 - PRZR LO PRESS PORV 455A BLK** **5B-3.4 – PRZR 1 OF 4 PRESS LO** **5B-4.4 – PRZR 1 OF 4 SI PRESS LO** **5B-3.6 – PRZR LVL LO** **5C-1.2 – PRZR LVL DEV LO**		
	US	DIRECT performance of EOP-0.0A, Reactor Trip or Safety Injection.
Examiner Note: The following steps are from EOP-0.0A, Reactor Trip or Safety Injection.		
Examiner Note: Adverse Containment will exist when containment pressure exceeds 5 psig.		
	RO	VERIFY Reactor Trip: [Step 1]
		• VERIFY Reactor Trip Breakers – OPEN. [Step 1.a]
		• VERIFY Neutron flux – DECREASING. [Step 1.a]
		• DETERMINE all Control Rod Position Rod Bottom Lights – ON. [Step 1.a]
	BOP	VERIFY Turbine Trip: [Step 2]
		• VERIFY all HP Turbine Stop Valves – CLOSED. [Step 2]
	BOP	VERIFY Power to AC Safeguards Buses: [Step 3]
		• VERIFY AC Safeguards Buses – AT LEAST ONE ENERGIZED. [Step 3.a]
		• VERIFY both AC Safeguards Buses – ENERGIZED. [Step 3.b]

Operating Test :	NRC	Scenario #	4	Event #	5,6,7 and 8	Page	24	of	43
Event Description:	SG 3 Faulted/Ruptured, Train A and B CNTMT Spray actuation failures, HV-2399A fails to auto close								

Time	Position	Applicant's Actions or Behavior
	RO	CHECK SI Status: [Step 4]
		• Check if SI is Actuated: [Step 4.a]
		• SI actuation as indicated on the First Out Annunciator 1-ALB-6C.
		• SI Actuated blue status light - ON
		• VERIFY Both Trains SI Actuated: [Step 4.b]
		• SI Actuated blue status light - ON NOT FLASHING
Examiner Note:		**EOP-0.0A, Attachment 1.A, FOLDOUT FOR EOP-0.0A REACTOR TRIP OR SAFETY INJECTION steps are below and may be performed immediately following verbalization of EOP-0.0A, step 4. The Operator may stop AFW flow to the Faulted/Ruptured SG using the AFW FCVs or the motor operated isolation valve.**
CRITICAL TASK STATEMENT (CT1)		**Identify and Isolate Faulted Steam Generator Prior to Exiting EOP-2.0A, Faulted Steam Generator Isolation.**
	BOP	Control AFW Flow to Maintain Adequate Heat [Step 3]
		• Ensure AFW flow throttled following a Reactor Trip/SI (normally 150 gpm to 200 gpm). AND • Maintain total AFW flow GREATER THAN 460 gpm UNTIL at least ONE SG NR Level greater than 43%(50% for ADVERSE CONTAINMENT)
		• IF any SG identified as faulted, THEN stop AFW flow to the SG
CT-1		• Determined SG 1-03 is Faulted and isolates AFW flow to SG 1-03 by closing the following valves; • MDAFWP 2 SG 3 FLO CTRL, 1-FK-2454A • TDAFWP SG 3 FLO CTRL 1-FK-2461A (if TDAFWP is operating, with both MDAFWPs running, the steam supplies may have been placed in PULL-OUT prior to this step.) AND\OR • AFWIV 3, 1-HS-2493

Operating Test :	NRC	Scenario #	4	Event #	5,6,7 and 8	Page	25	of	43
Event Description:	SG 3 Faulted/Ruptured, Train A and B CNTMT Spray actuation failures, HV-2399A fails to auto close								

Time	Position	Applicant's Actions or Behavior
	BOP	Control AFW Flow to Maintain Adequate Heat [Step 3]
		• IF BOTH MDAFWPs are running with flow THEN, secure the TDAFWP
		• Determined both MDAFWPs running and places TDAFWP steam supplies in PULL-OUT; • AFWPT STM SPLY VLV MSL 1, 1-HS-2452-2 • AFWPT STM SPLY VLV MSL 4, 1-HS-2452-1
Examiner Note:		**EOP-0.0A, Attachment 2 steps performed by BOP are identified beginning on page 38 in this scenario guide.**
		CAUTION: A Safety Injection actuation will affect normal egress from the Containment Building. Attachment 9 of this procedure provides instructions to evacuate personnel from the Containment during a Safety Injection actuation.
		NOTE: Attachment 2 is required to be completed before FRGs are implemented.
	US/BOP	INITIATE Proper Safeguards Equipment Operation Per Attachment 2. [Step 5]
Examiner Note:		**If not performed per EOP-0.0A, the Operator may stop AFW flow to the Faulted/Ruptured SG using the AFW FCVs or the motor operated isolation valve during performance of EOP-0.0A, step 6 below.**
	RO	VERIFY AFW Alignment [Step *6]
		• VERIFY MDAFW Pumps – RUNNING [Step 6.a]
		• TDAFW Pump – RUNNING if necessary [Step 6.b]
		• VERIFY AFW total flow – GREATER THAN 460 GPM to SGs 1,2 and 4. AFW flow to SG 3 is stopped. [Step 6.c]
		• VERIFY AFW valve alignment - PROPER ALIGNMENT. [Step 6.d]

Operating Test :	NRC	Scenario #	4	Event #	5,6,7 and 8	Page	26	of	43
Event Description:	SG 3 Faulted/Ruptured, Train A and B CNTMT Spray actuation failures, HV-2399A fails to auto close								

Time	Position	Applicant's Actions or Behavior
		<u>Examiner Note</u>: The RO will attempt to manually actuate Containment Spray in the following steps. Once CS HX 2 OUT VLV, 1-HS-4777 is opened, Train B Containment Spray will be fully aligned from a single train.
	RO	VERIFY Containment Spray NOT Required: [Step *7]
		• VERIFY 1-ALB-2B, Window 1.8, CS ACT – ILLUMINATED. [Step 7.a]
		• VERIFY 1-ALB-2B, Window 4.11, CNTMT ISOL PHASE B ACT – ILLUMINATED. [Step 7.a]
		• VERIFY Containment pressure – >18.0 PSIG. [Step 7.a]
	RO	• VERIFY Containment Spray AND Phase B Actuation initiated. [Step 7.a.1 RNO] • DETERMINED Train A pumps not running and Train B Hx Outlet valve not open and MANUALLY ACTUATES Containment Spray and Phase B at CB02 and CB07.

	RO	• VERIFY appropriate MLB indication for CNTMT SPRAY (blue windows) AND PHASE B (orange windows). [Step 7.a.2 RNO]
		  • DETERMINED MLB (BLUE WINDOWS) for CNTMT SPRAY is not appropriate.
		  • ATTEMPTED to start CSP 1 and CSP 3 – Pumps do not start.
		  • OPENS CS HX 2 OUT VLV, 1-HS-4777 initiating Train B Containment Spray flow

		• VERIFY Containment Spray flow. [Step 7.a.3 RNO]
		• ENSURE CHEM ADD TK DISCH VLVs – OPEN. [Step 7.a.4 RNO]
		• 1-HS-4752 and 1-HS-4753.
		• Stop all RCPs. [Step 7.a.5 RNO]

	RO	• Places all RCP handswitches in STOP.
		  • RCP 1, 1/1-PCPX1
		  • RCP 2, 1/1-PCPX2
		  • RCP 3, 1/1-PCPX3
		  • RCP 4, 1/1-PCPX4

		• Go to Step 8. [Step 7.a.6 RNO]

Operating Test :	NRC	Scenario #	4	Event #	5,6,7 and 8	Page	27	of	43
Event Description:	SG 3 Faulted/Ruptured, Train A and B CNTMT Spray actuation failures, HV-2399A fails to auto close								

Time	Position	Applicant's Actions or Behavior
	RO	CHECK if Main Steam lines should be ISOLATED: [Step *8]

		• VERIFY the following: [Step 8.a]
		  • Containment pressure – GREATER THAN 6.0 PSIG.
		  • Steam Line pressure – LESS THAN 610 PSIG.

		• DETERMINE Main Steam Isolation Valves – CLOSED.
		• VERIFY Main Steam Isolation Bypass Valves – CLOSED.
		• VERIFY Before MSIV Drip Pot Isolation Valves – CLOSED.
	RO	CHECK RCS Temperature: [Step *9]
		• VERIFY RCS Average Temperature – STABLE AT OR TRENDING TO 557°F. [Step 9] - Less than 557°F
		• STOP dumping steam. [Step 9.a RNO]

		• IF cooldown continues, THEN REDUCE total AFW flow as necessary to minimize cooldown. [Step 9.b RNO]
		  • Maintaining a minimum of 460 gpm UNTIL narrow range level greater than 43% (50% ADVERSE CONTAINMENT) in at least one SG.
		  • As necessary to maintain SG levels WHEN narrow range level greater than 43% (50% FOR ADVERSE CONTAINMENT) in at least one SG
		  • IF TDAFW pump is not required to maintain greater than 460 gpm flow, THEN stop TDAFW pump.

	US/RO	• IF cooldown continues, THEN CLOSE Main Steam Isolation Valves. [Step 9.c RNO]
	RO	CHECK PRZR Valve Status: [Step 10]
		• VERIFY PRZR Safeties – CLOSED. [Step 10.a]
		• VERIFY Normal PRZR Spray Valves – CLOSED. [Step 10.b]
		• VERIFY PORVs – CLOSED. [Step 10.c]
		• VERIFY Power to at least 1 Block Valve – AVAILABLE. [Step 10.d]
		• VERIFY Block Valves – AT LEAST ONE OPEN. [Step 10.e]
Examiner Note: The RCPs will have been previously stopped based on step 7 of EOP-0.0A and the Containment Spray actuation response.		

Operating Test :	NRC	Scenario #	4	Event #	5,6,7 and 8	Page	28	of	43
Event Description:	SG 3 Faulted/Ruptured, Train A and B CNTMT Spray actuation failures, HV-2399A fails to auto close								

Time	Position	Applicant's Actions or Behavior
	RO	CHECK if RCPs Should Be Stopped: [Step 11]
		• VERIFY RCS subcooling – LESS THAN 25°F (55°F FOR ADVERSE CONTAINMENT). [Step 11.a]
		• VERIFY ECCS pumps - AT LEAST ONE RUNNING [Step 11.b]
		• CCP -OR- • SI pump
		• Stop all RCPs. [Step 11.c]
	RO/BOP	CHECK if Any SG is Faulted: [Step 12]
		• CHECK pressures in all SGs: [Step 12.a]
		• ANY SG PRESSURE DECREASING IN AN UNCONTROLLED MANNER -OR- • ANY SG COMPLETELY DEPRESSURIZED
		• DETERMINED SG 1-03 is faulted.
	US	Go to EOP-2.0A, FAULTED STEAM GENERATOR ISOLATION, Step 1. [Step 12.b]
Examiner Note: EOP-2.0A, Faulted Steam Generator Isolation steps begin here.		
CAUTION: At least one SG must be maintained available for RCS cooldown.		
CAUTION: Any faulted SG or secondary break should remain isolated during subsequent recovery actions unless needed for RCS cooldown.		

Operating Test :	NRC	Scenario #	4	Event #	5,6,7 and 8	Page	29	of	43
Event Description:	SG 3 Faulted/Ruptured, Train A and B CNTMT Spray actuation failures, HV-2399A fails to auto close								

Time	Position	Applicant's Actions or Behavior
	US/RO	Check Main Steamline Isolation Valves – CLOSED [Step 1]
	US/RO	CHECK at Least One Steam Generator Pressure STABLE OR INCREASING. [Step 2]
	US/RO	IDENTIFY Faulted Steam Generator: [Step 3] • ANY SG PRESSURE DECREASING IN AN UNCONTROLLED MANNER -OR- • ANY SG COMPLETELY DEPRESSURIZED • DETERMINE SG 1-03 is faulted.
		CAUTION: If the TDAFW pump is the only available source of feed flow, steam supply to the TDAFW pump must be maintained from at least one SG.
CRITICAL TASK STATEMENT (CT1)		**Identify and Isolate Faulted Steam Generator Prior to Exiting EOP-2.0A, Faulted Steam Generator Isolation.**
CT-1	US/RO	Isolate Faulted SG(s): [Step 4] • ISOLATE Main Feed Line to Steam Generator 1-03. • ISOLATE AFW flow to Steam Generator 1-03. • ISOLATE Blowdown and Sample Lines to Steam Generator 1-03. • DETERMINE SG 3 BLDN HELB ISOL VLV, 1-HV-2399A not closed and closes valve using 1-HS-2399A. • ENSURE Steam Generator 1-03 atmospheric CLOSED. • ENSURE Main Steam Line Drip Pot Isolation Valve CLOSED.
	RO	CHECK CST Level – GREATER THAN 10%. [Step 5]
	US/RO	VERIFY Faulted Steam Generator 1-03 Break Inside Containment. [Step 6]
	BOP	CHECK Secondary Radiation: [Step 7]
		• REQUEST periodic activity samples of all SGs. [Step 7.a]

Operating Test :	NRC	Scenario #	4	Event #	5,6,7 and 8	Page	30	of	43
Event Description:	SG 3 Faulted/Ruptured, Train A and B CNTMT Spray actuation failures, HV-2399A fails to auto close								

Time	Position	Applicant's Actions or Behavior
		• CHECK available Secondary Radiation Monitors – NORMAL. [Step 7.b] • DETERMINED SG 1-03 is also RUPTURED based on secondary radiation monitor readings.
		• Go to EOP-3.0A, Steam Generator Tube Rupture, Step 1. [Step 7.b RNO]
Examiner Note: EOP-3.0A, Steam Generator Tube Rupture steps begin here.		
	US/RO	CHECK If RCPs Should Be Stopped: [Step 1]
		• RCPs were stopped at step 7 of EOP-0.0A
	US/RO	Identify Ruptured SG(s): [Step 2]
		• Unexpected increase in any SG narrow range level -OR- • High radiation from any SG blowdown sample line. (SGS164, 1-RE-4200) -OR- • High radiation from any Main steamline. (MSL178 through 181, 1-RE-2325 through 2328)
	RO	• IDENTIFIED SG 1-03 as ruptured steam generator.
		CAUTION: If the TDAFW pump is the only available source of feed flow, steam supply to the TDAFW pump must be maintained from at least one SG.
		CAUTION: At least two SG(s) must be maintained available for the initial RCS cooldown. At least one SG must be maintained available for the subsequent RCS cooldown to RHR system operating conditions.

Operating Test :	NRC	Scenario #	4	Event #	5,6,7 and 8	Page	31	of	43
Event Description:	SG 3 Faulted/Ruptured, Train A and B CNTMT Spray actuation failures, HV-2399A fails to auto close								

Time	Position	Applicant's Actions or Behavior
		NOTE: If any SG atmospheric opens the Plant Staff should be notified.
		Examiner Note: If not closed by BOP operator during performance of EOP-0.0A, Attachment 2, the Faulted/Ruptured SGBD HELB valve will be closed during performance of the following step.
CRITICAL TASK STATEMENT (CT1)		**Identify and Isolate Faulted Steam Generator Prior to Exiting EOP-2.0A, Faulted Steam Generator Isolation.**
	US/RO	Isolate Flow From Ruptured SG(s): [Step 3]
		• Adjust ruptured SG(s) atmospheric controller setpoint to 1160 psig. [Step 3.a]
		• Check ruptured SG(s) atmospheric – CLOSED [Step 3.b]
		• Close ruptured SG(s) main steam line isolation, and SG drippot isolation valves – previously closed by MSLI. [Step 3.c]
		• Pull-Out steam supply valve handswitch from ruptured SG(s) to TDAFW pump. [Step 3.d] (not required)
CT-1	RO/BOP	• Verify blowdown isolation valve(s) from ruptured SG(s) – CLOSED • CLOSE SG 3 BLDN HELB ISOL VLV, 1-HS-2399A (if open)
		CAUTION: If any ruptured SG is faulted, feed flow to that SG should remain isolated during subsequent recovery actions unless needed for RCS cooldown.
	US/BOP	Check Ruptured SG(s) Level: [Step 4]
		• Operator does not feed SG 1-03 based on preceding CAUTION.
		CAUTION: Major steam flow paths from the ruptured SG(s) should be isolated before initiating RCS cooldown.

Operating Test :	NRC	Scenario #	4	Event #	5,6,7 and 8	Page	32	of	43
Event Description:	SG 3 Faulted/Ruptured, Train A and B CNTMT Spray actuation failures, HV-2399A fails to auto close								

Time	Position	Applicant's Actions or Behavior
	US/BOP	Check Ruptured SG(s) Pressure - GREATER THAN 420 PSIG [Step 5]
		• Determined SG 1-03 pressure is NOT greater than 420 psig
		Go to ECA-3.1A, SGTR WITH LOSS OF REACTOR COOLANT – SUBCOOLED RECOVERY DESIRED, Step 1. [Step 5 RNO]
Examiner Note:		**The following steps are from ECA-3.1A, SGTR WITH LOSS OF REACTOR COOLANT – SUBCOOLED RECOVERY DESIRED**
		CAUTION: When time permits, Attachment 9 of EOP-0.0A, REACTOR TRIP OR SAFETY INJECTION should be performed to realign equipment after an SI signal has been reset.
		CAUTION: If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment.
Examiner Note:		**Steps 1 – 6 are also contained in the FOLD-OUT Page book located at CB07 as ECA-3.1A, Attachment 1D. If the Unit Supervisor elects to have an operator perform Attachment 1D, a laminated copy will be removed from the book and will be performed without verbalization. The Unit Supervisor will continue with step 7 of ECA-3.1A. When Attachment 1D is complete, it will be returned to the Unit Supervisor and reported complete. All steps of ECA-3.1A are contained below.**
	US	DIRECTS RO or BOP Operator to perform Attachment 1D of ECA-3.1A
	RO/BOP	[1.D] CHECK If Diesel Generators Should Be Emergency Started: [Step 1]
	RO/BOP	• VERIFY Diesel Generator(s) – RUNNING. [Step 1.a]
		• Place D/G EMER STOP/START handswitch(es) in START [Step 1.b]
	RO/BOP	[1.D] RESET SI [Step 2]

Operating Test :	NRC	Scenario #	4	Event #	5,6,7 and 8	Page	33	of	43
Event Description:	SG 3 Faulted/Ruptured, Train A and B CNTMT Spray actuation failures, HV-2399A fails to auto close								

Time	Position	Applicant's Actions or Behavior
		• DEPRESS 1/1-SIRA, TRAIN A SI RESET pushbutton.
		• DEPRESS 1/1-SIRB, TRAIN B SI RESET pushbutton.
	RO/BOP	[1.D] VERIFY SI Sequencers – RESET. [Step 3]
		• At SI Sequencer Train A Cabinet, DEPRESS SI SEQR RESET green pushbutton then PLACE ON/RESET toggle switch in RESET.
		• After ~ 2 seconds, PLACE ON/RESET toggle switch in ON.
		• At SI Sequencer Train B Cabinet, DEPRESS SI SEQR RESET green pushbutton then PLACE ON/RESET toggle switch in RESET.
		• After ~ 2 seconds, PLACE ON/RESET toggle switch in ON.
	RO/BOP	[1.D] RESET Containment Isolation Phase A and Phase B. [Step 4]a
		• DEPRESS 1/1-C1PARA, CNTMT ISOL – PHASE A RESET pushbutton.
		• DEPRESS 1/1-C1PARB, CNTMT ISOL – PHASE A RESET pushbutton.
		• DEPRESS 1/1-C1PBRA, CNTMT ISOL – PHASE B RESET pushbutton.
		• DEPRESS 1/1-C1PBRB, CNTMT ISOL – PHASE B RESET pushbutton.
	RO/BOP	[1.D] RESET Containment Spray Signal. [Step 5]
		• DEPRESS 1/1-CSRA, TRAIN A CS RESET pushbutton.
		• DEPRESS 1/1-CSRB, TRAIN B CS RESET pushbutton.
	RO/BOP	[1.D] ESTABLISH Instrument Air and Nitrogen to Containment. [Step 6]
		• ESTABLISH Instrument Air: [Step 6.a]
		• VERIFY Air Compressor – RUNNING. [Step 6.a.1)]
		• ESTABLISH Instrument Air to Containment: [Step 6.a.2)] • OPENS CNTMT INSTR AIR ISOL VLV, 1-HS-3487
		• ESTABLISH Nitrogen: [Step 6.b]
		• VERIFY ACCUM 1●4 VENT CTRL, 1-HC-943 – CLOSED. [Step 6.b.1)]
		• OPEN SI/PORV ACCCUM N2 ISOL VLV 1/1-8880. [Step 6.b.2)]
	US/BOP	VERIFY all AC Buses – ENERGIZED BY OFFSITE POWER. [Step 7]

Operating Test :	NRC	Scenario #	4	Event #	5,6,7 and 8	Page	34	of	43
Event Description:	SG 3 Faulted/Ruptured, Train A and B CNTMT Spray actuation failures, HV-2399A fails to auto close								

Time	Position	Applicant's Actions or Behavior
		CAUTION: PRZR heaters should not be energized until PRZR water level indicates greater than minimum level recommended by Plant Staff to ensure heaters are covered.
		Simulator Operator: When contacted as the Shift Manager to consult Plant Staff below, acknowledge the communication.
	RO	DEENERGIZE PRZR Heaters: [Step 8]
		• PLACE all PRZR heater switches in OFF position. [Step 8.a]
		• CONSULT Plant Staff for a recommended minimum indicated PRZR water level that will ensure heaters are covered. [Step 8.b]
		CAUTION: If any ruptured SG is faulted, AFW flow to that SG should remain isolated during subsequent recovery action unless needed for RCS cooldown.
	US	CHECK Ruptured SG(s) Level. [Step 9]
		• Based on preceding CAUTION, crew will not establish AFW flow to 1-03 SG.
		CAUTION: RCS pressure should be monitored. If RCS pressure decreases in an uncontrolled manner to less than 325 PSIG (425 PSIG FOR ADVERSE CONTAINMENT), the RHR pumps must be manually restarted to supply water to the RCS.
	US	Check If RHR Pumps Should Be Stopped: [Step 10]
		• RHR pumps - ANY RUNNING WITH SUCTION ALIGNED TO RWST [Step 10.a]
		• Check RCS pressure: [Step 10.b]
		• RCS pressure - GREATER THAN 325 PSIG (425 PSIG FOR ADVERSE CONTAINMENT) [Step 10.b.1)]

Operating Test :	NRC	Scenario #	4	Event #	5,6,7 and 8	Page	35	of	43
Event Description:	SG 3 Faulted/Ruptured, Train A and B CNTMT Spray actuation failures, HV-2399A fails to auto close								

Time	Position	Applicant's Actions or Behavior
		• RCS pressure - STABLE OR INCREASING [Step 10.b.2)]
		• Stop RHR pumps and place in standby [Step 10.c]
		• Reset RHR auto switchover [Step 10.d]
	US	Initiate Evaluation Of Plant Status: [Step 11]
		• Check auxiliary building and safeguards building radiation - NORMAL: [Step 11.a]
		• Check PC-11 area monitors - NORMAL (GRID 4) [Step 11.a.1)]
		• Notify Radiation Protection to take local radiation surveys. [Step 11.a.2)]
		• Notify Chemistry to obtain RCS samples to assist in determining extent of the accident. [Step 11.b]
		• Evaluate plant equipment: [Step 11.c]
		• Consult Plant Staff to determine equipment that should be available/started to assist in recovery. [Step 11.c.1)]
<u>Simulator Operator</u>: When contacted as the Shift Manager to contact Chemistry and consult Plant Staff below, acknowledge the communication.		
	US	• Check If Any SG Is Faulted: [Step 12]
	BOP	• Check pressures in all SGs: [Step 12.a]
		• Any SG Pressure Decreasing in an Uncontrolled Manner -OR- • Any SG Completely Depressurized
	BOP	• Verify all faulted SGs isolated unless needed for RCS cooldown: [Step 12.b]
		• Steamlines • Feedlines • Blowdown and Sample Lines
	US	• Check Intact SG Levels: [Step 13]
		• Narrow range level – GREATER THAN 43% (50% FOR ADVERSE CONTAINMENT). [Step 13.a]
		• Control AFW flow to maintain narrow range level between 43% (50% FOR ADVERSE CONTAINMENT) and 60%. [Step 13.b]

Operating Test :	NRC	Scenario #	4	Event #	5,6,7 and 8	Page	36	of	43
Event Description:	SG 3 Faulted/Ruptured, Train A and B CNTMT Spray actuation failures, HV-2399A fails to auto close								

Time	Position	Applicant's Actions or Behavior
		NOTE: Shutdown margin should be monitored during RCS cooldown.
		NOTE: After the low steamline pressure SI signal is blocked, main steamline isolation will occur if the high steam pressure rate setpoint is exceeded.
		Examiner Note: The cooldown will require the operator to dump steam using the Atmospheric Relief Valves (ARVs). The ARV controllers (1-PK-2325 thru -2328) require a ~20% demand signal to unseat the valves and then a reduction in demand to establish a cooldown rate of below 100°F/hr. Final demand is based on the combination of AFW flow and steam flow, but somewhere near 4% demand.
		Examiner Note: The combination of extended loop transport time in natural circulation and the use of strap on RTDs increase the time required by the operator to establish and adjust the cooldown rate.
CRITICAL TASK STATEMENT (CT-2)		**Initiate Cooldown of Reactor Coolant System in ECA-3.1A, SGTR With Loss of Reactor Coolant – Subcooled Recovery Desired, prior to commencing ECCS flow reduction.**
	US	INITIATE RCS Cooldown to Cold Shutdown: [Step 14]
		• MAINTAIN cooldown rate in RCS Cold Legs – LESS THAN 100°F/HR. [Step 14.a]
		• Use RHR System if in service. [Step 14.b]
		• CHECK PRZR pressure – LESS THAN 1960 PSIG. [Step 14.c]

		• BLOCK Low Main Steam Pressure SI signal when Pressurizer pressure – LESS THAN 1960 psig. [Step 14.d]
		  • 1/1-SLSIRBA, MSL ISOL SI RESET/BLOCK
		  • 1/1-SLSIRBA, MSL ISOL SI RESET/BLOCK

		• DUMP steam to condenser from intact SG(s). [Step 14.e] (MSIVs are closed so the RNO response is required.
CT-2		• Dump steam from intact SG(s) using SG atmospheric. [Step 14.e RNO]

Operating Test :	NRC	Scenario #	4	Event #	5,6,7 and 8	Page	37	of	43
Event Description:	SG 3 Faulted/Ruptured, Train A and B CNTMT Spray actuation failures, HV-2399A fails to auto close								

Time	Position	Applicant's Actions or Behavior
		• Make plant announcement and notify Plant Staff of steam release. [Step 14.e.1 RNO]

		• Perform the following as necessary to release steam while maintaining cooldown rate: [Step 14.e.2 RNO]
		  • Place SG(s) atmospheric(s) controller(s) in manual and increase demand.
		  • 1-PK-2325, SG 1 ATMOS RLF VLV
		  • 1-PK-2326, SG 2 ATMOS RLF VLV
		  • 1-PK-2328, SG 4 ATMOS RLF VLV

When an RCS Cooldown is established at ≤ 100ºF/hr, or at the discretion of the Lead Evaluator, TERMINATE the scenario.		

Operating Test :	NRC	Scenario #	4	Event #	N/A	Page	38	of	43
Event Description:	EOP-0.0A, Attachment 2								

Time	Position	Applicant's Actions or Behavior
Examiner Note: These steps are performed by the BOP per EOP-0.0A, Attachment 2.		
		CAUTION: If during performance of this procedure the SI sequencer fails to complete its sequence, Attachment 3 may be used to ensure proper equipment operation for major equipment.
	BOP	VERIFY SSW Alignment: [Step 1]
		• VERIFY SSW Pumps – RUNNING. [Step 1.a]
		• VERIFY Diesel Generator Cooler SSW return flow. [Step 1.b]
	BOP	VERIFY Safety Injection Pumps – RUNNING. [Step 2]
	BOP	VERIFY Containment Isolation Phase A – APPROPRIATE MLB LIGHT INDICATION (RED WINDOWS). [Step 3]
	BOP	VERIFY Containment Ventilation Isolation – APPROPRIATE MLB LIGHT INDICATION (GREEN WINDOWS). [Step 4]
	BOP	VERIFY CCW Pumps – RUNNING. [Step 5]
	BOP	VERIFY RHR Pumps – RUNNING. [Step 6]
	BOP	VERIFY Proper CVCS Alignment: [Step 7]
		• VERIFY CCPs – RUNNING. [Step 7.a]
		• VERIFY Letdown Relief Valve Isolation: [Step 7.b]
		• VERIFY Letdown Orifice Isolation Valves – CLOSED. [Step 7.b.1)]
		• VERIFY Letdown Isolation Valves 1/1-LCV-459 & 1/1-LCV-460 – CLOSED. [Step 7.b.2)]
	BOP	VERIFY ECCS flow: [Step 8]
		• CCP SI flow indicators – CHECK FOR FLOW. [Step 8.a]

Time	Position	Applicant's Actions or Behavior
		• RCS pressure – LESS THAN 1700 PSIG (1800 PSIG FOR ADVERSE CONTAINMENT). [Step 8.b]
		• SIP discharge flow indicator – CHECK FOR FLOW. [Step 8.c]
		• RCS pressure – LESS THAN 325 PSIG (425 PSIG FOR ADVERSE CONTAINMENT). [Step 8.d]
		• Go to Step 9 of this attachment. [Step 8.d RNO d]
	BOP	VERIFY Feedwater Isolation Complete: [Step 9]
		• Feedwater Isolation Valves – CLOSED.
		• Feedwater Isolation Bypass Valves – CLOSED.
		• Feedwater Bypass Control Valves – CLOSED.
		• Feedwater Control Valves – CLOSED.
	BOP	VERIFY Diesel Generators – RUNNING. [Step 10]
	BOP	VERIFY Monitor Lights for SI Load Shedding on 1-MLB-9 and 1-MLB-10 – LIT. [Step 11]
		NOTE: The MLB indication for SI alignment includes components which may be in a different alignment to support unit conditions. MSIVs, MSLs BEF MSIV D/POT ISOL, TDAFWP STEAM SUPPLIES, TDAFWP RUN, MDAFWP FLO CTRL VLVs and TDAFWP FLO CTRL VLVs may be exceptions to the expected MLB indication.
	BOP	VERIFY Proper SI alignment – PROPER MLB LIGHT INDICATION. [Step 12]
		NOTE: Any previously removed missile shield(s) that affects the Control Room, Auxiliary, Safeguards or Fuel Building pressure boundary is required to be restored upon initiation of a Safety Injection Signal.

Operating Test :	NRC	Scenario #	4	Event #	N/A	Page	40	of	43
Event Description:	EOP-0.0A, Attachment 2								

Time	Position	Applicant's Actions or Behavior

NOTE: When the SI sequencer has timed out,the Reactor Makeup Water Pump with its handswitch in Auto will restart.

	BOP	VERIFY Components on Table 1 are Properly Aligned. [Step 13]			
		Location	Equipment	Description	Condition
		CB-03	X-HS-5534	H2 PRG SPLY FN 4	STOPPED
		CB-03	X-HS-5532	H2 PRG SPLY FN 3	STOPPED
		CB-04	1/1-8716A	RHRP 1 XTIE VLV	OPEN
		CB-04	1/1-8716B	RHRP 2 XTIE VLV	OPEN
		CB-06	1/1-8153	XS LTDN ISOL VLV	CLOSED
		CB-06	1/1-8154	XS LTDN ISOL VLV	CLOSED
		CB-07	1/1-RTBAL	RX TRIP BKR	OPEN
		CB-07	1/1-RTBBL	RX TRIP BKR	OPEN
		CB-07	1/1-BBAL	RX TRIP BYP BKR	OPEN/DEENERGIZED
		CB-07	1/1-BBBL	RX TRIP BYP BKR	OPEN/DEENERGIZED
		CB-08	1-HS-2397A	SG 1 BLDN HELB ISOL VLV	CLOSED
		CB-08	1-HS-2398A	SG 2 BLDN HELB ISOL VLV	CLOSED

CRITICAL TASK STATEMENT (CT1)	**Identify and Isolate Faulted Steam Generator Prior to Exiting EOP-2.0A, Faulted Steam Generator Isolation.**

CT-1	CB-08	1-HS-2399A	SG 3 BLDN HELB ISOL VLV • CLOSES VALVE	OPEN
	CB-08	1-HS-2400A	SG 4 BLDN HELB ISOL VLV	CLOSED
	CB-08	1-HS-2111C	FWPT A TRIP	TRIPPED
	CB-08	1-HS-2112C	FWPT B TRIP	TRIPPED
	CB-09	1-HS-2490	CNDS XFER PUMP	STOPPED (MCC deenergized on SI)

Time	Position	Applicant's Actions or Behavior			
		CV-01	X-HS-6181	PRI PLT SPLY FN 17 & INTK DMPR	STOPPED/DEENERGIZED
		CV-01	X-HS-6188	PRI PLT SPLY FN 18 & INTK DMPR	STOPPED/DEENERGIZED
		CV-01	X-HS-6195	PRI PLT SPLY FN 19 & INTK DMPR	STOPPED/DEENERGIZED
		CV-01	X-HS-6202	PRI PLT SPLY FN 20 & INTK DMPR	STOPPED/DEENERGIZED
		CV-01	X-HS-6209	PRI PLT SPLY FN 21 & INTK DMPR	STOPPED/DEENERGIZED
		CV-01	X-HS-6216	PRI PLT SPLY FN 22 & INTK DMPR	STOPPED/DEENERGIZED
		CV-01	X-HS-6223	PRI PLT SPLY FN 23 & INTK DMPR	STOPPED/DEENERGIZED
		CV-01	X-HS-6230	PRI PLT SPLY FN 24 & INTK DMPR	STOPPED/DEENERGIZED
		CV-01	X-HS-3631	UPS & DISTR RM A/C FN 1 & BSTR FN 42	STARTED
		CV-01	X-HS-3632	UPS & DISTR RM A/C FN 2 & BSTR FN 43	STARTED
		CV-01	1-HS-5600	ELEC AREA EXH FN 1	STOPPED/DEENERGIZED
		CV-01	1-HS-5601	ELEC AREA EXH FN 2	STOPPED/DEENERGIZED
		CV-01	1-HS-5602	MS & FW PIPE AREA EXH FN 3 & EXH DMPR	STOPPED/DEENERGIZED
		CV-01	1-HS-5603	MS & FW PIPE AREA EXH FN 4 & EXH DMPR	STOPPED/DEENERGIZED
		CV-01	1-HS-5618	MS & FW PIPE AREA SPLY FN 17	STOPPED/DEENERGIZED
		CV-01	1-HS-5620	MS & FW PIPE AREA SPLY FN 18	STOPPED/DEENERGIZED
		CV-03	X-HS-5855	CR EXH FN 1	STOPPED/DEENERGIZED
		CV-03	X-HS-5856	CR EXH FN 2	STOPPED/DEENERGIZED
		CV-03	X-HS-5731	SFP EXH FN 33	STOPPED/DEENERGIZED
		CV-03	X-HS-5733	SFP EXH FN 34	STOPPED/DEENERGIZED
		CV-03	X-HS-5727	SFP EXH FN 35	STOPPED/DEENERGIZED
		CV-03	X-HS-5729	SFP EXH FN 36	STOPPED/DEENERGIZED

Operating Test :	NRC	Scenario #	4	Event #	N/A	Page	42	of	43
Event Description:	EOP-0.0A, Attachment 2								

Time	Position	Applicant's Actions or Behavior			
Examiner Note: The next four steps would be performed on Unit 2.					
		CB-03	2-HS-5538	AIR PRG EXH ISOL DMPR	CLOSED
		CB-03	2-HS-5539	AIR PRG EXH ISOL DMPR	CLOSED
		CB-03	2-HS-5537	AIR PRG SPLY ISOL DMPR	CLOSED
		CB-03	2-HS-5536	AIR PRG SPLY ISOL DMPR	CLOSED
	BOP	NOTIFY Unit Supervisor attachment instructions complete AND to IMPLEMENT FRGs as required.			
EOP-0.0A, Attachment 2 steps are now complete.					

```
;2018 NRC Scenario 4
;IC-15, 100%, BOL
;No OOS Equipment

;Create Oscillation on LQY-553 Test Input
set LQY-553-Input.Amplitude=2;
set LQY-553-Input.Period=0.5;
set LQY-553-Input.Y_Offset=14;

;PT-2328 Fails High
;SG 1-04 ARV Opens
IMF MS13D f:1300 k:1

;PR Channel NI-43 Fails High
IMF NI05E f:200 k:2

;0.5% Fuel Failure
IMF CR01 f:.5 k:3 r:360

;SG 1-03 FCV (FCV-530) Oscillates
;set cdFC-530.PGAIN=1.0
{Key[4] != 0} scn 2018 NRC Exam\2018 NRC Scenario 4a
IOR LOANTSLB5_22 f:0 k:4
IRF RXR121 f:1 k:4

;MSLB on SG 1-03 IRC
;SGTR on SG 1-03 - Faulted/Ruptured
IMF MS01C f:9.5 k:5
IMF SG01C f:300 k:5

;Train A CSPs Fail to Sequence on SI
;Train A CSP Fails to Actuate on Hi-3
;Unable to manually start pumps
IMF CS02E f:1
IMF CS02G f:1
IMF CS09A f:1
IOR DICSHS4764 f:1
IOR DICSHS4765 f:1

;CS Train B HX Outlet Vlv Fails to Auto Open
IMF CS07B f:1

;SG 1-03 Blowdown Iso Vlv FTC on MSLI
IOR DISGHS2399A f:2
{DISGHS2399A.Value=0} DOR DISGHS2399A

************************************************
set cdFC-530.PGAIN=1.0
```