Facility: CPNPP Units 1 and 2		Date of Examination:	04/01/13
Examination Level	RO ☐	Operating Test Number:	NRC

Administrative Topic (see Note)	Type Code*	Describe Activity to be Performed
Conduct of Operations (RA1)	D, R	2.1.25 Ability to interpret reference materials such as graphs, curves, tables, etc. (3.9). JPM: Restore Refueling Water Storage Tank Level (RO1307).
Conduct of Operations (RA2)	M, R	2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation (4.3). JPM: Perform Reactor Coolant System Pressure / Temperature Verification (RO5115).
Equipment Control (RA3)	M, R	2.2.1 Ability to perform pre-startup procedures including operating those controls associated with plant equipment that could affect reactivity (4.5). JPM: Perform a 1/M Plot and Predict Critical Conditions (RO1003).
Radiation Control (RA4)	D, S	2.3.13 Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc. (3.4) JPM: Perform Actions for Fuel Handling Accident in the Spent Fuel Pool (RO4504).
Emergency Plan	—	—

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

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

RA1 The applicant will restore Refueling Water Storage Tank (RWST) level when it is determined out of specification per SOP-104A, Reactor Make-Up and Chemical Control System, Section 5.2.7, Makeup to RWST. Critical steps include calculating the required volume of borated water necessary to raise RWST level, Boric Acid Flowrate, total gallons of Boric Acid, and potentiometer settings for the Flow Control Valves. This is a bank JPM.

RA2 The applicant will perform a Reactor Coolant System Pressure/Temperature Verification per ABN-905A, Loss of Control Room Habitability, Attachment 7, RCS Pressure/Temperature Verification. Critical steps include calculating saturation temperatures, subcooled margin, and cooldown rate. This is a modified bank JPM.

RA3 The applicant will perform a 1/M plot for a Reactor Startup per IPO-002A, Plant Startup from Hot Standby, Attachment 2, Inverse Count Rate Ratio Calculation. The critical steps include accurately calculating and plotting 1/M, predicting critical conditions, and identifying action for criticality below the Power Dependent Insertion Limit. This is a modified bank JPM.

RA4 The applicant will implement radiological emergency actions per ABN-908, Fuel Handling Accident, Section 3.0, Fuel Handling Accident in the Fuel Building Involving Spent Fuel. The critical steps include initiating local evacuation, activating the Radiological Emergency Alarm, and ensuring proper ventilation alignment. This is a bank JPM.

Facility: CPNPP Units 1 and 2		Date of Examination:	04/01/13
Examination Level	SRO ☐	Operating Test Number:	NRC

Administrative Topic (see Note)	Type Code*	Describe Activity to be Performed
Conduct of Operations (SA1)	M, R	2.1.25 Ability to interpret reference materials such as graphs, curves, tables, etc. (4.2). JPM: Restore Refueling Water Storage Tank Level and Evaluate Technical Specifications (SO1211).
Conduct of Operations (SA2)	M, R	2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation (4.4). JPM: Perform Reactor Coolant System Pressure / Temperature Verification and Evaluate Technical Specifications (SO1005).
Equipment Control (SA3)	M, R	2.2.14 Knowledge of the process for controlling equipment configuration or status. (4.3) JPM: Determine Fire Compensatory Measures for an Emergent Condition (SO1048).
Radiation Control (SA4)	D, R	2.3.6 Ability to approve release permits (3.8). JPM: Approve a Liquid Waste Release Permit (SO1039).
Emergency Plan (SA5)	M, R	2.4.44 Knowledge of emergency plan protective action recommendations. (4.4) JPM: Determine Protective Action Requirements (SO1140).

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

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

SA1 The applicant will restore Refueling Water Storage Tank (RWST) per SOP-104A, Reactor Make-Up and Chemical Control System, Section 5.2.7, Makeup to RWST. Critical steps include calculating the required volume of borated water necessary to raise RWST level, Boric Acid Flowrate, total gallons of Boric Acid, and potentiometer settings for the Flow Control Valves and then evaluating Technical Specifications when it is determined that RWST temperature is out of specification. This is a modified bank JPM.

SA2 The applicant will perform a Reactor Coolant System Pressure/Temperature Verification per ABN-905A, Loss of Control Room Habitability, Attachment 7, RCS Pressure/Temperature Verification. Critical steps include calculating saturation temperatures, subcooled margin, cooldown rate, and evaluating Technical Specifications when the cooldown rate exceeds 100°F/hr. This is a modified bank JPM.

SA3 The applicant will evaluate a Fire Protection Impairment per STA-738, Fire Protection Systems/Equipment Impairments. The critical steps are to determine Fire Watch implementation and other Compensatory Measures. This is a modified bank JPM.

SA4 The applicant will approve a Liquid Waste Release Permit per STA-603, Control of Station Radioactive Effluents and STA-603-10, Batch Liquid Radioactive Effluent Release Data Sheet. The critical steps include identifying any errors and actions required prior to approving the release. This is a bank JPM.

SA5 The applicant will determine Protective Actions per EPP-304, Protective Action Recommendations. The critical steps include determining the proper Protective Actions, Pasquill Stability Class, and Zones to be evacuated or sheltered. This is a modified bank JPM.

Facility: CPNPP JPM # NRC RA1 Task # RO1307 K/A # 2.1.25 3.9 / 4.2

Title: Restore Refueling Water Storage Tank Level

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 1.
- Volume Control Tank level is stable at 60%.
- Current Refueling Water Storage Tank (RWST) Boron concentration is 2525 ppm.
- RWST level is 90%.
- Boric Acid Tank X-01 is at 97% and Boric Acid Tank X-02 is at 98%.
- Both Boric Acid Tanks have a concentration of 7450 ppm.
- OPERABLE boration flowpaths exist.

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

- CALCULATE the blended makeup to the Unit 1 Refueling Water Storage Tank to raise level from 90% to 97% per SOP-104A, Reactor Make-Up and Chemical Control System, Section 5.2.7, Makeup to RWST.
- DETERMINE the gallons of makeup required to raise RWST level from 90% to 97%.
- DETERMINE the required Boric Acid flowrate and Reactor Makeup Water flowrate for a makeup concentration of 2575 ppm at a total blended flowrate of 20 gpm.
- RECORD the following information:
  - RWST Makeup Required ________ gallons
  - Boric Acid Flowrate ________ gpm
  - Total Gallons of Boric Acid ________ gallons
  - POT Setting for 1-FK-110 ________
  - POT Setting for 1-FK-111 ________

Task Standard: Utilizing SOP-104A, TDM-201A, TDM-203A, and TDM-804A, calculated makeup required to the Refueling Water Storage Tank, including boric acid flowrate, reactor makeup water flowrate, total gallons of boric acid, and potentiometer settings for the Boric Acid and Reactor Makeup Water Flow Control Valves.

Required Materials: SOP-104A, Reactor Make-Up and Chemical Control System, Rev. 14-4.
TDM-201A, CVCS Calculations/ Blended Flow, Rev. 6.
TDM-203A, CVCS Controller Data. Rev. 3.
TDM-804A, Equipment Data Tank Height vs. Volume, Rev. 3.

Validation Time: 15 minutes Completion Time: ________ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): ______________________________ Date: ____________

CLASSROOM SETUP

EXAMINER:

PROVIDE the examinee with a copy of:

- **SOP-104A, Reactor Make-Up and Chemical Control System.**
- **TDM-201A, CVCS Calculations/ Blended Flow.**
- **TDM-203A, CVCS Controller Data.**
- **TDM-804A, Equipment Data Tank Height vs. Volume.**
- **Calculator and Ruler.**

√ - Check Mark Denotes Critical Step

START TIME:	

Examiner Note:	**The following step is from SOP-104A, Section 5.2.7.**
Examiner Note:	**RWST volumes found in TDM-804A, Page 16 of 56.**
Perform Step: 1√ 5.2.7.A	DETERMINE volume (VT) required to fill RWST to desired level using TDM-804A.
Standard:	REFERENCED Page 16 of TDM-804A and DETERMINED the following to raise RWST level from 90% to 97%: • 508220.9 – 472618.3 = **35602.6 ± 1000 gallons**.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Formula found in TDM-201A, Page 8 of 14.**
Perform Step: 2√	Determine required boric acid flowrate.
Standard:	CALCULATED Boric Acid Flowrate per TDM-201A as follows: • $F_b = C \times F_T / C_{bat} = 2575 \times 20 / 7450 =$ **6.91 ± 0.5 gpm**.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3√	Determine total gallons of boric acid required.
Standard:	CALCULATED total gallons of boric acid as follows: • 35603 gallons x 6.91 / 20 = **12300.8 ± 500 gallons**.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Formula found in TDM-203A, Page 11 of 12.**
Perform Step: 4√	Determine potentiometer setting for 1-FK-110, Boric Acid Blender Flow Control Valve.
Standard:	CALCULATED potentiometer setting for 1-FK-110, Boric Acid Blender Flow Control Valve, per TDM-203A as follows: • 6.91 gpm = **1.73 ± 0.2**.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Formula found in TDM-203A, Page 12 of 12.**
Perform Step: 5√	Determine potentiometer setting for 1-FK-111, Reactor Makeup Water Blender Flow Control Valve.
Standard:	CALCULATED potentiometer setting for 1-FK-111, Reactor Makeup Water Blender Flow Control Valve, per TDM-203A as follows: • 20 gpm = **1.25 ± 0.2**.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

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

- **Unit 1 is in MODE 1.**
- **Volume Control Tank level is stable at 60%.**
- **Current Refueling Water Storage Tank (RWST) Boron concentration is 2525 ppm.**
- **RWST level is 90%.**
- **Boric Acid Tank X-01 is at 97% and Boric Acid Tank X-02 is at 98%.**
- **Both Boric Acid Tanks have a concentration of 7450 ppm.**
- **OPERABLE boration flowpaths exist.**

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

- **CALCULATE the blended makeup to the Unit 1 Refueling Water Storage Tank to raise level from 90% to 97% per SOP-104A, Reactor Make-Up and Chemical Control System, Section 5.2.7, Makeup to RWST.**
- **DETERMINE the gallons of makeup required to raise RWST level from 90% to 97%.**
- **DETERMINE the required Boric Acid flowrate and Reactor Makeup Water flowrate for a makeup concentration of 2575 ppm at a total blended flowrate of 20 gpm.**
- **RECORD the following information:**
  - **RWST Makeup Required** ________ **gallons**
  - **Boric Acid Flowrate** ________ **gpm**
  - **Total Gallons of Boric Acid** ________ **gallons**
  - **POT Setting for 1-FK-110** ________
  - **POT Setting for 1-FK-111** ________

Facility: CPNPP JPM # NRC RA2 Task # RO5115 K/A # 2.1.23 4.3 / 4.4

Title: Perform Reactor Coolant System Pressure / Temperature Verification

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:

- ABN-905A, Loss of Control Room Habitability, Attachment 7, RCS Pressure / Temperature Verification, is in progress.
- Reactor Coolant System cooldown is in progress.

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

- UTILIZING the data provided, CALCULATE the identified parameters (shown with arrows) on Attachment 7, RCS Pressure/Temperature Verification, per ABN-905A, Loss of Control Room Habitability.

Task Standard: Utilizing ABN-905A, calculated saturation temperatures, Reactor Coolant System subcooling margin, and Reactor Coolant System cooldown rate during a Loss of Control Room Habitability.

Required Materials: ABN-905A, Loss of Control Room Habitability, Rev. 9-10.

Validation Time: 15 minutes Completion Time: ________ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): ______________________________ Date: ______________

CLASSROOM SETUP

EXAMINER:

PROVIDE the examinee with a copy of:

- **ABN-905A, Loss of Control Room Habitability.**
  - **Attachment 7, RCS Pressure / Temperature Verification with data inserted where appropriate.**

√ - Check Mark Denotes Critical Step

START TIME:	

Examiner Note:	**The following is from ABN-905A, Attachment 7.**
Perform Step: 1√	Calculate saturation temperature for Pressurizer pressure using Steam Tables at 0900 and 0930.
Standard:	CALCULATED saturation temperature for Pressurizer pressure using Steam Tables and ENTERED data at 0900 and 0930.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2√	Calculate subcooling for Reactor Coolant System using Steam Tables at 0900 and 0930.
Standard:	CALCULATED subcooling for Reactor Coolant System using Steam Tables and ENTERED data at 0900 and 0930.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3√	Calculate saturation temperature for Steam Generator 1 pressure using Steam Tables at 0900 and 0930.
Standard:	CALCULATED saturation temperature for Steam Generator 1 pressure using Steam Tables and ENTERED data at 0900 and 0930.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4√	Calculate saturation temperature for Steam Generator 2 pressure using Steam Tables at 0900 and 0930.
Standard:	CALCULATED saturation temperature for Steam Generator 2 pressure using Steam Tables and ENTERED data at 0900 and 0930.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5√	Calculate saturation temperature for Steam Generator 3 pressure using Steam Tables at 0900 and 0930.
Standard:	CALCULATED saturation temperature for Steam Generator 3 pressure using Steam Tables and ENTERED data at 0900 and 0930.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6√	Calculate saturation temperature for Steam Generator 4 pressure using Steam Tables at 0900 and 0930.
Standard:	CALCULATED saturation temperature for Steam Generator 4 pressure using Steam Tables and ENTERED data at 0900 and 0930.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7√	Calculate Reactor Coolant System cooldown rate from the Steam Generator with the largest pressure drop at 0930.
Standard:	CALCULATED Reactor Coolant System cooldown rate from Steam Generator 3 and ENTERED data at 0930.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

<u>INITIAL</u> <u>CONDITIONS</u>: **Given the following conditions:**

- **ABN-905A, Loss of Control Room Habitability, Attachment 7, RCS Pressure / Temperature Verification, is in progress.**
- **Reactor Coolant System cooldown is in progress.**

<u>INITIATING</u> <u>CUE</u>: **The Unit Supervisor directs you to PERFORM the following:**

- **UTILIZING the data provided, CALCULATE the identified parameters (shown with arrows) on Attachment 7, RCS Pressure/Temperature Verification, per ABN-905A, Loss of Control Room Habitability.**

CPNPP ABNORMAL CONDITIONS PROCEDURES MANUAL	UNIT 1	PROCEDURE NO. ABN-905A
LOSS OF CONTROL ROOM HABITABILITY	REVISION NO. 9	PAGE 46 OF 74

ATTACHMENT 7
PAGE 1 OF 2

RCS PRESSURE/TEMPERATURE VERIFICATION

Time		0900	0930					
PRZR PRESS	1-PI-455B	2085	1785					
Tsat from Steam Table (2)	→	643±3	621±3					
PRZR LVL	1-LI-459B	49%	46%					
NEUT FLUX SR	1-NI-50A-3	450	400					
RCS LOOP (4)	CL1	545	540					
1 & 2 TEMP	CL2	545	540					
1-TR-410F	HL1	550	545					
	HL2	550	545					
Calculated Subcooling °F	→	93±5	76±5					
SG 1 PRESS (2)	1-PI-514B	1010	960					
Tsat from Steam Table (2)	→	547±3	541±3					
SG 1 LVL (WR) (1)	1-LI-501A	79	78					
SG 2 LVL (WR) (1)	1-LI-502A	77	79					
SG 2 PRESS (2)	1-PI-524B	1020	970					
Tsat from Steam Table (2)	→	549±3	543±3					
RCS LOOP (4)	CL3	550	550					
3 & 4 TEMP	CL4	550	550					
1-TR-430F	HL3	555	555					
	HL4	555	555					
SG 3 PRESS (2)	1-PI-534B	1020	960					
Tsat from Steam Table (2)	→	549±3	541±3					
SG 3 LVL (WR) (1)	1-LI-503A	78	78					
SG 4 LVL (WR) (1)	1-LI-504A	76	76					
SG 4 PRESS (2)	1-PI-544B	1010	970					
Tsat from ST	→	547±3	543±3					
COOLDOWN RATE	(3) →	N/A	16±3					

(1) SG Level (WR) Cold Cal of approximately 74% corresponds to an AFW Pump Low Level Auto Start signal.

(2) Steam pressure converted to Tsat/Tcold is the best indication of temperature and temperature changes.

(3) Cooldown rate should be calculated based on most conservative SG Press reading. Calculate cooldown using Tsat values and steam tables, with SG Press reading that has dropped the largest amount from last reading.

(4) RCS indicated temperature response will be slow due to slow response time of strap on RTDs.

NOTE: When completed, this attachment shall be dispositioned by attaching it to the SMART Form generated as a result of this abnormal condition.

Facility: CPNPP JPM # NRC RA3 Task # RO1003 K/A # 2.2.1 4.5 / 4.4

Title: Perform a 1/M Plot and Predict Critical Conditions

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 performing a Reactor Startup per IPO-002A, Plant Startup from Hot Standby.
- Boron is at the Estimated Critical Boron Concentration of 1220 ppm.
- Shutdown Control Rod Banks are fully withdrawn.
- Critical Rod Height is predicted to be CBD at 78 steps.
- The +500 PCM Rod position is CBD at 210 steps.
- The -500 PCM Rod position is CBC at 123 or CBD at 8 steps.
- The Full Out Position (FOP) is 225 steps.
- Control Rods have been withdrawn four times in increments of 50 steps.
- The Unit Supervisor wants to re-perform the Inverse Count Rate Ratio Calculation and re-plot the points on a 1/M Data Sheet to re-verify Predicted Critical Rod Height.

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

- DETERMINE the Inverse Count Rate Ratio Calculation (ICRR) for the readings shown on IPO-002A, Plant Startup from Hot Standby, Attachment 2, Inverse Count Rate Ratio Calculation.
- LOG the ICRR on IPO-002A, Attachment 2, and PLOT the points on the 1/M Data Sheet.
- LOG the Predicted Critical Rod Height for each 50 step Control Bank A withdrawal up to 200 steps on the 1/M Data Sheet.
- RECORD any required action based on 1/M Data obtained:
  - ____

Task Standard: Utilizing IPO-002A, calculated the Inverse Count Rate, performed a 1/M Plot using provided data, and determined criticality predicted below Rod Insertion Limit.

Required Materials: IPO-002A, Plant Startup from Hot Standby, Rev. 20-17.

ERX-11-002, COLR for CPNPP Unit 1 Cycle 16, Figure 2, Rod Bank Insertion Limits Versus Thermal Power, Rev. 0.

Straight edge or ruler.

Validation Time: 15 minutes Completion Time: ________ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): ______________________________ Date: ____________

CLASSROOM SETUP

EXAMINER:
PROVIDE the examinee with a copy of:

- **IPO-002A, Plant Startup from Hot Standby.**
  - **COMPLETE Attachment 2 through four sets of data.**
- **Straight edge or ruler.**

√ - Check Mark Denotes Critical Step

START TIME:	

Examiner Note:	**The following steps are from IPO-002A, Attachment 2.**
Perform Step: 1√	Calculate Inverse Count Rate Ratio calculation for Control Bank A at 50 steps and plot on 1/M Data Sheet.
Standard:	CALCULATED Inverse Count Rate Ratio for Control Bank A at 50 steps, PLOTTED on 1/M Data Sheet, and RECORDED Data: • RECORD an average Count Rate of **55.** • CALCULATE ICRR = 1/M = 50/55 = 0.91 ± 0.01. • RECORD ICRR = **0.91 ± 0.01.** • PLOT points for CBA @ 0 steps and CBA @ 50 steps. • DRAW a line from 1.00 to 0.91 that INTERSECTS with CBD at 190 ± 100 steps. • LOG an Estimated Critical Condition with **CBD at 190 ± 100 steps**.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2√	Calculate Inverse Count Rate Ratio calculation for Control Bank A at 100 steps and plot on 1/M Data Sheet.
Standard:	CALCULATED Inverse Count Rate Ratio for Control Bank A at 100 steps, PLOTTED on 1/M Data Sheet, and RECORDED Data: • RECORD an average Count Rate of **65.** • CALCULATE ICRR = 1/M = 50/65 = 0.77 ± 0.01. • RECORD ICRR = **0.77 ± 0.01.** • PLOT points for CBA @ 50 steps and CBA @ 100 steps. • DRAW a line from 0.91 to 0.77 that INTERSECTS with CBD at 20 ± 50 steps. • LOG an Estimated Critical Condition with **CBD at 20 ± 50 steps**.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3√	Calculate Inverse Count Rate Ratio calculation for Control Bank B at 35 steps and plot on 1/M Data Sheet.
Standard:	CALCULATED Inverse Count Rate Ratio for Control Bank B at 35 steps, PLOTTED on 1/M Data Sheet, and RECORDED Data: • RECORD an average Count Rate of **104.** • CALCULATE ICRR = 1/M = 50/104 = 0.48 ± 0.01. • RECORD ICRR = **0.48 ± 0.01.** • PLOT points for CBA @ 100 steps and CBB @ 35 steps. • DRAW a line from 0.77 to 0.48 that INTERSECTS with CBC at 5 ± 30 steps. • LOG an Estimated Critical Condition with **CBC at 5 ± 30 steps**.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4√	Calculate Inverse Count Rate Ratio calculation for Control Bank B at 85 steps and plot on 1/M Data Sheet.
Standard:	CALCULATED Inverse Count Rate Ratio for Control Bank B at 85 steps, PLOTTED on 1/M Data Sheet, and RECORDED Data: • RECORD an average Count Rate of **333.** • CALCULATE ICRR = 1/M = 50/333 = 0.15 ± 0.01. • RECORD ICRR = **0.15 ± 0.01.** • PLOT points for CBB @ 35 steps and CBB @ 85 steps. • DRAW a line from 0.48 to 0.15 that INTERSECTS with CBB at 105 ± 25 steps. • LOG an Estimated Critical Condition with **CBB at 105 ± 25 steps**.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following Standard is from IPO-002A, Step 5.2.10, 4th bullet.**
Perform Step: 5√	RECORD any required action based on 1/M Data obtained on Attachment 2, Page 3 of 4.
Standard:	DETERMINED Estimated Critical Condition occurs below the Rod Insertion Limit within the next reactivity addition and RECORDED the following on Attachment 2, Page 3 of 4: • **INSERT all Control Bank Rods to the CBO position (critical).**
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

<u>INITIAL CONDITIONS</u>: **Given the following conditions:**

- **Unit 1 is performing a Reactor Startup per IPO-002A, Plant Startup from Hot Standby.**
- **Boron is at the Estimated Critical Boron Concentration of 1220 ppm.**
- **Shutdown Control Rod Banks are fully withdrawn.**
- **Critical Rod Height is predicted to be CBD at 78 steps.**
- **The +500 PCM Rod position is CBD at 210 steps.**
- **The -500 PCM Rod position is CBC at 123 or CBD at 8 steps.**
- **The Full Out Position (FOP) is 225 steps.**
- **Control Rods have been withdrawn four times in increments of 50 steps.**
- **The Unit Supervisor wants to re-perform the Inverse Count Rate Ratio Calculation and re-plot the points on a 1/M Data Sheet to re-verify Predicted Critical Rod Height.**

<u>INITIATING CUE</u>: **The Unit Supervisor directs you to PERFORM the following:**

- **DETERMINE the Inverse Count Rate Ratio Calculation (ICRR) for the readings shown on IPO-002A, Plant Startup from Hot Standby, Attachment 2, Inverse Count Rate Ratio Calculation.**
- **LOG the ICRR on IPO-002A, Attachment 2, and PLOT the points on the 1/M Data Sheet.**
- **LOG the Predicted Critical Rod Height for each 50 step Control Bank A withdrawal up to 200 steps on the 1/M Data Sheet.**
- **RECORD any required action based on 1/M Data obtained:**
    - ______________________________________

ATTACHMENT 2
PAGE 1 OF 4

INVERSE COUNT RATE RATIO CALCULATION

NOTE:	This calculation is not required when Core Performance Engineering is performing ICRR calculations per NUC-111.

1.0 PREREQUISITES

- The scalar timer is available for use in the manual mode per SOP-703.

OR

- IF the scalar timer is out-of-service, THEN Nuclear Instrument indication shall be used.

2.0 LIMITATIONS

2.1 Rod withdrawal increments should be performed at approximately 50 steps. The Shift Manager may authorize withdrawal of rods at any other increment less than 50 steps as the Reactor approaches criticality.

3.0 INSTRUCTIONS

3.1 The following steps describe the method for determining the baseline reference count values.

NOTE:	When count rate is greater than 50 counts/sec, a 10 second counting interval should be used. If count rate is less than or equal to 50 counts/sec, then a 30 second counting interval should be used. Once initiated, the same counting interval should be used throughout the ICRR.

A. Obtain ten separate reference counts for each Source Range channel and record values on the ICRR worksheet.

B For each Source Range channel, compute the average count from the 10 reference counts on the ICRR worksheet.

3.2 Mark the graph for the rod heights at + / - 500 pcm (if using OPT-308-1) or for the Expected Criticality Range (if using OPT-308-2). |
|

ATTACHMENT 2
PAGE 2 OF 4

INVERSE COUNT RATE RATIO CALCULATION

3.3 The following steps describe the method used in determining the Inverse Count Rate Ratio (ICRR).

A. After obtaining the Shift Manager permission, withdraw the Control Rods a maximum of 50 steps. The Shift Manager may authorize withdrawals of less than 50 steps.

B. Monitor Source Range indication on recorder 1-NR-0045 to determine when the Source Range channels have stabilized.

C. Obtain three separate integral count measurements for each Source Range channel using the counting interval determined in Step 3.1.

D. Ensure audible Source Range counts is returned to service after completion of counting measurements.

E. Calculate the average of these counts for each Source Range channel on the ICRR worksheet.

F. Perform the following calculation and record the result on the ICRR worksheet.

$$ICRR = \frac{\text{Source Range Channel Reference Counts}}{\text{Source Range Channel Average Counts}}$$

G. Plot the ICRR values at the appropriate rod position on graph paper similar to the one attached.

3.4 Perform a linear extrapolation of the ICRR plot, using the last two data points, to the point at which the extrapolation intersects the horizontal axis. This point defines the rod position at which criticality is estimated.

3.5 List rod position estimation on the ICRR worksheet.

3.6 Continue to perform Steps 3.3 thru 3.5 until either of the following occurs:

A. The Reactor is critical

OR

B. The Shift Manager terminates ICRR data collection.

CPSES INTEGRATED PLANT OPERATING PROCEDURES MANUAL	UNIT 1	PROCEDURE NO. IPO-002A
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ATTACHMENT 2
PAGE 3 OF 4

INVERSE COUNT RATE RATIO CALCULATION

INVERSE COUNT RATE RATIO

Estimated Critical Condition:

Bank CBD at 78 steps

Boron Concentration 1220 ppm

Completed by______________________

Date________________Time____________

REFERENCE N-31	COUNTS N-32
50	49
49	50
49	51
51	49
50	49
51	51
48	52
50	50
51	49
51	50
50	50
AVE	AVE

BANK CBA AT 50 STEPS

	N-31	N-32
	55	55
	56	54
	54	56
AVE	55	55
ICRR	0.91	0.91
ECC BANK	CBD	CBD
STEP	190	190

CBD 190 ± 100

BANK CBA AT 100 STEPS

	N-31	N-32
	65	64
	65	67
	65	64
AVE	65	65
ICRR	0.77	0.77
ECC BANK	CBD	CBD
STEP	20	20

CBD 20 ± 50

BANK CBB AT 35 STEPS

	N-31	N-32
	104	103
	103	104
	105	105
AVE	104	104
ICRR	0.48	0.48
ECC BANK	CBC	CBC
STEP	5	5

CBC 5 ± 30

BANK CBB AT 85 STEPS

	N-31	N-32
	335	333
	333	329
	331	337
AVE	333	333
ICRR	0.15	0.15
ECC BANK	CBB	CBB
STEP	105	105

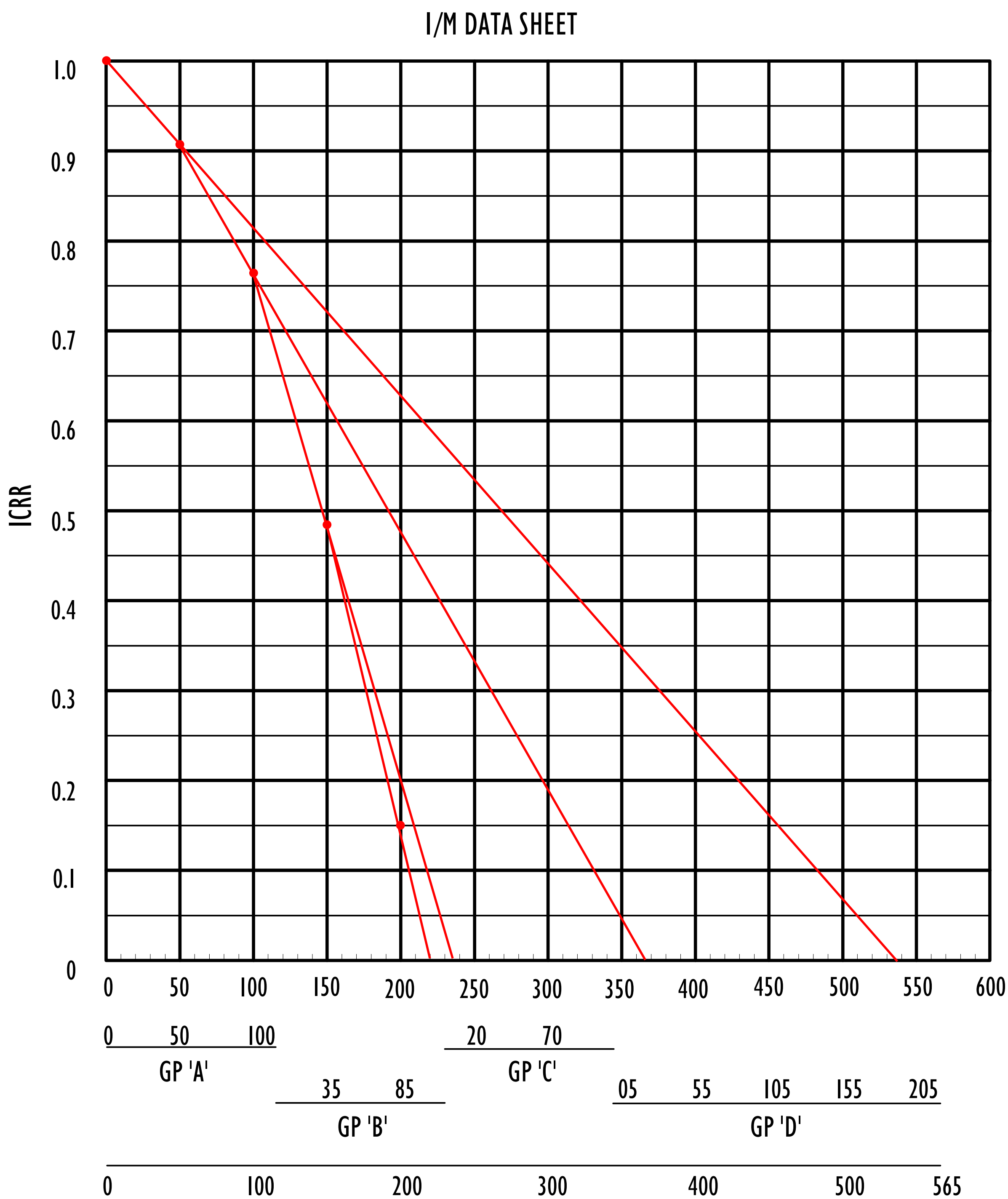
CBB 105 ± 25

BANK ____ AT ____ STEPS

	N-31	N-32
AVE		
ICRR		
ECC BANK		
STEP		

ATTACHMENT 2
PAGE 4 OF 4

INVERSE COUNT RATE RATIO CALCULATION



Facility: CPNPP JPM # NRC RA4 Task # RO4504 K/A # 2.3.13 3.4 / 3.8

Title: Perform Actions for Fuel Handling Accident in the Spent Fuel Pool

Examinee (Print): ______________________________

Testing Method:

Simulated Performance:	______	Classroom:	______
Actual Performance:	X	Simulator:	X
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:

- Spent fuel re-racking is in progress in Spent Fuel Pool X-01.
- The following alarms were just received on PC-11, Digital Radiation Monitoring System:
  - X-RE-6274, SFP-003 LRAM SFP 1 E. WALL.
  - X-RE-5700, FBV-088 FB VENT EXH.

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

- IMPLEMENT the actions of ABN-908, Fuel Handling Accident.
- The Shift Manager has been NOTIFIED.

Task Standard: Utilizing ABN-908, initiated evacuation of the Fuel Building and placed Spent Fuel Pool Exhaust ventilation in service.

Required Materials: ABN-908, Fuel Handling Accident, Rev. 4-4.

Validation Time: 5 minutes Completion Time: ________ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): ______________________________ Date: ____________

SIMULATOR SETUP

BOOTH OPERATOR:

INITIALIZE to any MODE 1 Initial Condition and LOAD scenario file "LC-21 NRC JPM RA4" or PERFORM the following:

- **INSERT malfunction RM003 at 1E6, Area Radiation Monitor failure X-RE-6274/SFP003 into high alarm.**
- **INSERT malfunction RM088 at 1E6, Process Radiation Monitor failure X-RE-5700/FBV088 into high alarm.**
- **ENSURE both Unit 1 Spent Fuel Pool Exhaust Fans 33 and 34 are OFF.**

BOOTH OPERATOR NOTE:

- **After each JPM, VERIFY both Unit 1 Spent Fuel Pool Exhaust Fans 33 and 34 are OFF.**

EXAMINER:

PROVIDE the examinee with a copy of:

- **ABN-908, Fuel Handling Accident.**

√ - Check Mark Denotes Critical Step

START TIME:	

Examiner Note:	**Wording of the announcement does NOT need to be verbatim.**
Examiner Note:	**The following steps are from ABN-908, Section 3.0.**
Perform Step: 1 3.3.1	Notify the Shift Manager of the incident and location.
Standard:	DETERMINED Shift Manager was notified per the Initial Conditions.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Performing either Step 2 or Step 4 is critical, not both.**
Perform Step: 2√ 3.3.2 & 3.3.2.a	Evacuate the Fuel Building as follows: • Announce the Fuel Building evacuation over the Gai-tronics.
Standard:	ANNOUNCED the following using the GAI-TRONICS: THIS IS NOT A DRILL. ATTENTION ALL PERSONNEL IN THE FUEL BUILDING. EVACUATE THE FUEL BUILDING. PROCEED INTO THE AUXILIARY BUILDING CORRIDOR. THIS IS NOT A DRILL.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The Control Room credenza is located behind the Unit Supervisor's desk and the Communication Control Station is located adjacent to the Main Fire Panel.**
Perform Step: 3√ 3.3.2 & 3.3.2.b	Evacuate the Fuel Building as follows: • Sound the Radiological Emergency Alarm.
Standard:	DEPRESSED **either** of the RADIOLOGICAL EMERGENCY ALARM pushbuttons: • Yellow RADIATION ALARM pushbutton on the Control Room credenza. • Yellow RADIATION ALERT pushbutton at the Communication Control Station.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4√ 3.3.2 & 3.3.2.c	Evacuate the Fuel Building as follows: • Repeat the announcement.
Standard:	ANNOUNCED the following using the GAI-TRONICS: THIS IS NOT A DRILL. ATTENTION ALL PERSONNEL IN THE FUEL BUILDING. EVACUATE THE FUEL BUILDING. PROCEED INTO THE AUXILIARY BUILDING CORRIDOR. THIS IS NOT A DRILL.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Starting either Spent Fuel Pool Exhaust Fan meets the requirement.**
Perform Step: 5√ 3.3.3 & 1st bullet	Ensure one spent fuel pool exhaust fan is running for the affected spent fuel pool. • SFP No. 1 • X-HS-5731, SFP EXH FAN 33
Standard:	DETERMINED a Fan is NOT running and PERFORMED the following: • PLACED X-HS-5731, SFP EXH FAN 33 in START (**critical**) • OBSERVED red START light LIT **(NOT critical)**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6√ 3.3.3 & 2nd bullet	Ensure one spent fuel pool exhaust fan is running for the affected spent fuel pool. • SFP No. 1 • X-HS-5733, SFP EXH FAN 34
Standard:	DETERMINED a Fan is NOT running and PERFORMED the following: • PLACED X-HS-5733, SFP EXH FAN 34 in START (**critical**) • OBSERVED red START light LIT **(NOT critical)**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7 3.3.4	Refer to EPP-201.
Standard:	REPORTED to the Unit Supervisor that EPP-201 must be referenced.
Examiner Cue:	**The Unit Supervisor is referring to EPP-201.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8 3.3.1	Notify Radiation Protection of the incident AND ensure all personnel who were in Fuel Building are being surveyed for possible contamination.
Standard:	CONTACTED Radiation Protection and NOTIFIED them of the fuel handling accident.
Terminating Cue:	**Radiation Protection has been contacted. This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

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

- **Spent fuel re-racking is in progress in Spent Fuel Pool X-01.**
- **The following alarms were just received on PC-11, Digital Radiation Monitoring System:**
  - **X-RE-6274, SFP-003 LRAM SFP 1 E. WALL.**
  - **X-RE-5700, FBV-088 FB VENT EXH.**

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

- **IMPLEMENT the actions of ABN-908, Fuel Handling Accident.**
- **The Shift Manager has been NOTIFIED.**

Facility: CPNPP JPM # NRC SA1 Task # SO1211 K/A # 2.1.25 3.9 / 4.2

Title: Restore Refueling Water Storage Tank Level and Evaluate Technical Specifications

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 1.
- Volume Control Tank level is stable at 60%.
- Current Refueling Water Storage Tank (RWST) Boron concentration is 2525 ppm.
- RWST level is 90%.
- Boric Acid Tank X-01 is at 97% and Boric Acid Tank X-02 is at 98%.
- Both Boric Acid Tanks have a concentration of 7450 ppm.
- OPERABLE boration flowpaths exist.

Initiating Cue: The Shift Manager directs you to PERFORM the following:

- CALCULATE the blended makeup to the Unit 1 Refueling Water Storage Tank to raise level from 90% to 97% per SOP-104A, Reactor Make-Up and Chemical Control System, Section 5.2.7, Makeup to RWST.
- DETERMINE the gallons of makeup required to raise RWST level from 90% to 97%.
- DETERMINE the required Boric Acid flowrate and Reactor Makeup Water flowrate for a makeup concentration of 2575 ppm at a total blended flowrate of 20 gpm.
- RECORD the following information:
  - RWST Makeup Required ________ gallons
  - Boric Acid Flowrate ________ gpm
  - Total Gallons of Boric Acid ________ gallons
  - POT Setting for 1-FK-110 ________
  - POT Setting for 1-FK-111 ________
- The Reactor Operator REPORTS that while recording OPT-102A-1, MODE 1 and 2 Shiftly Surveillances Logs, RWST temperature is 122°F. RECORD any Required Action(s).
  - ____
    ____

Task Standard:	Utilizing SOP-104A, TDM-201A, TDM-203A, and TDM-804A, calculated makeup required to the Refueling Water Storage Tank (RWST), including boric acid flowrate, reactor makeup water flowrate, total gallons of boric acid, and potentiometer settings for the Boric Acid and Reactor Makeup Water Flow Control Valves. Utilizing Technical Specifications, identified LCO 3.5.4.A REQUIRED ACTION and COMPLETION TIME for RWST temperature out of specification.
Required Materials:	SOP-104A, Reactor Make-Up and Chemical Control System, Rev. 14-4. TDM-201A, CVCS Calculations/ Blended Flow, Rev. 6. TDM-203A, CVCS Controller Data. Rev. 3. TDM-804A, Equipment Data Tank Height vs. Volume, Rev. 3. Unit 1 Technical Specifications, Amendment 158.
Validation Time:	20 minutes Completion Time: ________ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): ______________________________ Date: ______________

CLASSROOM SETUP

EXAMINER:

PROVIDE the examinee with a copy of:

- **SOP-104A, Reactor Make-Up and Chemical Control System.**
- **TDM-201A, CVCS Calculations/ Blended Flow.**
- **TDM-203A, CVCS Controller Data.**
- **TDM-804A, Equipment Data Tank Height vs. Volume.**
- **Unit 1 Technical Specifications, Amendment 158.**
- **Calculator and Ruler.**

√ - Check Mark Denotes Critical Step

START TIME:	

Examiner Note:	**The following step is from SOP-104A, Section 5.2.7.**
Examiner Note:	**RWST volumes found in TDM-804A, Page 16 of 56.**
Perform Step: 1√ 5.2.7.A	DETERMINE volume (VT) required to fill RWST to desired level using TDM-804A.
Standard:	REFERENCED Page 16 of TDM-804A and DETERMINED the following to raise RWST level from 90% to 97%: • 508220.9 – 472618.3 = **35602.6 ± 1000 gallons**.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Formula found in TDM-201A, Page 8 of 14.**
Perform Step: 2√	Determine required boric acid flowrate.
Standard:	CALCULATED Boric Acid Flowrate per TDM-201A as follows: • $F_b = C \times F_T / C_{bat}$ = 2575 x 20 / 7450 = **6.91 ± 0.5 gpm**.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3√	Determine total gallons of boric acid required.
Standard:	CALCULATED total gallons of boric acid as follows: • 35603 gallons x 6.91 / 20 = **12300.8 ± 500 gallons**.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Formula found in TDM-203A, Page 11 of 12.**
Perform Step: 4√	Determine potentiometer setting for 1-FK-110, Boric Acid Blender Flow Control Valve.
Standard:	CALCULATED potentiometer setting for 1-FK-110, Boric Acid Blender Flow Control Valve, per TDM-203A as follows: • 6.91 gpm = **1.73 ± 0.2**.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Formula found in TDM-203A, Page 12 of 12.**
Perform Step: 5√	Determine potentiometer setting for 1-FK-111, Reactor Makeup Water Blender Flow Control Valve.
Standard:	CALCULATED potentiometer setting for 1-FK-111, Reactor Makeup Water Blender Flow Control Valve, per TDM-203A as follows: • 20 gpm = **1.25 ± 0.2**.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6	DETERMINE impact of Refueling Water Storage Tank temperature.
Standard:	DETERMINED Refueling Water Storage Tank temperature is out of specification high at 122°F per Technical Specifications.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7√	EVALUATE Technical Specifications.
Standard:	DETERMINED Technical Specification **LCO 3.5.4**, **Refueling Water Storage Tank** is applicable: • **CONDITION A: RWST borated water temperature not within limits per SR 3.5.4.1.** • **REQUIRED ACTION: Restore RWST to OPERABLE status within 8 hours.**
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

<u>INITIAL</u> <u>CONDITIONS</u>: **Given the following conditions:**

- **Unit 1 is in MODE 1.**
- **Volume Control Tank level is stable at 60%.**
- **Current Refueling Water Storage Tank (RWST) Boron concentration is 2525 ppm.**
- **RWST level is 90%.**
- **Boric Acid Tank X-01 is at 97% and Boric Acid Tank X-02 is at 98%.**
- **Both Boric Acid Tanks have a concentration of 7450 ppm.**
- **OPERABLE boration flowpaths exist.**

<u>INITIATING</u> <u>CUE</u>: **The Shift Manager directs you to PERFORM the following:**

- **CALCULATE the blended makeup to the Unit 1 Refueling Water Storage Tank to raise level from 90% to 97% per SOP-104A, Reactor Make-Up and Chemical Control System, Section 5.2.7, Makeup to RWST.**
- **DETERMINE the gallons of makeup required to raise RWST level from 90% to 97%.**
- **DETERMINE the required Boric Acid flowrate and Reactor Makeup Water flowrate for a makeup concentration of 2575 ppm at a total blended flowrate of 20 gpm.**
- **RECORD the following information:**
  - **RWST Makeup Required** _________ **gallons**
  - **Boric Acid Flowrate** _________ **gpm**
  - **Total Gallons of Boric Acid** _________ **gallons**
  - **POT Setting for 1-FK-110** _________
  - **POT Setting for 1-FK-111** _________
- **The Reactor Operator REPORTS that while recording OPT-102A-1, MODE 1 and 2 Shiftly Surveillances Logs, RWST temperature is 122°F. RECORD any Required Action(s).**
  - ____
    ____

Facility: CPNPP JPM # NRC SA2 Task # SO1005 K/A # 2.1.23 4.3 / 4.4

Title: Perform RCS Pressure / Temperature Verification and Evaluate Technical Specifications

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:

- ABN-905A, Loss of Control Room Habitability, Attachment 7, RCS Pressure / Temperature Verification, is in progress.
- Reactor Coolant System cooldown is in progress.

Initiating Cue: The Shift Manager directs you to PERFORM the following:

- UTILIZING the data provided, CALCULATE the identified parameters (shown with arrows) on Attachment 7, RCS Pressure/Temperature Verification, per ABN-905A, Loss of Control Room Habitability.
- When complete, IDENTIFY any Technical Specification CONDITION, REQUIRED ACTION, and COMPLETION TIME.

____

____

____

Task Standard: Utilizing ABN-905A, calculated saturation temperatures, Reactor Coolant System subcooling margin, and Reactor Coolant System cooldown rate during a Loss of Control Room Habitability.

Utilizing Unit 1 Technical Specifications, identified LCO 3.4.3 CONDITION A, REQUIRED ACTIONS, and COMPLETION TIME.

Required Materials: ABN-905A, Loss of Control Room Habitability, Rev. 9-10.

Unit 1 Technical Specifications, Amendment 158.

Pressure and Temperature Limits Report, ERX-07-003, Rev. 2.

Validation Time: 17 minutes Completion Time: ________ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): ______________________________ Date: ______________

CLASSROOM SETUP

EXAMINER:

PROVIDE the examinee with a copy of:

- **ABN-905A, Loss of Control Room Habitability.**
    - **Attachment 7, RCS Pressure / Temperature Verification with data inserted where appropriate.**

MAKE the following available in the classroom:

- **Unit 1 Technical Specifications.**

√ - Check Mark Denotes Critical Step

START TIME:	

Examiner Note:	**The following is from ABN-905A, Attachment 7.**
Perform Step: 1√	Calculate saturation temperature for Pressurizer pressure using Steam Tables at 0900, 0930, and 1000.
Standard:	CALCULATED saturation temperature for Pressurizer pressure using Steam Tables and ENTERED data at 0900, 0930, and 1000.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2√	Calculate subcooling for Reactor Coolant System using Steam Tables at 0900, 0930, and 1000.
Standard:	CALCULATED subcooling for Reactor Coolant System using Steam Tables and ENTERED data at 0900, 0930, and 1000.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3√	Calculate saturation temperature for Steam Generator 1 pressure using Steam Tables at 0900, 0930, and 1000.
Standard:	CALCULATED saturation temperature for Steam Generator 1 pressure using Steam Tables and ENTERED data at 0900, 0930, and 1000.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4√	Calculate saturation temperature for Steam Generator 2 pressure using Steam Tables at 0900, 0930, and 1000.
Standard:	CALCULATED saturation temperature for Steam Generator 2 pressure using Steam Tables and ENTERED data at 0900, 0930, and 1000.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5√	Calculate saturation temperature for Steam Generator 3 pressure using Steam Tables at 0900, 0930, and 1000.
Standard:	CALCULATED saturation temperature for Steam Generator 3 pressure using Steam Tables and ENTERED data at 0900, 0930, and 1000.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6√	Calculate saturation temperature for Steam Generator 4 pressure using Steam Tables at 0900, 0930, and 1000.
Standard:	CALCULATED saturation temperature for Steam Generator 4 pressure using Steam Tables and ENTERED data at 0900, 0930, and 1000.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7√	Calculate Reactor Coolant System cooldown rate from the Steam Generator with the largest pressure drop at 0930 and 1000.
Standard:	CALCULATED Reactor Coolant System cooldown rate from Steam Generator 3 and ENTERED data at 0930 and 1000.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8√	Identify any Technical Specification CONDITION, REQUIRED ACTION, and COMPLETION TIME.

Standard:	DETERMINED Technical Specification **LCO 3.4.3**, **RCS Pressure and Temperature Limits** is applicable:
	• **CONDITION A: Requirements of the LCO not met in MODE 1, 2, 3, or 4.**
	• **REQUIRED ACTION and COMPLETION TIME:**
	  • **A.1 – Restore parameter(s) to within limits in 30 minutes.**
	  AND
	  • **A.2 – Determine RCS is acceptable for continued operation within 72 hours.**

Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

<u>INITIAL</u> <u>CONDITIONS</u>: **Given the following conditions:**

- **ABN-905A, Loss of Control Room Habitability, Attachment 7, RCS Pressure / Temperature Verification, is in progress.**
- **Reactor Coolant System cooldown is in progress.**

<u>INITIATING</u> <u>CUE</u>: **The Shift Manager directs you to PERFORM the following:**

- **UTILIZING the data provided, CALCULATE the identified parameters (shown with arrows) on Attachment 7, RCS Pressure/Temperature Verification, per ABN-905A, Loss of Control Room Habitability.**
- **When complete, IDENTIFY any Technical Specification CONDITION, REQUIRED ACTION, and COMPLETION TIME.**

____

____

____

CPNPP ABNORMAL CONDITIONS PROCEDURES MANUAL	UNIT 1	PROCEDURE NO. ABN-905A
LOSS OF CONTROL ROOM HABITABILITY	REVISION NO. 9	PAGE 46 OF 74

ATTACHMENT 7
PAGE 1 OF 2

RCS PRESSURE/TEMPERATURE VERIFICATION

Time		0900	0930	1000				
PRZR PRESS	1-PI-455B	2085	1785	885				
Tsat from Steam Table (2)	→	643±3	621±3	532±3				
PRZR LVL	1-LI-459B	49%	46%	39%				
NEUT FLUX SR	1-NI-50A-3	450	400	330				
RCS LOOP (4)	CL1	545	540	430				
1 & 2 TEMP	CL2	545	540	430				
1-TR-410F	HL1	550	545	445				
	HL2	550	545	445				
Calculated Subcooling °F	→	93±5	76±5	87±5				
SG 1 PRESS (2)	1-PI-514B	1010	960	335				
Tsat from Steam Table (2)	→	547±3	541±3	432±3				
SG 1 LVL (WR) (1)	1-LI-501A	79	78	79				
SG 2 LVL (WR) (1)	1-LI-502A	77	79	77				
SG 2 PRESS (2)	1-PI-524B	1020	970	345				
Tsat from Steam Table (2)	→	549±3	543±3	435±3				
RCS LOOP (4)	CL3	550	550	430				
3 & 4 TEMP	CL4	550	550	430				
1-TR-430F	HL3	555	555	445				
	HL4	555	555	445				
SG 3 PRESS (2)	1-PI-534B	1020	960	335				
Tsat from Steam Table (2)	→	549±3	541±3	432±3				
SG 3 LVL (WR) (1)	1-LI-503A	78	78	78				
SG 4 LVL (WR) (1)	1-LI-504A	76	76	78				
SG 4 PRESS (2)	1-PI-544B	1010	970	345				
Tsat from ST	→	547±3	543±3	435±3				
COOLDOWN RATE	(3) →	N/A	16±3	117±3				

(1) SG Level (WR) Cold Cal of approximately 74% corresponds to an AFW Pump Low Level Auto Start signal.

(2) Steam pressure converted to Tsat/Tcold is the best indication of temperature and temperature changes.

(3) Cooldown rate should be calculated based on most conservative SG Press reading. Calculate cooldown using Tsat values and steam tables, with SG Press reading that has dropped the largest amount from last reading.

(4) RCS indicated temperature response will be slow due to slow response time of strap on RTDs.

NOTE: When completed, this attachment shall be dispositioned by attaching it to the SMART Form generated as a result of this abnormal condition.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.3 RCS Pressure and Temperature (P/T) Limits

LCO 3.4.3 RCS pressure, RCS temperature, and RCS heatup and cooldown rates shall be maintained within the limits specified in the PTLR.

APPLICABILITY: At all times

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. --------------NOTE-------------- Required Action A.2 shall be completed whenever this Condition is entered. ------------------------------------ Requirements of LCO not met in MODE 1, 2, 3, or 4.	A.1 Restore parameter(s) to within limits. AND A.2 Determine RCS is acceptable for continued operation.	30 minutes 72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5 with RCS pressure < 500 psig.	6 hours 36 hours

2.1 RCS Temperature Rate-of-Change Limits (LCO 3.4.3)

2.1.1 Maximum Heatup Rate

The RCS heatup rate limit is 100°F in any 1-hour period.

2.1.2 Maximum Cooldown Rate

The RCS cooldown rate limit is 100°F in any 1-hour period.

2.1.3 Maximum Temperature Change During Inservice Leak and Hydrostatic Testing

During inservice leak and hydrostatic testing operations above the heatup and cooldown limit curves, the RCS temperature change limit is 10°F in any 1-hour period.

2.2 P/T Limits for Heatup, Cooldown, Inservice Leak & Hydrostatic Testing, and Criticality (LCO 3.4.3)

The limiting materials and adjusted reference temperatures at the 1/4t and 3/4t locations for each unit's reactor vessel are extracted from Reference 4 and are presented in Table 2-1. These values are based on the evaluation of two surveillance capsule specimens for each unit which include evaluations of the credibility of data per Regulatory Guide 1.99, Revision 2. All surveillance data for Unit 1 is credible. For Unit 2, the surveillance plate data (for the intermediate shell plate R3807-1) is not credible, while the surveillance weld data is credible.

The limiting reference temperatures for pressurized thermal shock (RT_{PTS}) values for each unit's reactor vessel were previously docketed in accordance with 10CFR50.61 and are extracted from References 8 and 9 for presentation in Table 2-1. Analyses of the withdrawn surveillance capsules from the Unit 1 and Unit 2 reactor vessels have confirmed the similarity between the two vessels in irradiated and non-irradiated material properties. The results of these surveillance capsule evaluations have confirmed that the early projections for CPNPP vessel materials were conservative. In addition, the majority of the irradiation-induced shift in vessel material properties occurs early in life. Therefore, with substantial margin to the RT_{PTS} screening criteria, the conservative fluence projections for the CPNPP vessel materials, and the

Facility: CPNPP JPM # NRC SA3 Task # SO1048 K/A # 2.2.14 3.9 / 4.3

Title: Determine Fire Compensatory Measures for an Emergent Condition

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:

- FIR-303-1, Halon Fire Suppression System Inspection Sheet has been completed.
- Based on the FIR-303-1 a Fire Protection Impairment must be initiated using STA-738-2, Fire Protection System/Equipment Impairment Form.

Initiating Cue: The Shift Manager directs you to PERFORM the following:

- INITIATE the STA-738-2, Fire Protection System/Equipment Impairment Form in accordance with STA-738, Fire Protection Systems/Equipment Impairments and COMPLETE as follows:
  - RECORD the following information in the **IMPAIRED FIRE PROTECTION SYSTEM/EQUIPMENT** section:
    - AFFECTED LOCATION.
    - GENERAL ACTIVITY DESCRIPTION.
  - RECORD the following information in the **COMPENSATORY MEASURE REVIEW/AUTHORIZATION** section:
    - CONTINUOUS FIRE WATCH required. CHECK box if required.
    - ROVING FIRE WATCH route change required. Circle YES or NO.
    - ROVING FIRE WATCH with OPERABLE detection route change required. Circle YES or NO.
    - OTHER compensatory measure information. ENTER additional action information if required.

Task Standard: Utilizing STA-738, determined Fire Impairment Compensatory Measures for a disabled Halon System.

Required Materials: STA-738, Fire Protection Systems / Equipment Impairments, Rev. 6-6.

STA-738-2, Fire Protection System / Equipment Impairment Form, Rev. 6.

Validation Time: 25 minutes Completion Time: ________ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): ______________________________________ Date: ______________

CLASSROOM SETUP

EXAMINER:

PROVIDE the examinee with a copy of:

- **STA-738, Fire Protection Systems/Equipment Impairments.**
- **STA-738-2, Fire Protection System / Equipment Impairment Form.**
- **Completed FIR-303-1, Halon Fire Suppression System Inspection Sheet.**

√ - Check Mark Denotes Critical Step

START TIME:	

Examiner Note:	**The following information is from STA-783-2.**
Perform Step: 1	Enter information for AFFECTED LOCATION.
Standard:	ENTERED the following; BLDG: Electric Control, ELEV: 807, ROOM/OTHER: Unit 1 Cable Spreading Room.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2	Enter information for GENERAL ACTIVITY DESCRIPTION.
Standard:	ENTERED the following; Halon bottle pressure low. Detection system remains operable. Expected return to service on 4/3/13.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3√	Determine if CONTINUOUS FIRE WATCH is required.
Standard:	DETERMINED that a CONTINUOUS FIRE WATCH is required and checked box.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4	Determine if ROVING FIRE WATCH route change is required.
Standard:	DETERMINED that a ROVING FIRE WATCH route change is NOT required and circles NO.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5	Determine if ROVING FIRE WATCH with operable detection route change is required.
Standard:	DETERMINED that a ROVING FIRE WATCH with operable detection route change is NOT required and circles NO.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6√	Determine if OTHER compensatory measure information is required.
Standard:	DETERMINED that establishing a continuous fire watch and backup suppression equipment within one hour is required.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

<u>INITIAL CONDITIONS</u>: **Given the following conditions:**

- **FIR-303-1, Halon Fire Suppression System Inspection Sheet has been completed.**
- **Based on the FIR-303-1 a Fire Protection Impairment must be initiated using STA-738-2, Fire Protection System/Equipment Impairment Form.**

<u>INITIATING CUE</u>: **The Shift Manager directs you to PERFORM the following:**

- **INITIATE the STA-738-2, Fire Protection System/Equipment Impairment Form in accordance with STA-738, Fire Protection Systems/Equipment Impairments and COMPLETE as follows:**
  - **RECORD the following information in the **IMPAIRED FIRE PROTECTION SYSTEM/EQUIPMENT** section:**
    - **AFFECTED LOCATION.**
    - **GENERAL ACTIVITY DESCRIPTION.**
  - **RECORD the following information in the **COMPENSATORY MEASURE REVIEW/AUTHORIZATION** section:**
    - **CONTINUOUS FIRE WATCH required. CHECK box if required.**
    - **ROVING FIRE WATCH route change required. Circle YES or NO.**
    - **ROVING FIRE WATCH with OPERABLE detection route change required. Circle YES or NO.**
    - **OTHER compensatory measure information. ENTER additional action information if required.**

FIRE PROTECTION SYSTEM/EQUIPMENT IMPAIRMENT FORM

IMPAIRMENT # ____________________ **WORK DOCUMENT NUMBER** (S) ____________________

CLEARANCE/MTO# ____________________

Completed by Fire Protection

****IMPAIRED FIRE PROTECTION SYSTEM/EQUIPMENT****

SUPPRESSION SYSTEM ID Number (i.e., affected valves, system no., etc.) ____________________

ISOLATION POINT(S): ____________________

DETECTION SYSTEM ID Number (i.e., panel no., zone, detector) ____________________

FIRE PUMP: Electric, ☐ Diesel ☐ ID Number ____________________

FIRE PROTECTION WATER SUPPLY ☐ ID Number (i.e. tank, loop piv) ____________________

FIRE RATED ASSEMBLY ☐ Description/ID Number ____________________

(i.e. walls, floors, ceilings, penetrations seals, fire doors, fire dampers, radiant energy shield, thermolag, etc.)

OTHER SPECIFY: ____________________

AFFECTED LOCATION: BLDG. Electric Control ELEV. 807 ROOM/OTHER Unit 1 Cable Spreading Room

GENERAL ACTIVITY DESCRIPTION: Halon Bottle pressure low.
Detection Systems remain OPERABLE. Expected return to service on 04/03/13.

REQUESTED BY: ____________________ RWO __________ EXT.: __________ DATE: __________

Completed by Fire Protection/Shift Operations (normally performed during the impact review process)

****COMPENSATORY MEASURE REVIEW/AUTHORIZATION****

SCHEDULED IMPAIRED DATE: ____________________ SCHEDULED COMPLETION DATE: ____________________

_X_ CONTINUOUS FIRE WATCH POST NO.: ____________________

____ ROVING FIRE WATCH (route change required) YES NO ROUTE NO. __________

____ ROVING FIRE WATCH(with operable detection) (route change required) YES NO ROUTE NO. __________

____ NONE REQUIRED ____________________

_X_ OTHER Establish continuous fire watch and backup fire suppression equipment within one hour.

INSTRUCTIONS/ADDITIONAL INFORMATION ____________________

AUTHORIZED BY: ____________________ DATE: ____________________

Completed by Fire Protection/Shift Operations

(This section should be completed just prior to impairing any fire protection systems/equipment)

**** IMPAIRMENT/COMPENSATORY MEASURES INITIATION****

***** COMPENSATORY MEASURES INITIATED/VERIFIED: YES NO N/A (circle one) *****

BY: ____________________ DATE: __________ TIME: __________

Completed by FP/Shift Ops. ****RESTORATION****

FIRE PROTECTION SYSTEM/EQUIPMENT BACK IN-SERVICE YES NO (circle one)

BY: ____________________ DATE: __________ TIME: __________

STA-738-2
PAGE 1 of 1
R. 6

Facility: CPNPP JPM # NRC SA4 Task # SO1039 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:	______
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: Unit 1 is shutdown for REFUELING and the following conditions exist:

- Circulating Water Pumps 1-01 and 1-03 are operating and the Waterboxes are open on the other two Circulating Water Pumps.
- Waste Water Holdup Tank (WWHT) #1 is being released.
- Unit 2 is operating at 5% with all systems in normal alignments.
- The permit has just been received in the Control Room to release WWHT #1 and the Unit 1 Circulating Water System has been selected as the discharge path.

Initiating Cue: The Shift Manager directs you to PERFORM the following:

- REVIEW the Liquid Release Permit and Plant Conditions and CIRCLE the results:
  - STA-603-13 REQUIRED? YES / NO
  - Recirculation time SATISFACTORY? YES / NO
  - Unit #1 Discharge flowpath ALLOWED? YES / NO
  - Sample times SATISFACTORY? YES / NO
  - Sample ID data SATISFACTORY? YES / NO
  - Sample pH SATISFACTORY? YES / NO

Task Standard: Utilizing STA-603 and STA-603-10, reviewed the Liquid Release Permit and evaluated required parameters.

Required Materials: STA-603, Control of Station Radioactive Effluents, Rev. 21-1.
STA-603-10, Batch Liquid Radioactive Effluent Release Data Sheet, Rev. 18.

Validation Time: 15 minutes 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.**

√ - Check Mark Denotes Critical Step

START TIME:	

Examiner Note:	**The following Standard References are from STA-603.**
Perform Step: 1√	Review Release Permit, STA-603-10, Batch Liquid Radioactive Effluent Release Data Sheet.
Standard:	REVIEWED STA-603-10, Release Permit and DETERMINED the following: • STA-603-13 is NOT required and CIRCLED **NO**.
Examiner Note:	**STA-603-13 NOT required per STA-603, Step 6.1.9.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2√	Review Release Permit, STA-603-10, Batch Liquid Radioactive Effluent Release Data Sheet.
Standard:	REVIEWED STA-603-10, Release Permit and DETERMINED the following: • Recirculation time is > 0.5 hours and CIRCLED **YES**.
Examiner Note:	**Required per STA-603-10.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3√	Based on the initial conditions determine the required minimum dilution requirements are met for a release via Unit 1.
Standard:	DETERMINED that a minimum of two Circulating Water Pumps (CWP) are required for a release: • Unit #1 Discharge flowpath has 2 CWPs and CIRCLED **YES**.
Examiner Note:	**Required per STA-603, Step 6.2.7.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4√	Determine if Sample times are satisfactory.
Standard:	DETERMINED Sample times are > 15 minutes apart and CIRCLED **YES**.
Examiner Note:	**Required per STA-603-10.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5√	Determine if Sample ID Data are satisfactory.
Standard:	DETERMINED Sample ID Data are NOT ± 25% and CIRCLED **NO**.
Examiner Note:	**Required per STA-603-10.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6√	Determine if Sample pH is satisfactory.
Standard:	DETERMINED Sample pH is less than 6.0 and CIRCLED **NO**.
Examiner Note:	**Required per STA-603-10, Acceptance Criteria.**
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

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

- **Circulating Water Pumps 1-01 and 1-03 are operating and the Waterboxes are open on the other two Circulating Water Pumps.**
- **Waste Water Holdup Tank (WWHT) #1 is being released.**
- **Unit 2 is operating at 5% with all systems in normal alignments.**
- **The permit has just been received in the Control Room to release WWHT #1 and the Unit 1 Circulating Water System has been selected as the discharge path.**

INITIATING CUE: **The Shift Manager directs you to PERFORM the following:**

- **REVIEW the Liquid Release Permit and Plant Conditions and CIRCLE the results:**
  - **STA-603-13 REQUIRED?** **YES / NO**
  - **Recirculation time SATISFACTORY?** **YES / NO**
  - **Unit #1 Discharge flowpath ALLOWED?** **YES / NO**
  - **Sample times SATISFACTORY?** **YES / NO**
  - **Sample ID data SATISFACTORY?** **YES / NO**
  - **Sample pH SATISFACTORY?** **YES / NO**

Facility: CPNPP JPM # NRC SA5 Task # SO1140 K/A # 2.4.44 2.4 / 4.4

Title: Determine Protective Action Recommendations

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:

- Comanche Peak Unit 2 has experienced a Large Break Loss of Coolant Accident with multiple failures of Safeguards equipment and a breach of Containment.
- The Site is in a GENERAL EMERGENCY, a radiological release is in progress, and the following information is provided:
  - Core Exit Thermocouple highest reading is 1300ºF.
  - Containment pressure is 2 psig.
  - Meteorological Tower Data:
    - Wind Speed 5 mph.
    - Wind Direction from 180º.
  - Pasquill Stability Class is D.
  - Field Dose results are:
    - TEDE 1200 mrem at 5 miles and 400 mrem at 10 miles.
    - CDE Thyroid is 6250 mrem at 5 miles and 1500 mrem at 10 miles.
- Weather conditions include freezing rain and a temperature of 30°F throughout Somervell and Hood counties.
- The duration of the release cannot be determined at this time.

Initiating Cue: The Shift Manager directs you to PERFORM the following:

- COMPLETE an Initial PAR per EPP-304, Protective Action Recommendations.
- HIGHLIGHT the Decision Path on Attachment 1.
- COMPLETE Attachment 2, Minimum Affected Area - Three (3) Sectors **or** Attachment 2A, Minimum Affected Area - Five (5) Sectors, as appropriate.

Task Standard: Utilizing EPP-304, determined Protective Action Recommendations during an accident.

Required Materials: EPP-304, Protective Action Recommendations, Rev. 21.

Validation Time: 20 minutes Completion Time: ________ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): ______________________________ Date: ______________

CLASSROOM SETUP

EXAMINER:

PROVIDE the examinee with a copy of:

- **EPP-304, Protective Action Recommendations.**
- **Highlight pen.**

√ - Check Mark Denotes Critical Step

START TIME:	

Examiner Note:	**The following steps are from EPP-304, Attachment 1.**
Perform Step: 1	Enter Attachment 1 at GENERAL EMERGENCY declared: • Is this the Initial PAR?
Standard:	ENTERED Attachment 1 at GENERAL EMERGENCY declared and DETERMINED that this is the Initial PAR and CHOSE "**YES**" path.
Comment:	**SAT** ☐ **UNSAT** ☐

Perform Step: 2√	SEVERE FUEL DAMAGE Indicators: • ≥ 1000 R/hr CTE / CTW Or • ≥ 1200° auctioneered High CET
Standard:	DETERMINED SEVERE FUEL DAMAGE Indicator due to 1300°F Core Exit Thermocouple temperature and CHOSE "**YES**" path.
Comment:	**SAT** ☐ **UNSAT** ☐

Examiner Note:	**Reference Inset Table[1] on Attachment 1.**
Perform Step: 3	**[1]SHELTER OR EVACUATE?**
Standard:	REFERRED to Inset Table[1].
Comment:	**SAT** ☐ **UNSAT** ☐

Perform Step: 4√	Has there been severe core damage AND is a Rad release in progress?
Standard:	DETERMINED severe core damage exists due to Core Exit Thermocouple temperature with a radiation release in progress and CHOSE "**YES**" path.
Comment:	**SAT** ☐ **UNSAT** ☐

Perform Step: 5√	Can release duration be accurately determined AND will the release be of short duration?
Standard:	DETERMINED release duration can <u>NOT</u> be accurately determined and will <u>NOT</u> be of short duration based on breach of Containment and CHOSE "**NO**" path.
Comment:	**SAT** ☐ **UNSAT** ☐

Perform Step: 6√	**Impediments?** (ice, roads, hostile threat)
Standard:	DETERMINED impediments exist from the Initial Conditions due to weather conditions and CHOSE "**YES**" path to **SHELTER**.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7√	[1]**SHELTER OR EVACUATE?**
Standard:	CHOSE **SHELTER** path to Box **D** and SHELTERED 2 mile radius and Downwind Sectors to 10 miles **AND** ADVISED remainder of EPZ to go indoors and LISTEN to EAS.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps are from EPP-304, Attachment 2.**
Examiner Note:	**The first sequence of steps on either Attachment is used to determine if Attachment 2 or 2A is appropriate.**
Perform Step: 8 Step 1	To identify Minimum Affected Area, use instruction below to determine appropriate Attachment (Attachment 2 or Attachment 2A).
Standard:	REFERRED to Attachment 2 or 2A.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 9 Step 1	IF conditions are: • ON-SITE Pasquill Stability Class C, D, E, F, or G and ON-SITE Wind Direction (From) is available THEN use Attachment 2
Standard:	DETERMINED that Stability Class D allows Attachment 2 use.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 10 Step 2	Circle ON-SITE Pasquill Stability Class C D E F G
Standard:	CIRCLED Pasquill Stability Class D.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 11 Step 3	Enter Wind Direction (From): ___________ degrees
Standard:	ENTERED Wind Direction from 180 degrees.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 12√ Step 4	Circle applicable Centerline Sector in the Table below
Standard:	CIRCLED Centerline Sector A.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 13√ Step 5	Knowing Centerline Sector, GO TO applicable subsequent page to identify affected sectors and Emergency Response Zones (ERZ).
Standard:	Knowing Centerline Sector is A, CIRCLED or HIGHLIGHTED the following: • AFFECTED SECTORS are RAB. • EMERGENCY RESPONSE ZONES from 0 to < 5 miles are 2A, 4B, 4C, 4A, 1B. • EMERGENCY RESPONSE ZONES from > 5 to < 10 miles are 1D, 4E, 4F, 1C.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

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

- **Comanche Peak Unit 2 has experienced a Large Break Loss of Coolant Accident with multiple failures of Safeguards equipment and a breach of Containment.**
- **The Site is in a GENERAL EMERGENCY, a radiological release is in progress, and the following information is provided:**
  - **Core Exit Thermocouple highest reading is 1300ºF.**
  - **Containment pressure is 2 psig.**
  - **Meteorological Tower Data:**
    - **Wind Speed 5 mph.**
    - **Wind Direction from 180º.**
  - **Pasquill Stability Class is D.**
  - **Field Dose results are:**
    - **TEDE 1200 mrem at 5 miles and 400 mrem at 10 miles.**
    - **CDE Thyroid is 6250 mrem at 5 miles and 1500 mrem at 10 miles.**
- **Weather conditions include freezing rain and a temperature of 30°F throughout Somervell and Hood counties.**
- **The duration of the release cannot be determined at this time.**

INITIATING CUE: **The Shift Manager directs you to PERFORM the following:**

- **COMPLETE an Initial PAR per EPP-304, Protective Action Recommendations.**
- **HIGHLIGHT the Decision Path on Attachment 1.**
- **COMPLETE Attachment 2, Minimum Affected Area - Three (3) Sectors or Attachment 2A, Minimum Affected Area - Five (5) Sectors, as appropriate.**

CPNPP
EMERGENCY PLAN MANUAL

PROCEDURE NO. EPP-304

PROTECTIVE ACTION RECOMMENDATIONS

REVISION NO. 21

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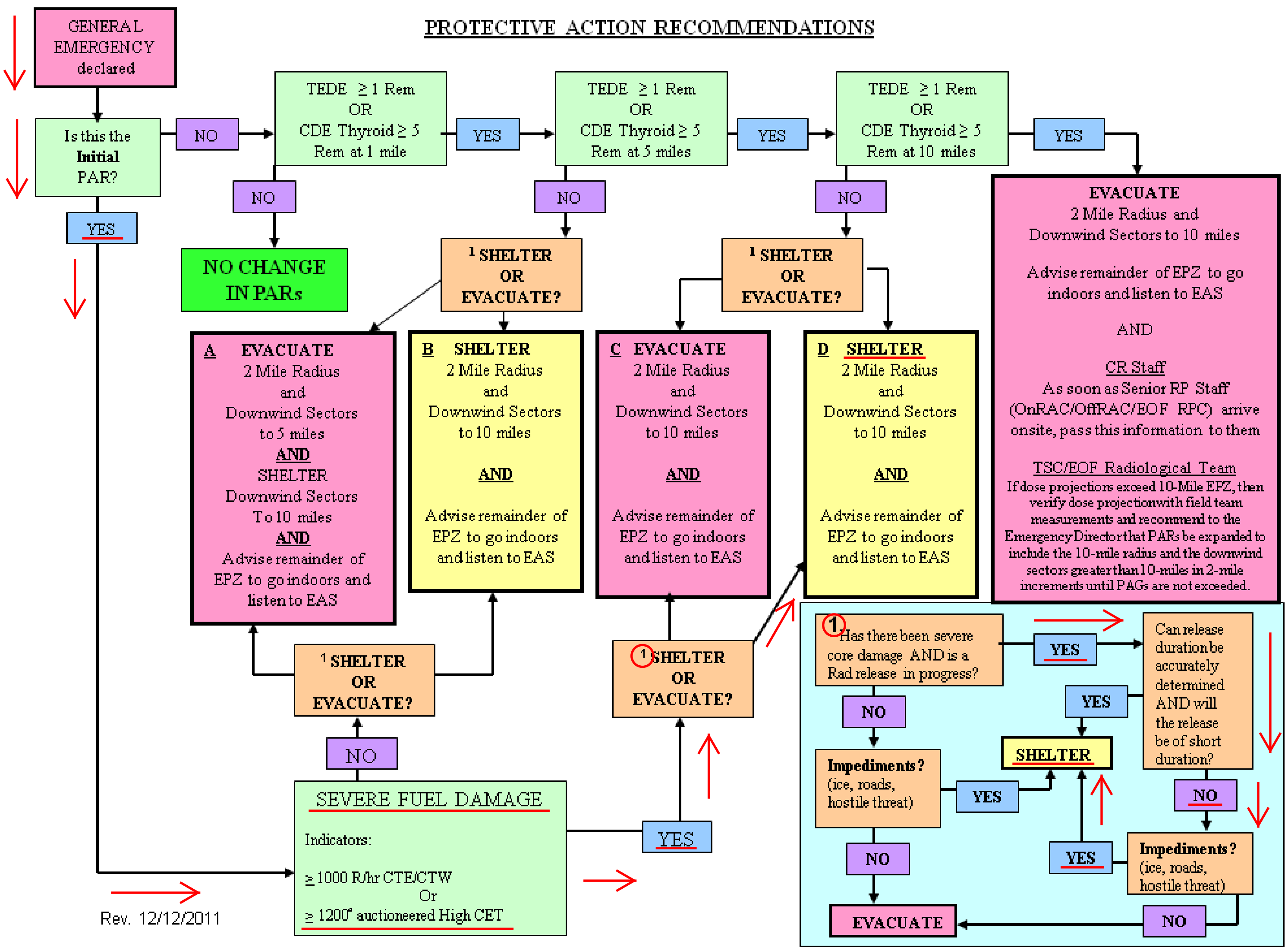
REFERENCE USE

ATTACHMENT 1

PAGE 1 OF 1



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ATTACHMENT 2

PAGE 1 OF 4

Minimum Affected Area – Three (3) Sectors

Step 1: To identify Minimum Affected Area, use instruction below to determine appropriate Attachment (Attachment 2 or Attachment 2A).

IF conditions are:	THEN
ON-SITE Pasquill Stability Class C, D, E, F, or G and ON-SITE Wind Direction (From) is available	Use Attachment 2
Pasquill Stability Class A or B	Use Attachment 2A
Pasquill Stability Class or Wind Direction was not available ON-SITE (eg: obtained from National Weather Service)	Use Attachment 2A

Step 2: Circle ON-SITE Pasquill Stability Class C D E F G
Step 3: Enter wind direction (From): 180 degrees
Step 4: Circle applicable Centerline Sector in the Table below

IF WIND DIRECTION (degrees) is (From)	THEN CENTERLINE Sector is	IF WIND DIRECTION (degrees) is (From)	THEN CENTERLINE Sector is
348.75 – 11.24	J	168.75 – 191.24	A
11.25 – 33.74	K	191.25 – 213.74	B
33.75 – 56.24	L	213.75 – 236.24	C
56.25 – 78.74	M	236.25 – 258.74	D
78.75 – 101.24	N	258.75 – 281.24	E
101.25 – 123.74	P	281.25 – 303.74	F
123.75 – 146.24	Q	303.75 – 326.24	G
146.25 – 168.74	R	326.25 – 348.74	H

Step 5: Knowing Centerline Sector, GO TO applicable subsequent page to identify affected sectors and Emergency Response Zones (ERZ).

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ATTACHMENT 2

Page 2 of 4

Minimum Affected Area – Three (3) Sectors

IF CENTERLINE Sector is	THEN Affected Sectors are	AND IF Distance From the Plant is	THEN Emergency Response Zones are
A	RAB	0mi <5mi >5mi <10mi	2A,4B, 4C, 4A, 1B 1D, 4E, 4F, 1C
B	ABC	0mi <5mi >5mi <10mi	2A,4B, 4A, 1B, 1A 1C, 1D, 4E, 2G
C	BCD	0mi <5mi >5mi <10mi	2A,4A, 1A, 1B, 4B, 2B, 2D, 2E 1C, 2G, 1D
D	CDE	0mi <5mi >5mi <10mi	2A,2B, 1A, 2D, 2E, 4A, 1B 1C, 2G, 2F
E	DEF	0mi <5mi >5mi <10mi	2A, 2B, 2D, 2E, 1A 2F, 1C, 2G, 2H

Note: Attachment 3, “10-Mile Emergency Planning Zone (EPZ) Map and its color copies are pictorial aids for CPNPP, State of Texas and county officials and should not be used to identify ERZs. Affected Sectors and Emergency Response Zones (ERZs) are determined using, as appropriate, either Attachment 2 or Attachment 2A. ERZs listed beneath the column titled “THEN Emergency Response Zones are” on both of these attachments were agreed upon by State and County officials responsible for implementing protective actions. In some cases, small portions of an ERZ may be in the affected sector but not be recommended for evacuation. This is due to the small population in this area and its location on the outer edge of the affected sector(s).

Facility:	CPNPP Units 1 and 2	Date of Examination:	04/01/13
Exam Level:	RO SRO(I) **SRO (U)**	Operating Test No.:	NRC

Control Room Systems@ (8 for RO; 7 for SRO-I; 2 or 3 for SRO-U, including 1 ESF)

	System / JPM Title	Type Code*	Safety Function
S-1	004 – Chemical and Volume Control System (RO1335) Emergency Boration from the RWST	A, M, S	1
S-2	**010 – Pressurizer Pressure Control System (RO1824) Wide Range Pressure Transmitter Failure in MODE 5**	**A, L, D, S**	**3**
S-3	003 – Reactor Coolant Pump System (RO1118) Respond to Reactor Coolant Pump Seal Failure	D, S	4P
S-4	**061 – Auxiliary Feedwater (AFW) System (RO3516) Respond to a Motor Driven AFW Pump Trip**	**A, L, N, S**	**4S**
S-5	026 – Containment Spray (CS) System (RO2002C) Transfer CS from Injection to Recirculation	A, D, EN, S	5
S-6	**064 – Emergency Diesel Generator System (RO4302E) Loss of Both 6900 Volt Safeguards Buses**	**A, EN, N, S**	**6**
S-7	086 – Fire Protection System (RO4405) Respond to a Fire in the Safeguards Building	D, S	8
S-8	060 – Accidental Gaseous Radwaste Release (RO4006) Perform a Containment Pressure Reduction (RO Only)	A, D, S	9

In-Plant Systems@ (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)

P-1	**004 – Chemical & Volume Control System (RO5112) Perform Actions to Restart Positive Displacement Pump**	**D, E, R**	**2**
P-2	015 – Nuclear Instrumentation System (RO1818) Respond to Loss of Source Range Instrumentation	E, L, N, R	7
P-3	**035 – Steam Generator (SG) System (RO5115) Transfer SG Atmospheric Relief Valve Control**	**D, E, R**	**4P**

@	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; 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 feature	- / - / ≥ 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	

NRC JPM Examination
Summary Description

S-1 The applicant will initiate an emergency boration per ABN-107, Emergency Boration following a Reactor Trip with two stuck Control Rods. The alternate path occurs when Boric Acid flow is not available due to a failed normal boration path valve and an alternate path or the Refueling Water Storage Tank must be aligned via either Attachments 2, 3, or 4. This is a modified bank JPM under the Chemical and Volume Control System – Reactivity Control safety function. This is a PRA significant action.
(K/A 004.A2.14 - IR 3.8 / 3.9)

S-2 The applicant will respond to a Wide Range Pressure Transmitter failure while in MODE 5 per ALM-0053A, 1-ALB-5C, Window 1.4 – PORV 455A/456 NOT CLOSE or ABN-715, Wide Range RCS Pressure Instrument Malfunction. The alternate path occurs when the Power Operated Relief Valve opens and fails to close. This is a bank JPM under the Pressurizer Pressure Control System – Reactor Pressure Control Safety Function. This is a PRA significant action. (K/A 010.A4.03 - IR 4.0 / 3.8)

S-3 The applicant will respond to a Reactor Coolant Pump Seal failure per ABN-101, Reactor Coolant Pump Trip / Malfunction. This is a time critical, bank JPM under the Reactor Coolant Pump System – Primary System Heat Removal from Reactor Core Safety Function. (K/A 015.AA1.22 - IR 4.0 / 4.2)

S-4 The applicant will respond to a Motor Driven Auxiliary Feedwater Pump (MDAFWP) trip per ABN-305, Auxiliary Feedwater System Malfunction, Section 3.0, Motor Driven Auxiliary Feedwater Pump Malfunction while at low power. The alternate path occurs when the MDAFWP trips and flow is lost to 2 of 4 Steam Generators. The Turbine Driven Auxiliary Feedwater Pump must be started and aligned to those Steam Generators. This is a new JPM under the Auxiliary Feedwater System – Secondary System Heat Removal from Reactor Core Safety Function. This is a PRA significant action.
(K/A 061.A2.04 - IR 3.4 / 3.8)

S-5 The applicant will transfer Containment Spray suction to the Containment Sumps per EOS-1.3A, Transfer to Cold Leg Recirculation, Attachment 1.H, Containment Spray Switchover Criterion. The alternate path occurs when one of the Containment Sump Valves to the Containment Spray Pumps cannot be opened. This is a bank JPM under the Containment Spray System – Containment Integrity Safety Function. This is a PRA significant action. (K/A 026.A4.01 - IR 4.5 / 4.3)

S-6 The applicant will respond to a loss of both 6900 Volt Safeguards Buses per ABN-601, Response to a 138/345 KV System Malfunction, Section 7.0, Loss of Both Safeguards Buses – MODE 1, 2, 3, or 4. The alternate path includes tripping the Reactor, stopping Reactor Coolant Pumps, and closing the Train A Emergency Diesel Generator Output Breaker. This is a new JPM under the Emergency Diesel Generator System – Electrical Safety Function. This is a PRA significant action. (K/A 064.A4.06 - IR 3.9 / 3.9)

S-7 The applicant will respond to a fire in the Safeguards Building per ABN-804A, Respond to a Fire in the Safeguards Building, Section 5.0, Fire Affecting Safeguards Building Fire Area 1SD. This is a bank JPM under the Fire Protection System – Plant Service Systems Safety Function. (K/A 068.AA1.22 - IR 4.0 / 4.3)

S-8 The applicant will perform a Containment Pressure Reduction per SOP-801A, Containment Ventilation System. The alternate path requires closing the Containment release path upon receipt of a high radiation alarm. This is a bank JPM under the Accidental Gaseous Radwaste Release – Radioactive Release safety function. (K/A 060.AA2.05 - IR 3.7 / 4.2)

P-1 The applicant will perform Unit 2 local actions to restart the Positive Displacement Pump per ABN-301, Instrument Air System Malfunction and SOP-103B, Chemical and Volume Control. This is a bank JPM under the Chemical and Volume Control System – Reactor Coolant System Inventory Control Safety Function. (K/A 004.A4.01 - IR 3.1 / 3.5)

P-2 The applicant will respond to a Unit 2 Loss of Source Range Instrumentation while in MODE 3 and perform actions to isolate potential dilution flowpaths per ABN-701, Source Range Instrument Malfunction, Attachment 1, Actions Required When SR Instrumentation Cannot Be Restored, Step 6. This is a new JPM under the Nuclear Instrumentation System – Instrumentation Safety Function. (K/A G 2.1.30 - IR 4.4 / 4.0)

P-3 The applicant will transfer control of Unit 2 Steam Generator Atmospheric Relief Valves per ABN-905B, Loss of Control Room Habitability, Attachment 9, Control Transfer of Steam Generator Atmospheric Relief Valves. This is a bank JPM under Steam Generator System – Primary System Heat Removal from Reactor Core safety function. This is a PRA significant action. (K/A 068.AA1.01 - IR 4.3 / 4.5)

Facility: CPNPP JPM # NRC S-1 Task # RO1335 K/A # 004.A2.14 3.8 / 3.9 SF-1

Title: Emergency Boration from the Refueling Water Storage Tank

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:

- Current RCS boron concentration is 908 ppm.
- 1/1-APBA2, BA XFER PMP 2, is tagged out.
- A Reactor trip has just occurred and two (2) Control Rods K10 and K14 have failed to fully insert.
- Immediate actions of EOP-0.0A, Reactor Trip or Safety Injection, have been verified.

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

- Emergency Borate in accordance with ABN-107, Emergency Boration, for two Control Rods not fully inserted.

Task Standard: Utilizing ABN-107, determined Attachment 1, Emergency Boration flowpath not available and referred to ABN-107, Attachments 2, 3, or 4, and initiated an Emergency Boration via the Normal Boration flowpath (Attachment 2), Manual Emergency Boration Valve flowpath (Attachment 3), or Refueling Water Storage Tank flowpath (Attachment 4).

Required Materials: ABN-107, Emergency Boration, Rev. 9-1.

Validation Time: 15 minutes Completion Time: ________ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): ______________________________ Date: ______________

SIMULATOR SETUP

BOOTH OPERATOR:

INITIALIZE to IC-30 and LOAD scenario file "LC-21 NRC JPM S1" or PERFORM the following:

- **ENSURE Centrifugal Charging Pump 1-01 is running.**
- **OVERRIDE 1-8104, Emergency Borate Valve to CLOSE.**
  - **IOR DICVHS8104 f:0.**
- **INSERT malfunctions for Control Rods CBB K-14 and CBC K-10 stuck at 30 steps.**
  - **IMF RD04K14 f:30 AND IMF RD04K10 f:30.**
- **OVERRIDE and HANG clearance tag on 1/2-APBA2, Boric Acid Transfer Pump 1-02.**
  - **IOR DICVAPBA2 f:0.**
- **Manually TRIP the Reactor.**
- **ACKNOWLEDGE all annunciators.**
- **SET out EOP-0.0A, Reactor Trip or Safety Injection, Attachment 1.A, Foldout Page.**
- **FREEZE the simulator.**
- **When examinee is ready, PLACE simulator in RUN.**
- **When directed, EXECUTE remote function CVR02, CS-8439, Emergency Manual Borate Valve to OPEN (Key 1).**

BOOTH OPERATOR NOTE:

After each JPM, ENSURE ABN-107 inside the Control Board Job Aid orange folder and the Emergency Boration Hard Card are clean.

EXAMINER:

PROVIDE the examinee with a copy of:

- **ABN-107, Emergency Boration.**

√ - Check Mark Denotes Critical Step

START TIME:	

Examiner Note:	**The first attempt to emergency borate should be via ABN-107, Emergency Boration, Attachment 1, Emergency Boration through Emergency Borate Valve 1-8104. This flowpath is unsuccessful.**
Examiner Note:	**Attachment 1 starts at Perform Step 4.** **Attachment 2 starts at Perform Step 11.** **Attachment 3 starts at Perform Step 18.** **Attachment 4 starts at Perform Step 28.**
Examiner Note:	**The following steps are from ABN-107, Section 2.0.**

CAUTION: CCP runout may occur with simultaneous flow through both charging and SI flowpaths.

NOTE: Attachment 1 and Attachment 4 have been developed into Operator Aids for use during emergency boration and may be entered independently of this procedure.

Perform Step: 1 2.3.1	Check RWST TO CHRG PMP SUCT VLVs, 1/u-LCV-112D AND 1/u-LCV-112E - CLOSED.
Standard:	VERIFIED RWST TO CHRG PMP SUCT VLVs, 1/1-LCV-112D AND 1/1-LCV-112E are both CLOSED.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2 2.3.2	Verify BA pump - AT LEAST ONE AVAILABLE.
Standard:	DETERMINED 1/1-APBA1, BA XFER PMP 1, is available and 1/1-APBA2, BA XFER PMP 2 is TAGGED OUT.
Comment:	**SAT ☐ UNSAT ☐**

NOTE: Attachment 1 is the preferred method of Emergency Boration. Train B Safeguards electrical power is required for operation of 1/u-8104.	
NOTE: Attachment 2 utilizes the normal boration flow path, which requires 1/u-LCV-112B and 1/u-LCV-112C to be open.	
Perform Step: 3 2.3.3 & 1st 3 bullets	Initiate and Continue EMERGENCY BORATION using one of the following methods: • Attachment 1 – 1/u-8104 • Attachment 2 – Normal Boration • Attachment 3 – Manual Emergency Boration Valve (uCS-8439)
Standard:	REFERRED to Attachment 1, Emergency Boration through Emergency Borate Valve u-8104.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps are from ABN-107, Attachment 1.**
Perform Step: 4 1	Ensure a charging pump is running: • 1/u-APCH1, CCP 1 • 1/u-APCH2, CCP 2 • 1/u-APPD, PDP
Standard:	DETERMINED Centrifugal Charging Pump 1-01 is running.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5√ 2	Start a boric acid transfer pump: • 1/u-APBA1, BA XFER PMP 1 - AUTO (AFTER START)
Standard:	PERFORMED the following: • PLACED 1/1- APBA1, BA XFER PMP 1 in START (**critical**). • OBSERVED red START light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6 3	Open 1/u-8104, EMER BORATE VLV.
Standard:	PLACED 1/1-8104, EMER BORATE VLV in OPEN and OBSERVED green CLOSE light LIT.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7 4	Verify flow on u-FI-183A, EMER BORATE FLO.	
Standard:	DETERMINED 1-FI-183A, EMER BORATE FLO indicates zero flow.	
Comment:		**SAT** ☐ **UNSAT** ☐

Perform Step: 8 5	Verify flow on u-FI-121A, CHRG FLO.	
Standard:	DETERMINED 1-FI-121A, CHRG FLO indicates ~ 160 gpm flow.	
Comment:		**SAT** ☐ **UNSAT** ☐

Perform Step: 9 6	IF EMER BORATE FLOW OR CHRG FLOW can NOT be verified, THEN initiate Emergency Boration Flow per another method of ABN-107.	
Standard:		
Comment:		**SAT** ☐ **UNSAT** ☐

Examiner Note:	**When Attachment 1 fails to initiate Boric Acid flow, the applicant may reference Attachment 2, Attachment 3, or go directly to Attachment 4. Attachment 2, Normal Boration steps are listed next.**	
Perform Step: 10 2.3.3 & 1st 3 bullets	Initiate and Continue EMERGENCY BORATION using one of the following methods: • Attachment 1 – 1/u-8104 • Attachment 2 – Normal Boration • Attachment 3 – Manual Emergency Boration Valve (uCS-8439)	
Standard:	DETERMINED 1/1-8104, Emergency Boration Valve would NOT OPEN and REFERRED to Attachment 2, Normal Boration.	
Comment:		**SAT** ☐ **UNSAT** ☐

Examiner Note:	**The following steps are from ABN-107, Attachment 2.**
Examiner Note:	**The following steps represent an Alternate Path for this JPM.**
NOTE: Attachment 2 utilizes the normal boration flow path, which requires 1/u-LCV-112B and 1/u-LCV-112C to be open.	
Perform Step: 11 1	Place 1/u-MU, RCS MU MAN ACT switch in – STOP.
Standard:	PERFORMED the following: • PLACED 1/1-MU, RCS MU MAN ACT switch in STOP and OBSERVED green STOP light LIT.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 12√ 2	Open 1/u-FCV-110B, RCS MU TO CHRG PMP SUCT ISOL VLV.
Standard:	PERFORMED the following: • PLACED 1/1-FCV-110B, RCS MU TO CHRG PMP SUCT ISOL VLV in OPEN (**critical**). • OBSERVED red OPEN light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Boric Acid Pump 1 may already be running.**
Perform Step: 13√ 3	Start a boric acid transfer pump: • 1/u-APBA1, BA XFER PMP 1 - AUTO (AFTER START)
Standard:	PERFORMED the following: • PLACED 1/1- APBA1, BA XFER PMP 1 in START (**critical**). • OBSERVED red START light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 14√ 4	Open 1/u-FCV-110A, BA BLNDR FLO CTRL VLV.
Standard:	PERFORMED the following: • PLACED 1/1-FCV-110A, BA BLNDR FLO CTRL VLV in OPEN (**critical**). • OBSERVED red OPEN light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 15 5	Verify flow on u-FR-110 (RED PEN), BA FLOW TO BLNDR.
Standard:	DETERMINED 1-FR-110, BA FLOW TO BLNDR indicates ~ 40 gpm flow.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 16 6	Verify flow on u-FI-121A, CHRG FLOW.
Standard:	DETERMINED 1-FI-121A, CHRG FLOW indicates ~190 gpm flow.
Terminating Cue:	**(If boration flow is initiated) This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**When Attachment 1 fails to initiate Boric Acid flow, the applicant may reference Attachment 2, Attachment 3, or go directly to Attachment 4. Attachment 3, Manual Emergency Boration Valve steps are listed next.**
Perform Step: 17 2.3.3 & 1st 3 bullets	Initiate and Continue EMERGENCY BORATION using one of the following methods: • Attachment 1 – 1/u-8104 • Attachment 2 – Normal Boration • Attachment 3 – Manual Emergency Boration Valve (uCS-8439)
Standard:	DETERMINED 1/1-8104, Emergency Boration Valve would NOT OPEN and REFERRED to Attachment 3, Manual Emergency Boration Valve.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**If performed, the following steps are from ABN-107, Attachment 3.**
Examiner Note:	**The following steps represent an Alternate Path for this JPM.**
NOTE: Attachment 2 utilizes the normal boration flow path, which requires 1/u-LCV-112B and 1/u-LCV-112C to be open.	
Perform Step: 18 1	Locally open affected unit emergency borate manual valve. • uCS-8439-RO, Uu CVCS CHRG PMP EMER BORATE MAN VLV RMT OPER [AB 822 Blndr Rm X-209(X-208)]
Standard:	CONTACTED Nuclear Equipment Operator to OPEN 1CS-8439-RO, U1 CVCS CHRG PMP EMER BORATE MAN VLV RMT OPER.
Booth Operator:	**When contacted, EXECUTE remote function CVR02, CS-8439, Emergency Manual Borate Valve to OPEN (Key 1).**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 19 2	Verify a charging pump is running: • 1/u-APCH1, CCP 1 • 1/u-APCH2, CCP 2 • 1/u-APPD, PDP
Standard:	DETERMINED Centrifugal Charging Pump 1-01 is running.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 20 3	Place 1/u-MU, RCS MU MAN ACT switch in – STOP.
Standard:	PLACED 1/1-MU, RCS MU MAN ACT switch in STOP and OBSERVED green STOP light LIT.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Boric Acid Pump 1 may already be running.**
Perform Step: 21√ 4	Start a boric acid transfer pump: • 1/u-APBA1, BA XFER PMP 1 - AUTO (AFTER START)
Standard:	PERFORMED the following: • PLACED 1/1- APBA1, BA XFER PMP 1 in START (**critical**). • OBSERVED red START light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 22√ 5	Open 1/u-FCV-110A, BA BLNDR FLO CTRL VLV.
Standard:	PERFORMED the following: • PLACED 1/1-FCV-110A, BA BLNDR FLO CTRL VLV in OPEN (**critical**). • OBSERVED red OPEN light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 23 6	Verify flow on u-FR-110 (RED PEN), BA FLOW TO BLNDR.
Standard:	DETERMINED 1-FR-110, BA FLOW TO BLNDR indicates ~ 40 gpm flow.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 24 7	Verify flow on u-FI-121A, CHRG FLOW.
Standard:	DETERMINED 1-FI-121A, CHRG FLOW indicates ~200 gpm flow.
Terminating Cue:	**(If boration flow is initiated) This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps are continued from ABN-107, Section 2.0 which aligns the RWST to the Charging Pump suction.**
Perform Step: 25 2.3.4 & 2.3.4 RNO	Verify EMERGENCY BORATION flow • GO TO Step 6.
Standard:	DETERMINED no Boric Acid flow available and TRANSITIONED to Step 6 per the RNO column.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 26 2.3.6	Verify RWST - AVAILABLE
Standard:	VERIFIED RWST available by level indications on CB-04: • 1-LI-930, RWST LVL CHAN I • 1-LI-931, RWST LVL CHAN II • 1-LI-932, RWST LVL CHAN III • 1-LI-933, RWST LVL CHAN IV
Comment:	**SAT ☐ UNSAT ☐**

NOTE: Attachment 4 is the preferred method to EMERGENCY BORATE from the RWST.

Perform Step: 27 2.3.7 & 1st bullet	Initiate and Continue EMERGENCY BORATION using one of the following methods: • From the RWST via 1/u-LCV-112D OR 1/u-LCV-112E per Attachment 4.	
Standard:	INITIATED Attachment 4, Transfer of Charging Pump Suction to the RWST.	
Comment:		**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps are from ABN-107, Attachment 4.**
Examiner Note:	**The following steps represent an Alternate Path for this JPM.**

CAUTION: Injecting through a CCP SI ISOL VLV (8801A/B) requires CCP SI injection check valve leak test within 24 hours per SR 3.4.14.1 (requires MODE 3, 4, or 5).

Perform Step: 28 1	IF Safety Injection actuated (1/u-LCV-112D OR 1/u-LCV-112E OPEN), THEN perform the following steps:	
Standard:	DETERMINED Safety Injection NOT actuated and N/A'd Step 1.	
Comment:		**SAT ☐ UNSAT ☐**

Perform Step: 29 2	IF Safety Injection NOT actuated (1/u-LCV-112D AND 1/u-LCV-112E CLOSED), THEN perform the following steps:	
Standard:	DETERMINED Safety Injection NOT actuated.	
Comment:		**SAT ☐ UNSAT ☐**

Examiner Note:	**<u>Either</u> 1/1-LCV-112D <u>OR</u> 1/1-LCV-112E can be opened.**
Perform Step: 30√ 2.a & bullets	OPEN <u>ONE</u> of the following: • 1/<u>u</u>-LCV-112D, RWST TO CHRG PMP SUCT VLV. <u>OR</u> • 1/<u>u</u>-LCV-112E, RWST TO CHRG PMP SUCT VLV.
Standard:	PERFORMED <u>ONE</u> of the following: • PLACED 1/1-LCV-112D, RWST TO CHRG PMP SUCT VLV in OPEN (**critical**). • OBSERVED red OPEN light LIT (**NOT critical**). **<u>OR</u>** • PLACED 1/1-LCV-112E, RWST TO CHRG PMP SUCT VLV in OPEN (**critical**). • OBSERVED red OPEN light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**<u>Both</u> 1/1-LCV-112B <u>AND</u> 1/1-LCV-112C <u>must</u> be closed.**
Perform Step: 31√ 2.b & bullets	CLOSE <u>BOTH</u> of the following: • 1/<u>u</u>-LCV-112B, VCT TO CHRG PMP SUCT VLV. <u>AND</u> • 1/<u>u</u>-LCV-112C, VCT TO CHRG PMP SUCT VLV
Standard:	PERFORMED <u>BOTH</u> of the following: • PLACED 1/1-LCV-112B, VCT TO CHRG PMP SUCT VLV in CLOSE (**critical**). • OBSERVED green CLOSE light LIT (**NOT critical**). **<u>AND</u>** • PLACED 1/1-LCV-112C, VCT TO CHRG PMP SUCT VLV in CLOSE (**critical**). • OBSERVED green CLOSE light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**<u>Either</u> 1/1/1-8110 <u>OR</u> 1/1-8111 can be closed.**
Perform Step: 32√ 2.c & bullets	CLOSE <u>ONE</u> of the following: • 1/<u>u</u>-8110, CCP 1 & 2 MINIFLOW VLV. <u>OR</u> • 1/<u>u</u>-8111, CCP 1 & 2 MINIFLOW VLV.
Standard:	PERFORMED <u>ONE</u> of the following: • PLACED 1/1-8110, CCP 1 & 2 MINIFLOW VLV in CLOSE (**critical**). • OBSERVED green CLOSE light LIT (**NOT critical**). **<u>OR</u>** • PLACED 1/1-8111, CCP 1 & 2 MINIFLOW VLV in CLOSE (**critical**). • OBSERVED green CLOSE light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**If 1-LCV-112B (112C) is <u>NOT</u> closed then Vent Valve 8220 (8221) will also not close and 1-ZL-8220 (8221) will indicate OPEN.**
Perform Step: 33 2.d & bullets	Verify CLOSED <u>BOTH</u> of the following: • <u>u</u>-ZL-8220, CHRG PMP SUCT HI POINT VENT VLV. <u>AND</u> • <u>u</u>-ZL-8221, CHRG PMP SUCT HI POINT VENT VLV.
Standard:	VERIFIED <u>BOTH</u> of the following: • OBSERVED 1-ZL-8220, CHRG PMP SUCT HI POINT VENT VLV green CLOSE light LIT. <u>AND</u> • OBSERVED 1-ZL-8221, CHRG PMP SUCT HI POINT VENT VLV green CLOSE light LIT.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 34 2.e & bullets	CLOSE BOTH of the following: • 1/u-8202A, VENT VLV. AND • 1/u-8202B, VENT VLV.
Standard:	VERIFIED BOTH of the following: • OBSERVED 1/1-8202A, VENT VLV green CLOSE light LIT. AND • OBSERVED 1/1-8202B, VENT VLV green CLOSE light LIT
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 35 2.f	Start a centrifugal charging pump per SOP-103A/B, if one is not in service.
Standard:	DETERMINED Centrifugal Charging Pump 1-01 is running.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 36 2.g	Stop the Positive Displacement Charging Pump per SOP-103A/B. • 1/u-APPD, PDP
Standard:	DETERMINED the Positive Displacement Charging Pump not in service.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**If Attachment 4 is performed to meet Boration requirements, then TDM-201A, CVCS Calculations/Blended Flow, ECCS Volume Equivalent Values for 1800 / 3600 of BAT Boration (Page 12 of 15) would be referenced to determine the total volume from the RWST that must be injected to meet the 3600 ppm requirement for 2 stuck rods. An initial RCS boron of 900 ppm requires 16,055 gallons.**
Examiner Note:	**Current Charging flow rate more than meets this requirement.**
Perform Step: 37 2.h	Manually control u-FK-121, CCP CHRG FLO CTRL to maintain desired flow rate.
Standard:	Manually CONTROLLED 1-FK-121, CCP CHRG FLO CTRL to maintain desired flow rate.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

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

- **Current RCS boron concentration is 908 ppm.**
- **1/1-APBA2, BA XFER PMP 2, is tagged out.**
- **A Reactor trip has just occurred and two (2) Control Rods K10 and K14 have failed to fully insert.**
- **Immediate actions of EOP-0.0A, Reactor Trip or Safety Injection, have been verified.**

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

- **Emergency Borate in accordance with ABN-107, Emergency Boration, for two Control Rods not fully inserted.**

Facility: CPNPP JPM # NRC S-2 Task # RO1824 K/A # 010.A4.03 4.0 / 3.8 SF-3

Title: Wide Range Pressure Transmitter Failure in MODE 5

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 5.
- The Residual Heat Removal System is being controlled by another operator.

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

- RESPOND to any Primary Side alarms.

Task Standard: Utilizing ALM-0053A or ABN-715, responded to a Wide Range Pressure Transmitter failure while in MODE 5, and closed the Block Valve associated with the failed open PORV.

Required Materials: ALM-0053A, 1-ALB-5C, Window 1.4 – PORV 455A/456 NOT CLOSE, Rev. 7-1.
ABN-715, Wide Range RCS Pressure Instrument Malfunction, Rev. 5-2.
TDM-301A, RCS Temperature and Pressure Limits, Rev. 9-3.

Validation Time: 4 minutes Completion Time: ________ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): ______________________________ Date: ______________

SIMULATOR SETUP

<u>BOOTH OPERATOR</u>:

INITIALIZE to IC-4 or any MODE 5 Initial Condition and LOAD scenario file "LC-21 NRC JPM S2" or PERFORM the following:

- **When directed, EXECUTE malfunction RX13B, RCS Loop 1 Pressure Transmitter (PT-405) failure to 3000 PSIG.**
  - **EXECUTE malfunction RX16A, PCV-455A to 100% OPEN.**
- **HANG Control Board Tags on the following components:**
  - **1/1-APPD, PDP handswitch.**
- **PLACE CB07 Computer Screen to MODE 5.**

<u>BOOTH OPERATOR NOTE</u>:

- **After each JPM, VERIFY 1-ALB-5C, Window 1.4 – PORV 455A/456 NOT CLOSE pages are clean.**

<u>EXAMINER</u>:

When referenced, PROVIDE the examinee with a copy of:

- **ALM-0053A, 1-ALB-5C, Window 1.4 – PORV 455A/456 NOT CLOSE.**

If referenced, PROVIDE the examinee with a copy of:

- **ABN-715, Wide Range RCS Pressure Instrument Malfunction, <u>or</u>**
- **TDM-301A, RCS Temperature and Pressure Limits.**

<u>EXAMINER NOTE</u>:

Applicant will be given 8 minutes (twice the validation time) to close the Block Valve associated with the failed open PORV. If the Block Valve is not closed within 8 minutes, INFORM the applicant that this JPM is complete.

√ - Check Mark Denotes Critical Step

START TIME:	

Examiner Note:	**This JPM may be performed using steps from ALM-0053A or ABN-715. Locate the applicable steps within this JPM.**
Examiner Note:	**The following steps are from ALM-0053A, 1-ALB-5C, Window 1.4.**
CAUTION: When a safety valve actuation has resulted in plant shutdown, subsequent Mode 4 operation shall not be commenced until affected safety valve has been inspected.	
Perform Step: 1 1	DETERMINE affected PORV.
Standard:	DETERMINED 1/1-PCV-455A, PRZR PORV is the affected PORV.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2 2 & 2.A	MONITOR pressurizer pressure. • IF one channel is indicating >60 psig difference between the remaining operable channels, THEN GO to ABN-705.
Standard:	DETERMINED ABN-705 is not applicable and REMAINED in ALM-0053A.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3 2 & 2.B	Monitor pressurizer pressure. • IF reactor is in Mode 1, 2 or 3 with pressurizer pressure <2335 psig, THEN CLOSE affected PORV. • 1/1-PCV-455A, PRZR PORV
Standard:	DETERMINED Unit 1 is in MODE 5.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Provide TDM-301A, RCS Temperature and Pressure Limits, if referenced.**
Perform Step: 4 3	WITH reactor in Mode 4, 5 OR 6, THEN REFER to TDM-301A to determine RCS pressure AND temperature limits. • 1-PI-405, HL 4 PRESS (WR)
Standard:	REFERRED to TDM-301A, PRESSURIZER PORV LTOP SETPOINTS and DETERMINED 1-PI-405, HL 4 PRESS (WR) has failed HIGH.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps represent the Alternate Path of this JPM.**
Perform Step: 5 3.A & 1st bullet	IF RCS pressure is within the limits based on current RCS temperature, THEN CLOSE affected PORV. • 1/1-PCV-455A, PRZR PORV
Standard:	PERFORMED the following: • PLACED 1/1-PCV-455A, PRZR PORV in CLOSE. • OBSERVED red OPEN light LIT.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Applicant will be given 8 minutes to close the Block Valve.**
Perform Step: 6√ 4, 4.A, & 1st bullet	VERIFY pressurizer OR RCS wide range pressure stabilizes. • IF pressure continues to decrease due to PORV leakage, THEN CLOSE both PORV block valves and determine affected PORV. • 1/1-8000A, PRZR PORV BLK VLV
Standard:	PERFORMED the following: • PLACED 1/1-8000A, PRZR PORV Block Valve in CLOSE (**critical**). • OBSERVED green CLOSE light LIT (**NOT critical**).
Terminating Cue:	**This JPM is complete (if ALM-0053A is referenced).**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps are from ABN-715, Section 2.0.**
Perform Step: 7 1 & 1st bullet	Verify LTOP not actuated – PORVs NOT OPEN. • 1/u-PCV-455A, PRZR PORV
Standard:	DETERMINED 1/1-PCV-455A, PRZR PORV is OPEN.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps represent the Alternate Path of this JPM.**
Perform Step: 8 1 RNO	Manually close the affected PORV.
Standard:	PERFORMED the following: • PLACED 1/1-PCV-455A, PRZR PORV in CLOSE. • OBSERVED red OPEN light LIT.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Applicant will be given 8 minutes to close the Block Valve.**
Perform Step: 9√ 1 RNO	Manually close the affected PORV.
Standard:	DETERMINED 1/1-PCV-455A, PRZR PORV will NOT close and PERFORMED the following: • PLACED 1/1-8000A, PRZR PORV Block Valve in CLOSE (**critical**). • OBSERVED green CLOSE light LIT (**NOT critical**).
Terminating Cue:	**This JPM is complete (if ABN-715 is referenced).**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

INITIAL CONDITIONS:	**Given the following conditions:** • **Unit 1 is in MODE 5.** • **The Residual Heat Removal System is being controlled by another operator.**
INITIATING CUE:	**The Unit Supervisor directs you to PERFORM the following:** • **RESPOND to any Primary Side alarms.**

Facility: CPNPP JPM # NRC S-3 Task # RO1118 K/A # 015.AA1.22 4.0 / 4.2 SF-4P

Title: Respond to a Reactor Coolant Pump Seal Failure

Examinee (Print): ______________________________

Testing Method:

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

- Unit 1 is operating at 100% power with all controls in AUTOMATIC.

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

- RESPOND to any Primary Side alarms.

THIS IS A TIME CRITICAL JPM

Task Standard: Utilizing ABN-101, evaluated RCP seal leakoff flow condition, tripped the Reactor and affected RCP, and isolated affected RCP seal water leakoff flow within 3 to 5 minutes.

Required Materials: ABN-101, Reactor Coolant Pump Trip/Malfunction, Rev. 10-6.

ALM-0051A, 1-ALB-5A, Window 1.2 – ANY RCP SEAL 1 LKOFF FLO HI, Rev. 5-4.

OWI-214, Control of Time Critical Actions, Rev. 1.

Validation Time: 10 minutes Completion Time: ________ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): ______________________________ Date: ______________

SIMULATOR SETUP

BOOTH OPERATOR:

INITIALIZE to IC-18 and LOAD scenario file "LC-21 NRC JPM S3" or PERFORM the following:

- **When directed, INSERT malfunction CV27C, RCP 1-03 Seal #1 failure at 36%.**

EXAMINER:

When referenced, PROVIDE the examinee with a copy of:

- **ABN-101, Reactor Coolant Pump Trip/Malfunction.**

√ - Check Mark Denotes Critical Step

START TIME:	

Booth Operator:	**When directed, EXECUTE malfunction CV27C at 36%.**
Perform Step: 1	EVALUATE alarms and SELECT appropriate Alarm Procedure.
Standard:	ACKNOWLEDGED alarm 1-ALB-5A, Window 1.2 – ANY RCP SEAL 1 LKOFF FLO HI and REFERRED to ABN-101, Reactor Coolant Pump Trip/Malfunction.
Examiner Note:	**When referenced, PROVIDE copy of ABN-101.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps are from ABN-101, Section 4.0.**
NOTE: • Step 1 is a continuous action step. • The No. 1 Seal Leakoff Valve should not be closed before taking pump handswitch to stop.	
Perform Step: 2 4.3.1	Determine appropriate action step.
Standard:	OBSERVED 1-FR-0155, RCP 3 SEAL LKOFF FLO (NR) at 1.0 gpm and 1-FR-0159, RCP 3 SEAL LKOFF FLO (WR) at > 8 gpm.
Comment:	**SAT ☐ UNSAT ☐**

Note:
- Total #1 Seal Flow = #1 Leakoff plus #2 Leakoff indications
- For immediate shutdown required, a manual plant trip must precede RCP Shutdown.
- #2 seal leakoff is read locally in containment. If containment entry is not practicable it is acceptable to assume a #2 seal leakoff of 1 gpm if the "ANY SEAL 2 LEAKOFF FLO HI", u-ALB-5A, window 3.2 is DARK.
- Attachment 1 lists computer points for temperature monitoring.

#1 Seal Leakoff Flow	OR	Total #1 Seal Flow	AND	Pump Bearing/Seal Inlet Temperature	THEN	RCP Shutdown Step
>6.0 gpm		>6.0 gpm		Increasing		Immediate Step 2
>6.0 gpm		>6.0 gpm and <8.0 gpm		Stable		Orderly Step 3
		>8.0 gpm		NA		Immediate Step 2
<0.8 gpm		<0.8 gpm		Stable		Orderly Step 3
<0.8 gpm		<0.8 gpm		Increasing		Immediate Step 2

Perform Step: 3 4.3.1	Determine appropriate action step.
Standard:	DETERMINED Total #1 Seal Leak Off Flow greater than 8.0 gpm and IMMEDIATELY PERFORMED Step 2 of ABN-101.
Comment:	**SAT** ☐ **UNSAT** ☐

Perform Step: 4√ 4.3.2.a	Trip the Reactor <u>and</u> GO TO EOP-0.0A/B while other operators continue this procedure.
Standard:	PLACED 1/1-RTC, RX TRIP BKR Switch **<u>or</u>** 1/1-RT, RX TRIP Switch in TRIP position and VERIFIED the following: • Reactor Trip Breakers - at least one OPEN. • Neutron flux - DECREASING. • All Control Rod position rod bottom lights - ON.
Comment:	**SAT** ☐ **UNSAT** ☐

Examiner Note:	**The following steps are from EOP-0.0A.**
Perform Step: 4.a 1	Verify Reactor Trip:
Standard:	VERIFIED the following: • Reactor Trip Breakers - at least one OPEN. • Neutron flux - DECREASING. • All Control Rod position rod bottom lights - ON.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4.b 2	Verify Turbine Trip:
Standard:	VERIFIED the following: • All HP Turbine Stop Valves – CLOSED.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4.c 3	Verify Power to AC Safeguards Busses:
Standard:	VERIFIED the following: • Both AC Safeguards Buses – ENERGIZED.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4.d 4	Check SI Status:
Standard:	VERIFIED the following: • DETERMINED SI is not actuated.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps are from ABN-101, Section 4.0.**
Perform Step: 5√ 4.3.2.b	STOP affected RCP(s).
Standard:	PERFORMED the following: • PLACED 1/1-PCPX3, RCP 3 to STOP (**critical**). • OBSERVED green STOP light LIT (**NOT critical**). • OBSERVED 1-II-RCP 3, RCP MOT CURRENT at zero (0) amps (**NOT critical**). • OBSERVED 1-FI-434/435/436 RC LOOP 3 FLO CHAN I/II/III to zero (0) flow (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

CRITICAL START TIME:	

Examiner Note:	**OWI-214, Attachment 8.A, TCA-1.13 is the reference for this Time Critical task.**
Perform Step: 6√ 4.3.2.c	Between 3 to 5 minutes after RCP stopped, CLOSE No. 1 Seal Leakoff Valve for affected RCP(s).
Standard:	PERFORMED the following: • PLACED 1/1-8141C, RCP 3 SEAL 1 LKOFF VLV to CLOSE between 3 and 5 minutes after the RCP is stopped **(critical).** • OBSERVED green CLOSE light LIT (**NOT critical**).
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

CRITICAL STOP TIME:	

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

- **Unit 1 is operating at 100% power with all controls in AUTOMATIC.**

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

- **RESPOND to any Primary Side alarms.**

THIS IS A TIME CRITICAL JPM

Facility: CPNPP JPM # NRC S-4 Task # RO3516 K/A # 061.A2.04 3.4 / 3.8 SF-4S
Title: Respond to a Motor Driven AFW Pump Trip

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 at approximately 2% power.
- Preparations to start a Main Feedwater Pump are underway.
- Both Motor Driven Auxiliary Feedwater Pumps are in service maintaining narrow range Steam Generator levels between 60% and 75%.

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

- RESPOND to any Secondary Side alarms.

Task Standard: Utilizing ABN-305, started the Turbine Driven Auxiliary Feedwater Pump and fed Steam Generators 1-01 and 1-02 upon loss of the Train A Motor Driven Auxiliary Feedwater Pump.

Required Materials: ALM-0082A, 1-ALB-8B, Window 4.3 – MD AFWP 1/2 OVRLOAD/TRIP, Rev. 8-10.
ABN-305, Auxiliary Feedwater System Malfunction, Rev. 7-4.

Validation Time: 10 minutes Completion Time: ________ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): ____ Date: _______________

SIMULATOR SETUP

BOOTH OPERATOR:

INITIALIZE to IC-34 and LOAD scenario file "LC-21 NRC JPM S4-S8" or PERFORM the following:

- **VERIFY both Motor Driven Auxiliary Feedwater (MDAFW) Pumps are in service.**
- **ENSURE Steam Generator narrow range levels are between 60% and 75%.**
- **When directed, EXECUTE malfunction FW24A, MDAFW Pump 1-01 trip.**

EXAMINER:

PROVIDE the examinee with a copy of:

- **ABN-305, Auxiliary Feedwater System Malfunction.**
  - **Section 3.0, Motor Driven Auxiliary Feedwater Pump Malfunction.**

EXAMINER NOTE:

NRC JPMs S-4 and S-8 will be performed at the same time.

√ - Check Mark Denotes Critical Step

START TIME:	

Examiner Note:	**Applicant may take actions per ABN-305 without consulting the Alarm Procedure. In this case, actions will start at Perform Step 3.**
Examiner Note:	**The following steps are from ALM-0082A, 1-ALB-8B, Window 4.3 – MD AFWP 1/2 OVRLOAD/TRIP.**

> CAUTION: Do not place the pump handswitch in STOP if the pump is tripped (white TRIP light). This will reset the 86M relay (white TRIP light) and may result in an automatic restart.

Perform Step: 1 1	Determine affected pump. • 1-HS-2450A, MD AFWP 1 • 1-HS-2451A, MD AFWP 2
Standard:	OBSERVED 1-HS-2450A, MD AFWP 1 white TRIP light LIT.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2 1.A	If a pump is tripped, go to ABN-305 for Motor Driven Auxiliary Feedwater Pump Malfunction.
Standard:	CONTINUED actions per ABN-305.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps are from ABN-305, Section 3.0.**

> CAUTION: Placing the pump handswitch in STOP OR PULL-OUT with the pump tripped (white TRIP light) will reset the 86M relay (white TRIP light) and may result in an automatic restart if the handswitch is returned to AUTO.

Perform Step: 3 3.3.1	Determine which MD AFW Pump is malfunctioning AND verify affected pump – TRIPPED.
Standard:	OBSERVED 1-HS-2450A, MD AFWP 1 white TRIP light LIT.
Comment:	**SAT ☐ UNSAT ☐**

CAUTION: Do not exceed 800 gpm total flow on one Motor Driven Auxiliary Feedwater Pump.

Perform Step: 4 3.3.2	Verify at least one AFW pump RUNNING.
Standard:	DETERMINED 1-HS-2451A, MD AFWP 2 is running supplying Steam Generators 1-03 and 1-04.
Comment:	**SAT** ☐ **UNSAT** ☐

CAUTION: Do NOT operate both Motor-Driven Auxiliary Feedwater Pumps at the same time with the trains cross-connected.

Perform Step: 5 3.3.3	Verify Steam Generator levels – NORMAL.
Standard:	DETERMINED Steam Generator 1-01 and 1-02 narrow range levels are lowering.
Comment:	**SAT** ☐ **UNSAT** ☐

Examiner Note:	**The following steps represent the Alternate Path of this JPM.**
Examiner Note:	**Operating either switch meets the critical portion of this step.**
Perform Step: 6√ 3.3.3 RNO	<u>IF</u> the TD AFW Pump is available, <u>THEN</u> start the TD AFW Pump <u>AND</u> feed the two steam generators <u>NOT</u> being supplied by the MD AFW Pump.
Standard:	PERFORMED the following: • PLACED 1-HS-2452-1, AFWPT STM SPLY VLV MSL 4 from SG 1-04 to START (**critical**). **<u>and/or</u>** • PLACED 1-HS-2452-2, AFWPT STM SPLY VLV MSL 1 from SG 1-01 to START (**critical**).
Comment:	**SAT** ☐ **UNSAT** ☐

Examiner Note:	**At this time the applicant may choose to feed all 4 SGs using the TDAFW Pump. A Precaution in SOP-304A, AFW System, states that damage to the TDAFW Pump may result from continuous operation (more than 20 minutes) at flows less than 130 gpm.**
Perform Step: 7√ 3.3.3 RNO	IF the TD AFW Pump is available, THEN start the TD AFW Pump AND feed the two steam generators NOT being supplied by the MD AFW Pump.
Standard:	PERFORMED the following: • ESTABLISHED flow to Steam Generator 1-01 by DEPRESSING the red RAISE (▲) or green LOWER (▼) pushbuttons on 1-FK-2459A, TD AFWP SG 1 FLO CTRL (**critical**). • OBSERVED 1-FI-2463A **or** 1-FI-2463C, SG 1 AFW FLO indication (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8√ 3.3.3 RNO	IF the TD AFW Pump is available, THEN start the TD AFW Pump AND feed the two steam generators NOT being supplied by the MD AFW Pump.
Standard:	PERFORMED the following: • ESTABLISHED flow to Steam Generator 1-02 by DEPRESSING the red RAISE (▲) or green LOWER (▼) pushbuttons on 1-FK-2460A, TD AFWP SG 2 FLO CTRL (**critical**). • OBSERVED 1-FI-2464A **or** 1-FI-2464C, SG 2 AFW FLO indication (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 9 3.3.4 & 1st bullet	Dispatch a Nuclear Equipment Operator to check breaker status of affected auxiliary feedwater pump. • 1EA1/5/BKR, 1APMD1, AUXILIARY FEEDWATER PUMP 1-01 BKR (SFGD 810 Rm 1-83)
Standard:	DISPATCHED a Nuclear Equipment Operator.
Terminating Cue:	**An operator has been dispatched to check the Train A Motor Driven Auxiliary Feedwater Pump Breaker. This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

<u>INITIAL</u> <u>CONDITIONS</u>: **Given the following conditions:**

- **Unit 1 is at approximately 2% power.**
- **Preparations to start a Main Feedwater Pump are underway.**
- **Both Motor Driven Auxiliary Feedwater Pumps are in service maintaining narrow range Steam Generator levels between 60% and 75%.**

<u>INITIATING</u> <u>CUE</u>: **The Unit Supervisor directs you to PERFORM the following:**

- **RESPOND to any Secondary Side alarms.**

Facility: CPNPP JPM # NRC S-5 Task # RO2002C K/A # 026.A4.01 4.5 / 4.3 SF-5

Title: Transfer Containment Spray From Injection to Recirculation

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:

- A Large Break LOCA has occurred and Containment Spray has actuated.
- The Emergency Core Cooling System has been aligned for Cold Leg Recirculation per EOS-1.3A, Transfer to Cold Leg Recirculation.
- Refueling Water Storage Tank (RWST) level is 10%.

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

- When RWST level reaches 6%, TRANSFER Containment Spray to the Containment Sumps per EOS-1.3A, Transfer to Cold Leg Recirculation, Attachment 1.H, Containment Spray Switchover Criterion.

THIS IS NOT A TIME CRITICAL JPM

Task Standard: Utilizing EOS-1.3A, transferred Containment Spray from the Injection Mode to the Recirculation Mode from the Containment Sumps. Stopped Train B Containment Spray Pumps when alignment to the Containment Sump could not be performed.

Required Materials: EOS-1.3A, Transfer to Cold Leg Recirculation, Rev. 8-3.

Validation Time: 10 minutes Completion Time: ________ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): ______________________________ Date: ______________

SIMULATOR SETUP

BOOTH OPERATOR:

INITIALIZE to IC #33 and LOAD scenario file "LC21 NRC JPM S5", or any Post LOCA with RHR Swapover completed IC and PERFORM the following:

- **INSERT Remote Function to fail 1-HS-4783 in CLOSE position [DISCH4783.CB02 12.09 switch for HS-4783 CLS (current CLS) (final CLS)].**

If IC #33 is not available, RESET to any at power IC and PERFORM the following:

- **INSERT malfunction RC08A2 (or equivalent Large Break LOCA).**
- **PLACE Simulator in RUN.**
- **REDUCE AFW Flow to all SGs.**
- **RESET SI, SIS, Containment and Isolation Phases A & B and Containment Spray.**
- **STOP both Emergency Diesel Generators.**
- **STOP all Reactor Coolant Pumps.**
- **When RWST level reaches LO-LO level, TRANSFER ECCS to Cold Leg Recirculation by performing Steps 1-3 of EOS-1.3A.**
- **INSERT Remote Function to fail 1-HS-4783 in the CLOSE position.**
- **FREEZE simulator when RWST level is 10%.**

BOOTH OPERATOR NOTE:

- **After each JPM, VERIFY keys for the RWST Suction Valves are REMOVED and RETURNED to the top of the Key Locker.**

EXAMINER:

PROVIDE the examinee with a copy of:

- **EOS-1.3A, Transfer to Cold Leg Recirculation.**
  - **Attachment 1.H, Containment Spray Switchover Criterion.**

√ - Check Mark Denotes Critical Step

START TIME:	

Examiner Note:	**The following steps are from EOS-1.3, Attachment 1.H.**
Examiner Note:	**CUE the Booth Operator to PLACE the Simulator in RUN.**
CAUTION: Any Containment Spray pump taking suction from the RWST should be stopped when RWST level reaches 0%	
Perform Step: 1 4.a.	Check RWST level – LESS THAN 6%.
Standard:	OBSERVED 1-LI-930, RWST LVL CHAN I or 1-LI-931, RWST LVL CHAN II and VERIFY level is less than 6%.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Steps 2 and 3 may be performed in any order.**
Perform Step: 2√ 4.b.1) & 1st bullet	Open CNTMT SMP TO CSP 1 & 3 <u>AND</u> 2 & 4 SUCT ISOL VLVs: • 1-HS-4782
Standard:	PERFORMED the following: • PLACED 1-HS-4782, CNTMT SMP TO CSP 1 & 3 SUCT ISOL VLV to OPEN (**critical**). • OBSERVED red OPEN light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3√ 4.b.1) & 2nd bullet	Realign Containment Spray System as follows: • Open CNTMT SMP TO CSP 1 & 3 <u>AND</u> 2 & 4 SUCT ISOL VLVs: • 1-HS-4783
Standard:	PERFORMED the following: • PLACED 1-HS-4783, CNTMT SMP TO CSP 2 & 4 SUCT ISOL VLV to OPEN (**critical**). • OBSERVED green CLOSE light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following three steps represent the Alternate Path of this JPM.**
Perform Step: 4√ 4.b.1) RNO & 4.b.1) A) RNO	IF CNTMT SMP TO CSP VLV(s) can NOT be open, THEN perform the following: • Place affected CSPs in PULL-OUT.
Standard:	PERFORMED the following prior to 1% RWST level: • PLACED 1-HS-4766, CSP 2 in STOP then PULLOUT (**critical**). • OBSERVED red FAN light LIT (**NOT critical**). • PLACED 1-HS-4767, CSP 4 in STOP then PULLOUT (**critical**). • OBSERVED red FAN light LIT (**NOT critical**).
Examiner Note:	**1% RWST level is based on anti-vortexing calculation MEB 389.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5√ 4.b.1) RNO & 4.b.1).B) RNO	IF CNTMT SMP TO CSP VLV(s) can NOT be open, THEN perform the following: • Place affected CS HX OUT VLV(s) in PULL-OUT.
Standard:	PERFORMED the following: • PLACED 1-HS-4777, CS HX 2 OUT VLV to PULLOUT (**critical**). • OBSERVED all lights OFF (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6 4.b.1) RNO & 4.b.1).C RNO	IF CNTMT SMP TO CSP VLV(s) can NOT be open, THEN perform the following: • Consult Plant Staff to determine contingency actions.
Standard:	CONSULTED Plant Staff to determine contingency actions.
Examiner Cue:	**Another operator will consult with Plant Staff. The Unit Supervisor directs you to continue with the procedure.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Perform Steps 7 and 8 may be performed in any order.**
Perform Step: 7√ 4.b.2) & 1st bullet	Close RWST TO CSP 1 & 3 <u>AND</u> 2 & 4 SUCT VLVs: • 1-HS-4758
Standard:	PERFORMED the following: • PLACED 1-HS-4758, RWST TO CSP 1 & 3 SUCT VLV to CLOSE (**critical**). • OBSERVED green CLOSE light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8√ 4.b.2) & 2nd bullet	Close RWST TO CSP 1 & 3 <u>AND</u> 2 & 4 SUCT VLVs: • 1-HS-4759
Standard:	PERFORMED the following: • PLACED 1-HS-4759, RWST TO CSP 2 & 4 SUCT VLV to CLOSE (**critical**). • OBSERVED green CLOSE light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 9 4.b.3)	<u>IF</u> containment spray pumps have been stopped due to RWST level, <u>THEN</u> perform the following:
Standard:	DETERMINED Containment Spray Pumps were NOT stopped due to low RWST Level.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 10 4.b.4)	Verify containment spray flows.
Standard:	OBSERVED Containment Spray flows on: • 1-FI-4772-1, CSP 1 DISCH FLO at ~3600 GPM. • 1-FI-4772-2, CSP 3 DISCH FLO at ~3700 GPM.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

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

- **A Large Break LOCA has occurred and Containment Spray has actuated.**
- **The Emergency Core Cooling System has been aligned for Cold Leg Recirculation per EOS-1.3A, Transfer to Cold Leg Recirculation.**
- **Refueling Water Storage Tank (RWST) level is 10%.**

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

- **When RWST level reaches 6%, TRANSFER Containment Spray to the Containment Sumps per EOS-1.3A, Transfer to Cold Leg Recirculation, Attachment 1.H, Containment Spray Switchover Criterion.**

THIS IS NOT A TIME CRITICAL JPM

Facility: CPNPP JPM # NRC S-6 Task # RO4302E K/A # 064.A4.06 3.9 / 3.9 SF-6

Title: Loss of Both 6900 Volt Safeguard Buses

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 1.
- ABN-601, Response to a 138/345 KV System Malfunction, is in progress.

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

- RESPOND to a loss of both 6900 Volt Safeguards Buses per ABN-601, Response to a 138/345 KV System Malfunction, Section 7.0, Loss of Both Safeguards Buses – MODE 1, 2, 3, or 4.

Task Standard: Utilizing ABN-601, tripped the Reactor, stopped Reactor Coolant Pumps, and paralleled Train A(B) Emergency Diesel Generator to Safeguard Bus 1EA1(1EA2).

Required Materials: ABN-601, Response to a 138/345 KV System Malfunction, Rev. 11-18.

Validation Time: 10 minutes Completion Time: ________ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): ______________________ Date: ____________

SIMULATOR SETUP

BOOTH OPERATOR:

INITIALIZE to IC-31 and LOAD scenario file "LC-21 NRC JPM S6" or PERFORM the following:

- **INITIALIZE to IC-18 at 100% power.**
- **EXECUTE malfunction EG16A, Disable DG-1 Breaker 1EG1 Auto Closure.**
- **EXECUTE malfunction EG16B, Disable DG-2 Breaker 1EG2 Auto Closure.**
- **EXECUTE malfunction ED02, Loss of 345 KV Transformer XST1 and RED tag.**
- **CS-1EA1-1, INCOMING BKR 1EA1-1 handswitch in PULLOUT and RED tag.**
- **CS-1EA2-1, INCOMING BKR 1EA2-1 handswitch in PULLOUT and RED tag.**
- **PLACE Simulator in RUN then FREEZE until ready.**

BOOTH OPERATOR NOTE:

- **After each JPM, VERIFY Synchroscope Switch is in any position other than for the 1EG1 Breaker.**

EXAMINER:

PROVIDE the examinee with a copy of:

- **ABN-601, Response to a 138/345 KV System Malfunction.**
  - **Section 7.0, Loss of Both Safeguard Buses – MODE 1, 2, 3, or 4.**

EXAMINER NOTE:

During JPM verification it was determined that the plant would continue to operate with both 1E Safeguards Buses deenergized in excess of 10 minutes.

√ - Check Mark Denotes Critical Step

START TIME:	

Examiner Note:	**The following steps are from ABN-601, Section 7.0.**
Booth Operator:	**When applicant is ready to begin, PLACE Simulator in RUN.**

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. Security key rings may be obtained from the Key Control Facility (KCF) at the PAP. In addition, loss of normal lighting and ventilation may require use of portable lighting or heat stress equipment while performing local actions.

Perform Step: 1 7.3.1	Verify Reactor – TRIPPED.
Standard:	DETERMINED Reactor is NOT tripped.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps represent the Alternate Path of this JPM.**
Perform Step: 2√ 7.3.1 RNO	Manually trip the Reactor.
Standard:	PLACED 1/1-RTC, RX TRIP BKR Switch **or** 1/1-RT, RX TRIP Switch in TRIP position and VERIFIED the following: • Reactor Trip Breakers - at least one OPEN. • Neutron flux - DECREASING. • All Control Rod position rod bottom lights - ON.
Examiner Cue:	**Another operator will complete actions of EOP-0.0A.** **Continue with actions in accordance with ABN-601, Section 7.0.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3 7.3.2	Verify all RCPs – STOPPED.
Standard:	DETERMINED all Reactor Coolant Pumps are RUNNING.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4√ 7.3.2 RNO	Manually stop all RCPs.
Standard:	PERFORMED the following: • PLACED 1/1-PCPX1, RCP 1 in STOP (**critical**). • OBSERVED green STOP light LIT (**NOT critical**). • PLACED 1/1-PCPX2, RCP 2 in STOP (**critical**). • OBSERVED green STOP light LIT (**NOT critical**). • PLACED 1/1-PCPX3, RCP 3 in STOP (**critical**). • OBSERVED green STOP light LIT (**NOT critical**). • PLACED 1/1-PCPX4, RCP 4 in STOP (**critical**). • OBSERVED green STOP light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5 7.3.3	Check all Unit 6.9 KV Non-Safeguard Buses - ALL REMAINED ENERGIZED WITH LOADS CONNECTED TO THE BUS
Standard:	PERFORMED the following and DETERMINED all Unit 6.9 KV Non-Safeguard Buses are ENERGIZED: • TURNED VS-1A, 6.9 KV BUS VOLT/FREQ SELECT to 1A1, 1A2, 1A3, and 1A4 positions and OBSERVED V-1A, 6.9 KV NON-SFGD BUS VOLT and F-1A, 6.9 KV NON-SFGD BUS FREQ normal.
Comment:	**SAT ☐ UNSAT ☐**

NOTE:
- With the Diesel Generator Starting Air Receivers fully charged, there is sufficient air pressure for approximately five (5) start attempts.
- Performance of an Emergency Start will allow the diesel generator breaker to automatically close on a phase to ground bus fault (LOR 86-2/uEA1 or 86-2/uEA2). The diesel generator 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 Station Service Water pump will not be running to supply cooling water to the diesel generator. The time this condition exists should be minimized (approximately 15 minutes) to prevent damage to the diesel generator.

Perform Step: 6 7.3.4.a	Restore power to any 6.9 KV Safeguard bus: • Verify DG – RUNNING
Standard:	OBSERVED Train A (B) Emergency Diesel Generator parameters: • V-1EG1(1EG2), DG 1(2) VOLT at 6900 Volts. • F-1EG1(1EG2), DG 1(2) FREQ at 60 Hertz. • CS-1DG1N(1DG2N), DG 1(2) NORM STOP/START red light LIT.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7 7.3.4.b	Check DG supply breaker – CLOSED • CS-uEG1, DG 1 BKR uEG1 • CS-uEG2, DG 2 BKR uEG2
Standard:	DETERMINED CS-1EG1(1EG2), DG 1(2) BKR 1EG1(1EG2) is OPEN.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8√ 7.3.4.b RNO	Perform the following: • Manually close the supply breaker.
Standard:	PERFORMED the following: • INSERTED Sync Switch into SS-1EG1(1EG2), BKR EG1(EG2) SYNCHROSCOPE and TURNED to ON position (**critical**). • PLACED CS-1EG1(1EG2), DG 1(2) BKR 1EG1(1EG2) in CLOSE (**critical**). • OBSERVED red CLOSE light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 9 7.3.4.c	Check DG voltage – 6900 Volts (6500 - 7100 Volts) • V-uEG1, DG 1 VOLT
Standard:	VERIFIED V-1EG1(1EG2), DG 1(2) VOLT at approximately 6900 Volts.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 10 7.3.4.d	Check DG frequency – 60 Hz (59.9 - 60.1 Hz) • F-uEG1, DG 1 FREQ
Standard:	VERIFIED F-1EG1(1EG2), DG 1(2) FREQ at approximately 60 Hertz.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 11 7.3.4.e	Verify at least one 6.9 KV Safeguard Bus – ENERGIZED.
Standard:	DETERMINED Train A(B) Safeguard Bus 1EA1(1EA2) is ENERGIZED.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

<u>INITIAL</u> <u>CONDITIONS</u>: **Given the following conditions:**

- **Unit 1 is in MODE 1.**
- **ABN-601, Response to a 138/345 KV System Malfunction, is in progress.**

<u>INITIATING</u> <u>CUE</u>: **The Unit Supervisor directs you to PERFORM the following:**

- **RESPOND to a loss of both 6900 Volt Safeguards Buses per ABN-601, Response to a 138/345 KV System Malfunction, Section 7.0, Loss of Both Safeguards Buses – MODE 1, 2, 3, or 4.**

Facility: CPNPP JPM # NRC S-7 Task # RO4405 K/A # 068.AA1.22 4.0 / 4.3 SF-8

Title: Respond to a Fire in the Safeguards Building

Examinee (Print): ______________________________

Testing Method:

Simulated Performance:	______	Classroom:	______
Actual Performance:	X	Simulator:	X
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:

- ABN-804A, Response to a Fire in the Safeguards Building, is in progress.
- Other operators are performing ABN-804A, Attachments 5 and 6, which include isolation of Letdown flow.

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

- RESPOND to a fire in the Safeguards Building per ABN-804A, Response to a Fire in the Safeguards Building, Section 5.0, Fire Affecting Safeguards Building Fire Area 1SD.
- START at Step 5.3.6.

Task Standard: Utilizing ABN-804A, responded to a fire in the Safeguards Building, started the Train B Emergency Diesel Generator, transferred Charging Pump suction to the RWST, started the Train B Centrifugal Charging Pump, and secured Charging flow to the Reactor Coolant System.

Required Materials: ABN-804A, Respond to a Fire in the Safeguards Building, Rev. 5-11.

Validation Time: 10 minutes Completion Time: ________ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): ______________________________ Date: ______________

SIMULATOR SETUP

BOOTH OPERATOR:

INITIALIZE to IC-18 and LOAD scenario file "LC-21 NRC JPM S7" or PERFORM the following:

- **ALARM ON for these Safeguards Fire Protection Panel annunciators:**
  - **AFP09_16 for Window 4.2 – 810' SWGR RM TRN A.**
  - **AFP09_17 for Window 5.2 – 810' SWGR RM TRN A WTR FLO.**

EXAMINER:

PROVIDE the examinee with a copy of:

- **ABN-804A, Response to a Fire in the Safeguards Building.**
  - **Section 5.0, Fire Affecting Safeguards Building Fire Area 1SD.**

√ - Check Mark Denotes Critical Step

START TIME:	

Examiner Note:	**The following is from ABN-804A, and Section 5.0, Step 5.3.6.**
Perform Step: 1√ 5.3.6 & bullet	Perform an emergency start on Trn B Diesel Generator: • CS-1DG2E, DG 2 EMER STOP/ START – START
Standard:	PERFORMED the following: • PLACED CS-1DG2E, DG 2 EMER STOP/ START switch in START (**critical**). • OBSERVED V-1EG2, DG 2 VOLTS at ~6900 Volts (**NOT critical**). • OBSERVED F-1EG2, DG 2 FREQ at 60 Hertz (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2√ 5.3.7	Place 1/1-APRH 1, RHRP 1 – PULL OUT
Standard:	PERFORMED the following: • PLACED 1/1-APRH 1, RHRP 1 in PULLOUT (**critical**). • OBSERVED red FAN light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3√ 5.3.8	CLOSE 1/1-8812A, RWST TO RHRP 1 SUCT VLV
Standard:	PERFORMED the following: • PLACED 1/1-8812A, RWST TO RHRP 1 SUCT VLV in CLOSE (**critical**). • OBSERVED green CLOSE light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4√ 5.3.9	CLOSE 1/1-8100, RCP SEAL WTR RET ISOL VLV
Standard:	PERFORMED the following: • PLACED 1/1-8100, RCP SEAL WTR RET ISOL VLV in CLOSE (**critical**). • OBSERVED green CLOSE light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**<u>Either</u> 1/1-LCV-112D <u>OR</u> 1/1-LCV-112E can be opened.**
Perform Step: 5√ 5.3.10 & 5.3.10.a	Transfer Charging Pump suction to the RWST : • Ensure 1/1-LCV-112D <u>OR</u> 1/1-LCV-112E, RWST TO CHRG PMP SUCT VLV – OPEN.
Standard:	PERFORMED <u>ONE</u> of the following: • PLACED 1/1-LCV-112D, RWST TO CHRG PMP SUCT VLV in OPEN (**critical**). • OBSERVED red OPEN light LIT (**NOT critical**). **<u>OR</u>** • PLACED 1/1-LCV-112E, RWST TO CHRG PMP SUCT VLV in OPEN (**critical**). • OBSERVED red OPEN light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**<u>Both</u> 1/1-LCV-112B <u>AND</u> 1/1-LCV-112C <u>must</u> be closed.**
Perform Step: 6√ 5.3.10 & 5.3.10.b	Transfer Charging Pump suction to the RWST : • Ensure 1/1-LCV-112B <u>AND</u> 1/1-LCV-112C, VCT TO CHRG PMP SUCT VLV - CLOSED.
Standard:	PERFORMED <u>BOTH</u> of the following: • PLACED 1/1-LCV-112B, VCT TO CHRG PMP SUCT VLV in CLOSE (**critical**). • OBSERVED green CLOSE light LIT (**NOT critical**). **<u>AND</u>** • PLACED 1/1-LCV-112C, VCT TO CHRG PMP SUCT VLV in CLOSE (**critical**). • OBSERVED green CLOSE light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7 5.3.10 & 5.3.10.c	Transfer Charging Pump suction to the RWST : • Verify 1-ZL-8220 <u>AND</u> 1-ZL-8221, CHRG PMP SUCT HI POINT VENT VLV - CLOSED.
Standard:	OBSERVED 1-ZL-8220 **<u>and</u>** 1-ZL-8221, CHRG PMP SUCT HI POINT VENT VLVs green CLOSE lights LIT.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8 5.3.10 & 5.3.10.d	Transfer Charging Pump suction to the RWST : • Ensure 1/1-8202A AND 1/1-8202B, VENT VLV – CLOSED.	
Standard:	VERIFIED 1/1-8202A **and** 1/1-8202B, VENT VLVs in CLOSE and OBSERVED green CLOSE lights LIT.	
Comment:		**SAT** ☐ **UNSAT** ☐

Perform Step: 9√ 5.3.11	Ensure 1/1-APCH2, CCP 2 – RUNNING.	
Standard:	PERFORMED the following: • PLACED 1/1-APCH2, CCP 2 in START (**critical**). • OBSERVED red PUMP and FAN lights LIT (**NOT critical**).	
Comment:		**SAT** ☐ **UNSAT** ☐

Examiner Note:	**Applicant may be hesitant to isolate Charging flow with Letdown still in service, therefore, provide the following Examiner Cue:**	
Examiner Cue:	**If questioned, inform operator to continue the assigned task.**	
Perform Step: 10√ 5.3.12	CLOSE 1/1-8105, CHRG PMP TO RCS ISOL VLV.	
Standard:	PERFORMED the following: • PLACED 1/1-8105, CHRG PMP TO RCS ISOL VLV in CLOSE (**critical**). • OBSERVED green CLOSE light LIT (**NOT critical**).	
Terminating Cue:	**This JPM is complete.**	
Comment:		**SAT** ☐ **UNSAT** ☐

STOP TIME:	

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

- **ABN-804A, Response to a Fire in the Safeguards Building, is in progress.**
- **Other operators are performing ABN-804A, Attachments 5 and 6, which include isolation of Letdown flow.**

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

- **RESPOND to a fire in the Safeguards Building per ABN-804A, Response to a Fire in the Safeguards Building, Section 5.0, Fire Affecting Safeguards Building Fire Area 1SD.**
- **START at Step 5.3.6.**

Facility: CPNPP JPM # NRC S-8 Task # RO4006 K/A # 060.AA2.05 3.7 / 4.2 SF-9

Title: Perform a Containment Pressure Reduction

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:

- A Containment pressure reduction is required.
- All applicable Containment Ventilation System permits have been processed and the Prerequisites of SOP-801A, Containment Ventilation System, Section 2.6, have been met.
- The Unit Supervisor has completed all applicable steps associated with the Release Permit and the Permit is approved.

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

- PLACE the Containment Pressure Relief System in operation per SOP-801A, Containment Ventilation System.
- START at Step 5.6.5.B

Task Standard: Utilizing SOP-801A, commenced a Containment pressure reduction then isolated the release per ALM-0032A due to high radiation.

Required Materials: SOP-801A, Containment Ventilation System, Rev. 14.
ALM-0032A, 1-ALB-3B, Window 4.1, Rev. 7-10.

Validation Time: 10 minutes Completion Time: ________ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): ________________________________ Date: ______________

SIMULATOR SETUP

BOOTH OPERATOR:

INITIALIZE to IC-34 and LOAD scenario file "LC-21 NRC JPM S4-S8" or PERFORM the following:

- **OVERRIDE 1-PI-5470A & 1-PI-5470B, Containment Pressure Narrow Range indications to 1.1 psig on CB03 as follows:**
  - **SET CHR12A, Permissive to Change Containment Pressure to ON.**
  - **SET CHR12, Change Containment Pressure to 1.1 PSIG.**
  - **SET CHR12A, Permissive to Change Containment Pressure to OFF.**
- **EXECUTE remote function RMR02 to OFF (maintains 1-HV-5548 & 5549 OPEN).**
- **EXECUTE malfunction RM197, 1-RE-5503 / CAG-197, PRM Radiation Monitor Failure @ 1E^{6} 30 seconds after 1-HV-5548 is OPEN.**
- **EXECUTE remote function AN3B_4 to ALARM 1-ALB-03B-4.1, CNTMT AIR RAD HI when malfunction is activated with 45 second time delay.**
- **EXECUTE malfunction RP18C, Manual Containment Ventilation Isolation failure.**
- **ENSURE PC-11 is RESET and CAG-197 is green.**
- **ALIGN PC-11, Digital Radiation Monitoring System to Grid #2.**
- **HANG the CONTAINMENT VENT IN PROGRESS sign on CB02.**

BOOTH OPERATOR NOTE:

- **After each JPM, ENSURE PC-11 is reset and CAG197 is green.**

EXAMINER:

PROVIDE the examinee with a copy of:

- **SOP-801A, Containment Ventilation System.**
  - **INITIALS and N/As as appropriate up to Step 5.6.5.B.**

EXAMINER NOTE:

NRC JPMs S-4 and S-8 will be performed at the same time.

√ - Check Mark Denotes Critical Step

START TIME:	

Examiner Note:	**The following steps are from SOP-801A, Step 5.6.5.B.**
Perform Step: 1 5.6.5.B	LOG the time the containment vent is started.
Standard:	RECORDED start time of Containment vent in SOP-801A or DIRECTED the Unit Supervisor to log the start time in the release package.
Examiner Cue:	**If contacted as the Unit Supervisor, REPORT that the start time has been recorded in the release package.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2√ 5.6.5.C	OPEN 1-HS-5574, AIR PRG EXH DMPR.
Standard:	PERFORMED the following: • PLACED 1-HS-5574, AIR PRG EXH DMPR to OPEN (**critical**). • OBSERVED red OPEN light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3√ 5.6.5.D	OPEN 1-HS-5549, CNTMT PRESS RLF ISOL VLV.
Standard:	PERFORMED the following: • PLACED 1-HS-5549, CNTMT PRESS RLF ISOL VLV to OPEN (**critical**). • OBSERVED red OPEN light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4√ 5.6.5.E	OPEN 1-HS-5548, CNTMT PRESS RLF ISOL VLV.
Standard:	PERFORMED the following: • PLACED 1-HS-5548, CNTMT PRESS RLF ISOL VLV to OPEN (**critical**). • OBSERVED red OPEN light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5 5.6.5.F	Verify containment pressure has been reduced to within the limits specified in Section 4.0.
Standard:	DETERMINED Containment pressure is lowering by OBSERVING the following Containment pressure indications: • 1-PI-5470A, CNTMT PRESS (NR) on CB03. • 1-PI-5470b, CNTMT PRESS (NR) on CB03.
Comment:	**SAT ☐ UNSAT ☐**

Booth Operator:	**EXECUTE malfunction RM197, PRM Radiation Monitor failure.**
Perform Step: 6	RECOGNIZE Annunciator in alarm.
Standard:	ACKNOWLEDGED and RESPONDED to Annunciator 1-ALB-3B, Window 4.1 – CNTMT AIR RAD HI.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Due to ESFAS automatic actions associated with this alarm, the applicant may immediately isolate valves listed in Perform Steps 9 and 10.**
Examiner Note:	**The following steps are from ALM-0032A, 1-ALB-3B, Window 4.1 – CNTMT AIR RAD HI.**
NOTE: Containment Ventilation Isolation may be reset after this alarm is illuminated. This will allow Containment to be purged, if desired, with radiation levels above setpoint.	
Perform Step: 7 1 & 1st bullet	VERIFY the alarm on PC-11: • CAG-197, GASEOUS
Standard:	PERFORMED the following at PC-11: • DEPRESSED F7 then 197 then ENTER. • OBSERVED high radiation on 1-RE-5503, CNTMT AIR PIG GAS, CAG-197.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8 2 & bullets	Verify Containment Ventilation Isolation has occurred. (1-CB-02) • 1-MLB-45A, SI/CNTMT VENT ISOL • 1-MLB-45B, SI/CNTMT VENT ISOL
Standard:	DETERMINED Containment Ventilation Isolation has NOT occurred on 1-MLB-45A, SI/CNTMT VENT ISOL or 1-MLB-45B, SI/CNTMT VENT ISOL and OBSERVED 1-HV-5548 and 1-HV-5549 green lights DARK and green lights for remaining CVI valves LIT.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps represent the Alternate Path of this JPM.**
Examiner Note:	**At this point the applicant can reference either SOP-801A or 1-ALB-03B to perform Containment Ventilation Isolation actions.**
Perform Step: 9√ 2.A	If Containment Ventilation Isolation is <u>NOT</u> complete, manually align components as necessary.
Standard:	PERFORMED the following: • PLACED 1-HS-5548, CNTMT PRESS RLF ISOL VLV to CLOSE (**critical**). • OBSERVED green CLOSE light LIT (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 10√ 2.A	If Containment Ventilation Isolation is <u>NOT</u> complete, manually align components as necessary.
Standard:	PERFORMED the following: • PLACED 1-HS-5549, CNTMT PRESS RLF ISOL VLV to CLOSE (**critical**). • OBSERVED green CLOSE light LIT (**NOT critical**).
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

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

- **A Containment pressure reduction is required.**
- **All applicable Containment Ventilation System permits have been processed and the Prerequisites of SOP-801A, Containment Ventilation System, Section 2.6, have been met.**
- **The Unit Supervisor has completed all applicable steps associated with the Release Permit and the Permit is approved.**

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

- **PLACE the Containment Pressure Relief System in operation per SOP-801A, Containment Ventilation System.**
- **START at Step 5.6.5.B**

Facility: CPNPP JPM # NRC P-1 Task # RO5112 K/A # 004.A4.01 4.1/ 3.9 SF-2

Title: Perform Actions to Restart Positive Displacement Pump

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 on Unit 2:

- ABN-301, Instrument Air System Malfunction, is in progress.
- Restart of the Positive Displacement Charging Pump (PDP) is required to re-establish Charging flow.
- Boron concentration and T_{AVE} have not changed.

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

- RESET control air to the Unit 2 PDP Fluid Drive per ABN-301, Instrument Air System Malfunction, Step 3.3.4.n.
- RESTORE the Unit 2 PDP to operation per SOP-103B, Chemical and Volume Control System, Section 5.3.1, Positive Displacement Pump Startup.
- START at Step 5.3.1.E.

Task Standard: Utilizing SOP-103B, reset the PDP per ABN-301 and prepared PDP for restart per SOP-103B.

Required Materials: ABN-301, Instrument Air System Malfunction, Rev. 12.

SOP-103B, Chemical and Volume Control System, Rev. 12-26.

Validation Time: 20 minutes Completion Time: ________ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): ______________________ Date: ____________

PLANT SETUP

EXAMINER:

PROVIDE examinee with a copy of:

- **ABN-301, Instrument Air System Malfunction.**
  - **Step 3.3.4.n.**
- **SOP-103B, Chemical and Volume Control System, Sections 2.5 and 5.3.1 for Unit 2.**
  - **INITIAL and N/A Steps as appropriate up to Step 5.3.1.E.**
- **Flashlight for Charging Pump Remote Operator Room.**

EXAMINER NOTE:

This JPM will be performed on Unit 2 due to access restrictions in Unit 1.

√ - Check Mark Denotes Critical Step

START TIME:	

Examiner Note:	**The following step is from ABN-301, Step 3.3.4.n.**
Perform Step: 1√ 3.3.4.n	Reset air to PDP hydraulic speed changer by pushing the brass button on the P/A Converter.
Standard:	DEPRESSED brass control air RESET button on P/A Converter located atop Positive Displacement Pump Fluid Drive in PDP Room.
Examiner Cue:	**The button is recessed.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps are from SOP-103B, Step 5.3.1.E.**
NOTE: If the Stuffing Box Coolant Tank is overfilled, the PDP Charging Pump Room will become contaminated.	
Perform Step: 2 5.3.1.E	IF Stuffing Box Coolant Tank is low, THEN fill per the following steps:
Standard:	OBSERVED Stuffing Box Coolant Tank sightglass level.
Examiner Cue:	**The sight glass is EMPTY. Another operator will monitor sight glass level as the tank is filled.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Fill Valve is located in the Charging Pump Remote Operator Room.**
Perform Step: 3√ 5.3.1.E.1)	Slowly crack OPEN 2CS-0119, PD PMP 2-01 STUFFING BOX COOLANT TK MU ISOL VLV until desired fill rate is achieved.
Standard:	Slowly CRACKED OPEN 2CS-0119, PD PMP 2-01 STUFFING BOX COOL TK MU ISOL VLV, until desired fill rate is achieved.
Examiner Cue:	**The PDP operator reports sight glass is half-full.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4√ 5.3.1.E.2)	When the desired tank level has been established, CLOSE 2CS-0119.
Standard:	CLOSED 2-CS-0119, PD PMP 2-01 STUFFING BOX COOL TK MU ISOL VLV when level is OBSERVED in the Stuffing Box Coolant Tank.
Examiner Cue:	**The valve is rotated fully clockwise.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The remote operator is located in the Charging Pump Remote Operator Room. Unit 2 covers are <u>yellow</u>.**
Perform Step: 5√ 5.3.1.f	Ensure 2-8388-RO, PD CHRG PMP 2-01 DISCH VLV RMT OPER is OPEN.
Standard:	PERFORMED the following in the Charging Pump Remote Operator Room: • REMOVED the yellow cover for 2-8388-RO, PD CHRG PMP 2-01 DISCH VLV RMT OPER. • LOCATED a Remote Operator hand tool for 2-8388-RO. • PLACED hand tool on 2-8388-RO and TURNED in clockwise direction a small amount. • TURNED 2-8388-RO in the counter clockwise direction until operator will not turn, indicating valve is fully opened. • TURNED 2-8388-RO in the clockwise direction at least ¼ turn but no more than 1 turn to move off backseat.
Examiner Cue:	**When initially turned clockwise, REPORT valve is turning.** **When returned to full-open position, REPORT valve will not move.** **When taken off backseat, REPORT valve is turning.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6 5.3.1.g	OPEN the following valves: • 1/2-8202A, VENT VLV (MCB) • 1/2-8202B, VENT VLV (MCB)
Standard:	CONTACTED the Control Room to ENSURED 1/2-8202A <u>and</u> 1/2-8202B, VENT VLVs are OPEN.
Terminating Cue:	**The Control Room reports vent valves OPEN. This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

<u>INITIAL</u> <u>CONDITIONS</u>: **Given the following conditions on Unit 2:**

- **ABN-301, Instrument Air System Malfunction, is in progress.**
- **Restart of the Positive Displacement Charging Pump (PDP) is required to re-establish Charging flow.**
- **Boron concentration and T_{AVE} have not changed.**

<u>INITIATING</u> <u>CUE</u>: **The Unit Supervisor directs you to PERFORM the following:**

- **RESET control air to the Unit 2 PDP Fluid Drive per ABN-301, Instrument Air System Malfunction, Step 3.3.4.n.**
- **RESTORE the Unit 2 PDP to operation per SOP-103B, Chemical and Volume Control System, Section 5.3.1, Positive Displacement Pump Startup.**
- **START at Step 5.3.1.E.**

Facility: CPNPP JPM # NRC P-2 Task # RO1818 K/A # G 2.1.30 4.4 / 4.0 SF-7

Title: Respond to Loss of Source Range Instrumentation

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 3 with no Reactor Coolant Pumps running.
- ABN-701, Source Range Instrument Malfunction, is in progress.

Initiating Cue: The Unit Supervisor directs you to PERFORM the following on Unit 2:

- PERFORM actions to isolate dilution flowpaths per ABN-701, Source Range Instrument Malfunction, Attachment 1, Actions Required When SR Instrumentation Cannot Be Restored.
- START at Step 6.

Task Standard: Utilizing ABN-701, isolated potential dilution flow paths per Attachment 1.

Required Materials: ABN-701, Source Range Instrument Malfunction, Rev. 11-3.

Validation Time: 15 minutes Completion Time: ________ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): ______________________________ Date: ______________

PLANT SETUP

EXAMINER:

PROVIDE the examinee with a copy of:

- **ABN-701, Source Range Instrument Malfunction.**
  - **Attachment 1, Actions Required When SR Instrumentation Cannot Be Restored.**
- **Flashlight.**

√ - Check Mark Denotes Critical Step

START TIME:	

Examiner Note:	**The following steps are from ABN-701, Attachment 1, Step 6.**
Perform Step: 1 6	IF NO RCP is running in MODE 3, MODE 4 or MODE 5, THEN perform the following as required:
Standard:	DETERMINED no Reactor Coolant Pumps are running per the Initial Conditions.
Examiner Cue:	**Another operator will independently verify position and hang tags.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Valve is located in the Charging Pump Remote Operator Room.**
Perform Step: 2 6.a & 1st bullet	CLOSE and TAG the following valves to prevent inadvertent dilution of the RCS: • uCS-8455, RMUW TO CVCS BA BLNDR u-01 UPSTRM ISOL VLV
Standard:	PERFORMED the following: • ROTATED 2CS-8455, RMUW TO CVCS BA BLNDR 2-01 UPSTRM ISOL VLV handwheel in the clockwise direction.
Examiner Cue:	**Valve handle turns freely, valve stem will not move.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Valve is located in the Charging Pump Remote Operator Room.**
Perform Step: 3√ 6.a & 2nd bullet	CLOSE and TAG the following valves to prevent inadvertent dilution of the RCS: • uCS-8560-RO, Uu CVCS CHRG PMP SUCT MU ISOL VLV RMT OPER
Standard:	PERFORMED the following: • ROTATED 2CS-8560-RO, U2 CVCS CHRG PMP SUCT MU ISOL VLV RMT OPER handwheel in the clockwise direction.
Examiner Cue:	**Remote operator has rotated fully clockwise and stopped.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Valve is located in the Charging Pump Remote Operator Room.**
Perform Step: 4√ 6.a & 3rd bullet	CLOSE and TAG the following valves to prevent inadvertent dilution of the RCS: • uCS-8439-RO, Uu CVCS CHRG PMP EMER BORATE MAN VLV RMT OPER
Standard:	PERFORMED the following: • ROTATED 2CS-8439-RO, U2 CVCS CHRG PMP EMER BORATE MAN VLV RMT OPER handwheel in the clockwise direction.
Examiner Cue:	**Remote operator has rotated fully clockwise and stopped.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Valve is located in the Charging Pump Remote Operator Room.**
Perform Step: 5√ 6.a & 4th bullet	CLOSE and TAG the following valves to prevent inadvertent dilution of the RCS: • uCS-8441, Uu RMUW TO EMER BORATE FLSH VLV
Standard:	PERFORMED the following: • ROTATED 2CS-8441, U2 RMUW TO EMER BORATE FLSH VLV handwheel in the clockwise direction.
Examiner Cue:	**Handwheel has rotated fully clockwise and stopped.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Valve is located in the Charging Pump Remote Operator Room.**
Perform Step: 6√ 6.a & 5th bullet	CLOSE and TAG the following valves to prevent inadvertent dilution of the RCS: • uCS-8453, CVCS CHEM MIX TK u-01 ISOL VLV
Standard:	PERFORMED the following: • ROTATED 2CS-8453, CVCS CHEM MIX TK 2-01 ISOL VLV handwheel in the clockwise direction.
Examiner Cue:	**Handwheel has rotated fully clockwise and stopped.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Guidance for manually operating an air operated Flow Control Valve is contained in OWI-206, Guidelines for Operation of Manual and Power Operated Valves, Step 6.3.2.G.**
Examiner Note:	**Valve is located in the VCT Valve Room 2-090, Elev. 832'.**
Perform Step: 7√ 6.a & 6th bullet	CLOSE and TAG the following valves to prevent inadvertent dilution of the RCS: • u-FCV-0111B, RCS MU TO VCT u-01 ISOL VLV
Standard:	PERFORMED the following: • CLOSED 2-FCV-0111B-AS1, RCS MU TO VCT 2-01 ISOL VLV AS in the clockwise direction. • OPENED Pressure Regulator Petcock Valve on bottom of 2-FCV-0111B-PRI, RCS MU TO VCT 2-01 ISOL VLV PRESS REG, in the counterclockwise direction. • OBSERVED pressure gauge on 2-FCV-0111B bleeds to 0 psig. • OBSERVED 2-FCV-0111B, RCS MU TO VCT 2-01 ISOL VLV moving to closed position.
Terminating Cue:	**Air supply valve handwheel has rotated fully clockwise and stopped. Petcock Valve rotated fully counterclockwise and stopped. Pressure gauge indicates 0 psig and Air Operated Valve is closed. This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

<u>INITIAL</u> <u>CONDITIONS</u>: **Given the following conditions:**

- **Unit 2 is in MODE 3 with no Reactor Coolant Pumps running.**
- **ABN-701, Source Range Instrument Malfunction, is in progress.**

<u>INITIATING</u> <u>CUE</u>: **The Unit Supervisor directs you to PERFORM the following on Unit 2:**

- **PERFORM actions to isolate dilution flowpaths per ABN-701, Source Range Instrument Malfunction, Attachment 1, Actions Required When SR Instrumentation Cannot Be Restored.**
- **START at Step 6.**

Facility: CPNPP JPM # NRC P-3 Task # RO5115 K/A # 068.AA1.01 4.3 / 4.5 SF-4P

Title: Control Transfer of Steam Generator Atmospheric Relief Valves

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 Control Room has been evacuated due to a toxic gas.
- Manual control of the Steam Generator Atmospheric Relief Valves is required at the Remote Shutdown Panel.
- An operator has been dispatched to transfer connections in Unit 2 Junction Box JB2S-1053O.

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

- ALIGN Steam Generator Atmospheric Relief Valves to the Remote Shutdown Panel per ABN-905B, Loss of Control Room Habitability, Attachment 9, Control Transfer of Steam Generator Atmospheric Relief Valves.
- TRANSFER connections in Unit 2 Junction Box JB2S-1051G.

Task Standard: Utilizing ABN-905B, transferred control of the Steam Generator Atmospheric Relief Valves to the Remote Shutdown Panel.

Required Materials: ABN-905B, Loss of Control Room Habitability, Rev. 4-9.

Validation Time: 10 minutes Completion Time: ________ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): ______________________________ Date: ______________

PLANT SETUP

EXAMINER:

PROVIDE the examinee with a copy of:

- **ABN-905B, Loss of Control Room Habitability.**
  - **Attachment 9, Control Transfer of Steam Generator Atmospheric Relief Valves.**

√ - Check Mark Denotes Critical Step

START TIME:	

Examiner Note:	**The following steps are from ABN-905B, Attachment 9.**
NOTE: Tools needed to open the following junction boxes are located in the Safe Shutdown Repair Kit (located in the SFGD 790 N-S Hallway across from Chem Add Tank Area).	
Perform Step: 1 1	Obtain RSP manual control of SG Atmos Rlf valves as follows:
Standard:	TRANSITED to SFGD 852', SG High Pressure Feed Area and LOCATED junction boxes JB2S-1051G and JB2S-1276 on the wall.
Comment:	**SAT** ☐ **UNSAT** ☐

Examiner Note:	**Junction boxes should be opened to allow applicant to describe their actions.**
Examiner Note:	**Junction box JB2S-1051G is located above JB2S-1276.**
Perform Step: 2√ 1.a, & 2nd bullet	Open appropriate junction boxes: • JB2S-1276 JB2S-1051G SFGD 852 SG High Pressure Chemical Feed Area (W. wall)
Standard:	PERFORMED the following: • Using crescent wrench or similar tool, LOOSENED junction box cover hold down tabs. • OPENED JB2S-1051G and JB2S-1276.
Comment:	**SAT** ☐ **UNSAT** ☐

Examiner Note:	**The disconnect switches are toggled between ON (red on top) and OFF (red on bottom). There is no other labeling.**
Perform Step: 3√ 1.b	Place disconnect switches in OFF.
Standard:	PLACED <u>both</u> disconnect switches inside JB2S-1051G in OFF position.
Examiner Cue:	**The disconnect switches are toggled such that red is showing on the bottom.**
Comment:	**SAT** ☐ **UNSAT** ☐

Perform Step: 4√ 1.c	Route cable through conduit from junction box listed under CONNECTOR to junction box listed under SWITCHES.
Standard:	ROUTED connector cable from the lower junction box (JB2S-1276) through conduit to the upper junction box (JB2S-1051G).
Examiner Cue:	**The cable is routed to the upper junction box.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5√ 1.d	Connect prefabricated connector.
Standard:	ALIGNED the male and female ends of the connector and SECURED.
Examiner Cue:	**The cable ends are aligned and secured.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6 1.e	Close junction boxes.
Standard:	PERFORMED the following: • CLOSED the junction box doors JB2S-1051G and JB2S-1276. • SLID the junction box cover hold down tabs. • TIGHTENED tabs using crescent wrench or similar tool.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

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

- **Unit 2 Control Room has been evacuated due to a toxic gas.**
- **Manual control of the Steam Generator Atmospheric Relief Valves is required at the Remote Shutdown Panel.**
- **An operator has been dispatched to transfer connections in Unit 2 Junction Box JB2S-1053O.**

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

- **ALIGN Steam Generator Atmospheric Relief Valves to the Remote Shutdown Panel per ABN-905B, Loss of Control Room Habitability, Attachment 9, Control Transfer of Steam Generator Atmospheric Relief Valves.**
- **TRANSFER connections in Unit 2 Junction Box JB2S-1051G.**

Facility: CPNPP 1 & 2	Scenario No.: 1	Op Test No.: April 2013 NRC	
Examiners:		Operators:	

Initial Conditions: 100% power MOL - RCS Boron is 908 ppm (by sample).

Turnover: Maintain steady-state power conditions.

Critical Tasks:

- Manually Initiate Train A and Train B Safety Injection Signal Prior to Exiting EOP-0.0A, Reactor Trip or Safety Injection. (Event 6)
- Identify and Isolate the Faulted Steam Generator Prior to Exiting EOP-2.0A, Faulted Steam Generator Isolation. (Event 8)

Event No.	Malf. No.	Event Type*	Event Description
1 +10 min	RX08A	I (RO, SRO) TS (SRO)	Pressurizer Pressure Channel (PT-455) Fails Low.
2 +20 min	RX02A	I (BOP, SRO)	Steam Generator (1-01) Steam Flow Instrument (FT-512) Fails High.
3 +25 min	CV31A	C (RO, SRO) TS (SRO)	Centrifugal Charging Pump (1-01) Sheared Shaft.
4 +40 min	FW22	R (RO) N (BOP, SRO) TS (SRO)	Low Pressure Feedwater Heater Bypass Valve (PV-2286) Fails Open.
5 +45 min	FW25A	M (RO, BOP, SRO)	Feedwater Line Leak to Steam Generator (1-01) Outside Containment After Feedwater Isolation Valve (600 second ramp).
6 +50 min	RP07A RP07B	C (RO)	Train A Safety Injection Fails to Automatically Actuate. Train B Safety Injection Fails to Automatically Actuate.
7 +50 min	CS02F CS02H	C (RO)	Train B Containment Spray Pumps 1-02 & 1-04 Safety Injection Sequencer Start Failure.
8 +50 min	FW38A OVRDE	I (BOP)	Steam Generator 1-01 Feedwater Isolation Valve (HS-2134) Actuation Failure.

* (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)
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 SUMMARY NRC 1

The crew will assume the watch at 100% power with no scheduled activities per IPO-003A, Power Operations.

The first event is a Pressurizer Pressure Channel (PT-455) that fails low. The crew will enter ABN-705, Pressurizer Pressure Malfunction, Section 2.0, place the Pressurizer Master Pressure Controller in MANUAL, transfer to an Alternate Channel, and restore Pressurizer Pressure Control to AUTO. The SRO will refer to Technical Specifications.

The next event is a high failure of Steam Generator (1-01) Steam Flow Instrument, FT-512. Operator actions are per ABN-707, Steam Flow Instrument Malfunction, Section 2.0. The crew must manually control Steam Generator level, transfer to an Alternate Channel, and restore Steam Generator (SG) Feedwater Flow Control to AUTO.

The next event is a sheared shaft of the running Centrifugal Charging Pump (CCP). When low flow alarms are received, the initial operator actions of ABN-105, Chemical and Volume Control System Malfunction, Section 3.0, will be performed (start the standby CCP). Any delay in determining the cause of the low Charging flow will result in the isolation of Letdown which will be restored prior to proceeding. The SRO will refer to Technical Specifications.

When Technical Specifications have been referenced, the Low Pressure Heater Bypass Valve fails open. Entry into ABN-302, Feedwater, Condensate, Heater Drain System Malfunction, Section 7.0, is required and Rod Control is returned to AUTO and a Manual Turbine Runback to 900 MWe is performed. During this event, Control Rod position may drop below the Rod Insertion Limit (RIL) and when informed, the SRO will refer to Technical Specifications.

When plant conditions are stable, a Feed Line Break will commence on a 600 second ramp outside Containment downstream of Steam Generator (SG) 1-01 Feed Line Isolation Valve HS-2134. The crew will observe lowering Pressurizer pressure and level and manually initiate a Reactor Trip and Safety Injection. EOP-0.0A, Reactor Trip or Safety Injection, is entered and actions implemented until it is determined that SG 1-01 pressure is lower than the other Steam Generators and a transition into EOP-2.0A, Faulted Steam Generator Isolation, is performed.

The scenario includes a failure of Train A and Train B Safety Injection to automatically actuate and a Feedwater Isolation Signal actuation failure on HS-2134, Main Feedwater Line Isolation Valve which fails to close when the P-4 interlock is satisfied. Additionally, the Train B Containment Spray Pumps must be manually started due to a Safety Injection Sequencer failure.

This scenario is terminated when the Faulted Steam Generator is identified and isolated per EOP-2.0A and a transition to EOS-1.1A, Safety Injection Termination, is required.

Risk Significance:

- Failure of risk important system prior to trip: Centrifugal Charging Pump Sheared Shaft
- Risk significant core damage sequence: Feed Line Break Outside Containment
- Risk significant operator actions: Manually Initiate Turbine Runback
  Manually Initiate Safety Injection
  Start Train B Containment Spray Pumps
  Isolate Faulted Steam Generator

Facility: CPNPP 1 & 2	Scenario No.: 3	Op Test No.: April 2013 NRC	
Examiners:		Operators:	

Initial Conditions: 100% power MOL - RCS Boron is 908 ppm (by sample).

Turnover: Maintain steady-state power conditions.

Critical Tasks:

- Restore Component Cooling Water Flow Prior to Tripping the Reactor per ABN-502, Component Cooling Water System Malfunctions. (Event 1)
- Initiate Train A and/or Train B Containment Isolation Phase B due to Failure to Automatically Actuate Prior to Exiting FRZ-0.1A, Response to High Containment Pressure. (Event 7)
- Initiate Train A and/or Train B Containment Spray Flow Prior to Exiting FRZ-0.1A, Response to High Containment Pressure. (Event 8)

Event No.	Malf. No.	Event Type*	Event Description
1 +10 min	CC02A CC03A	C (BOP, SRO) TS (SRO)	Train A Component Cooling Water Pump 1-01 Trip. Train B Component Cooling Water Pump 1-02 Auto Start Failure.
2 +20 min	CV16A	I (RO, SRO)	Volume Control Tank Level Transmitter (LT-112) Fails Low.
3 +30 min	ED07A	C (RO, BOP, SRO) TS (SRO)	Loss of Inverter (IV1PC1).
4 +35 min	RC17B	M (RO, BOP, SRO)	Reactor Coolant Leak Inside Containment on Loop 2 Hot Leg of 600 GPM on 600 second ramp.
5 +40 min	CV01E	C (BOP)	Centrifugal Charging Pump (1-02) Auto Start Failure on Safety Injection Signal.
6 +50 min	RC08B2	M (RO, BOP, SRO)	Large Break Loss of Coolant Accident Inside Containment on Loop 2 Hot Leg.
7 +50 min	RP10A RP10B	C (BOP)	Train A and B Containment Isolation Phase B Automatic Actuation Failure.
8 +50 min	CS07A CS07B	C (BOP)	Train A and B Containment Spray Heat Exchanger Outlet Valves Fail to Auto Open.

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

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

SCENARIO SUMMARY NRC 3

The crew will assume the watch at 100% power with no scheduled activities per IPO-003A, Power Operations. The first event is a trip of the Train A Component Cooling Water (CCW) Pump and auto start failure of the Train B CCW Pump. The crew will enter ABN-502, Component Cooling Water System Malfunction, Section 2.0, and transfer CCW flow to Train B. The SRO will refer to Technical Specifications.

When Technical Specifications are referenced, a low failure of the Volume Control Tank Level Transmitter will occur. The crew will reference annunciator ALM-0061A-4.5, VCT LEVEL LO, and ABN-105, Chemical and Volume Control System Malfunction, and establish an Alternate Operating Mode for the Reactor Makeup System.

The next event is a loss of Inverter IV1PC1. Actions are per ABN-603, Loss of Protection or Instrument Bus, Section 2.0, and include placing Rod Control in MANUAL, controlling Steam Generator (SG) level and RCS pressure, and adjusting Charging flow due to a loss of Letdown. The SRO will refer to Technical Specifications.

When the Alternate Power Supply is aligned in ABN-603, a Reactor Coolant Leak inside Containment will commence. Once it is determined that Pressurizer level cannot be maintained, the Reactor must be manually tripped and Safety Injection manually initiated. The crew will enter EOP-0.0A, Reactor Trip or Safety Injection, and then transition to EOP-1.0A, Loss of Reactor or Secondary Coolant.

The scenario is complicated by a Train A and B Containment Isolation Phase B and Train A and B Containment Spray Heat Exchanger Outlet Valve automatic actuation failures. Additionally, the Train B Centrifugal Charging Pump will fail to auto start upon actuation of the Safety Injection Sequencer.

When EOP-1.0A is entered, a Large Break Loss of Coolant Accident will occur. At that point, the Unit Supervisor should recognize that entry into FRZ-0.1A, Response to High Containment Pressure, is required due to a Critical Safety Function Status Tree ORANGE path inside Containment. When the actions of FRZ-0.1A are completed a transition to FRP-0.1A, Response to Imminent Pressurized Thermal Shock Condition, is required. FRP-0.1A will be exited at Step 1 RNO when it is determined that Reactor Coolant System pressure is less than 425 psig and Residual Heat Removal System flow is greater than 750 GPM.

The crew will return to EOP-1.0A, Loss of Reactor or Secondary Coolant, as this is the current procedure and step in effect. This scenario is terminated when the conditions are reached for a Transfer to Cold Leg Recirculation.

<u>Risk Significance:</u>

• Failure of risk important system prior to trip:	Loss of Component Cooling Water
	Loss of Protection System Inverter
• Risk significant core damage sequence:	Small then Large Break LOCA
• Risk significant operator actions:	Restore Steam Generator Level Control
	Restore Pressurizer Pressure Control
	Start Train B Centrifugal Charging Pump
	Actuate Phase B Containment Isolation
	Initiate Containment Spray Flow

Facility: CPNPP 1 & 2	Scenario No.: 4	Op Test No.: April 2013 NRC	
Examiners:		Operators:	

Initial Conditions: ~3% power BOL - RCS Boron is 1659 ppm by Chemistry sample. Steam Dump System in service for Reactor Coolant System Temperature Control.

Turnover: Recirculate the Refueling Water Storage Tank prior to MODE 1 entry then raise Reactor Power from 3% to 8% in preparation for Turbine Startup.

Critical Tasks:

- Manually Trip Reactor Due to Reactor Protection System Failure Prior to Exiting EOP-0.0A, Reactor Trip or Safety Injection. (Event 7)
- Trip Reactor Coolant Pumps within 10 minutes upon a Loss of Subcooling per EOP-1.0A, Loss of Reactor or Secondary Coolant, Foldout Page. (Event 9)

Event No.	Malf. No.	Event Type*	Event Description
1 +10 min		N (BOP)	Recirculate the Refueling Water Storage Tank with Containment Spray Pump 1-01.
2 +20 min	RX12	C (RO, BOP, SRO)	Main Steam Header Pressure (PT-507) Fails High on 360 second ramp.
3 +40 min		R (RO) N (BOP, SRO)	Raise Power to 6% to 8% in Preparation for Synchronizing Main Generator to Electrical Grid.
4 +50 min	RX04A	I (BOP, SRO) TS (SRO)	Steam Generator (1-01) Level Channel (LT-551) Fails Low.
5 +55 min	CS02A	TS (SRO)	Containment Spray Pump (1-01) Trip.
6 +60 min	RP14B	M (RO, BOP, SRO)	Spurious Train B Safety Injection Actuation Signal.
7 +60 min	RP01	C (RO)	Automatic Reactor Trip Failure. Reactor Protection System Failure requires Manual Reactor Trip.
8 +60 min	RP09B	C (BOP)	Train B Containment Isolation Phase A Automatic Actuation Failure.
9 +80 min	RC08C1	M (RO, BOP, SRO)	Small Break Loss of Coolant Accident Inside Containment When Safety Injection Pump 1-02 is Secured in EOS-1.1A.

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

Actual	**Target Quantitative Attributes**
7	Total malfunctions (5-8)
3	Malfunctions after EOP entry (1-2)
2	Abnormal events (2-4)
2	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 SUMMARY NRC 4

The crew will assume the watch with power at approximately 3% per IPO-003A, Power Operations. Prior to raising power, the crew will recirculate the Refueling Water Storage Tank (RWST) using Containment Spray Pump 1-01 per SOP-204A, Containment Spray System, Section 5.1.3, Recirculation through the Recirculation Header.

The next event is a high failure of Main Steam Header Pressure Transmitter (PT-507) on a 360 second ramp. The crew enters ABN-709, Steam Header Pressure Instrument Malfunction, Section 3.0, and places the Steam Dump System in MANUAL to regain control of Reactor Coolant System (RCS) temperature. The controller will remain in MANUAL for the duration of the scenario.

When RCS temperature control is restored, the crew will continue with IPO-003A, Section 5.1, Warmup and Synchronization of the Turbine Generator, Step 5.1.16, and perform a power ascension using the Rod Control and Steam Dump Systems.

The next event is a Steam Generator Level Transmitter failure. Actions are per ABN-710, Steam Generator Level Instrumentation Malfunction. The BOP will be required to take manual control of the Feedwater Bypass Control Valve and then select an alternate controlling channel to return the Feedwater System to automatic control. The SRO will refer to Technical Specifications.

When conditions are stable, Containment Spray Pump 1-01 will trip. Actions are per ALM-0022A, 1-ALB-2B, Window 1.3 – ANY CSP OVRLD TRIP. The SRO will refer to Technical Specifications.

When Technical Specifications have been referenced, a spurious Train B Safety Injection Signal will actuate. The crew will determine that the Reactor did not automatically trip and initiate a Reactor Trip and Safety Injection and enter EOP-0.0A, Reactor Trip or Safety Injection. This scenario is complicated by Train B Containment Isolation Phase A Automatic actuation failure.

The crew will exit EOP-0.0A at Step 15 and enter EOS-1.1A, Safety Injection Termination. While in EOS-1.1A, Safeguards Signals are reset, the Charging flow path is realigned, and Safety Injection (SI) Pumps are stopped. When SI Pump 1-02 is stopped, a Small Break Loss of Coolant Accident will initiate. At this point, the crew will follow guidance on the EOS-1.1A Foldout Page that requires a transition to EOP-1.0A, Loss of Reactor or Secondary Coolant.

The scenario is terminated when it is determined in EOP-1.0A that Pressurizer pressure continues to slowly lower, and a transition to EOS-1.2 A, Post LOCA Cooldown and Depressurization, is required.

Risk Significance:

• Failure of risk important system prior to trip:	Containment Spray Pump Trip
• Risk significant core damage sequence:	Automatic Reactor Trip Failure
	Small Break Loss of Coolant Accident
• Risk significant operator actions:	Manually Trip Reactor
	Manually Initiate Safety Injection
	Initiate Train B Containment Isolation

Note for the exam file:
There were four scenarios developed for the Op test, with scenario 2 selected as the spare during exam validation week (with the applicant count at 14). Two applicants were removed from the class prior to admin week and therefore only two scenarios were needed. Scenario 1 was designated the spare, scenario 2 removed from the exam, and scenarios 3 and 4 were used for the Op test.

Facility: CPNPP 1 & 2 Scenario No.: 1 Op Test No.: April 2013 NRC

Examiners: ______________ Operators: ______________

Initial Conditions: 100% power MOL - RCS Boron is 908 ppm (by sample).

Turnover: Maintain steady-state power conditions.

Critical Tasks:

- Manually Initiate Train A and Train B Safety Injection Signal Prior to Exiting EOP-0.0A, Reactor Trip or Safety Injection. (Event 6)
- Identify and Isolate the Faulted Steam Generator Prior to Exiting EOP-2.0A, Faulted Steam Generator Isolation. (Event 8)

Event No.	Malf. No.	Event Type*	Event Description
1 +10 min	RX08A	I (RO, SRO) TS (SRO)	Pressurizer Pressure Channel (PT-455) Fails Low.
2 +20 min	RX02A	I (BOP, SRO)	Steam Generator (1-01) Steam Flow Instrument (FT-512) Fails High.
3 +25 min	CV31A	C (RO, SRO) TS (SRO)	Centrifugal Charging Pump (1-01) Sheared Shaft.
4 +40 min	FW22	R (RO) N (BOP, SRO) TS (SRO)	Low Pressure Feedwater Heater Bypass Valve (PV-2286) Fails Open.
5 +45 min	FW25A	M (RO, BOP, SRO)	Feedwater Line Leak to Steam Generator (1-01) Outside Containment After Feedwater Isolation Valve (600 second ramp).
6 +50 min	RP07A RP07B	C (RO)	Train A Safety Injection Fails to Automatically Actuate. Train B Safety Injection Fails to Automatically Actuate.
7 +50 min	CS02F CS02H	C (RO)	Train B Containment Spray Pumps 1-02 & 1-04 Safety Injection Sequencer Start Failure.
8 +50 min	FW38A OVRDE	I (BOP)	Steam Generator 1-01 Feedwater Isolation Valve (HS-2134) Actuation Failure.

* (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)
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 SUMMARY NRC 1

The crew will assume the watch at 100% power with no scheduled activities per IPO-003A, Power Operations.

The first event is a Pressurizer Pressure Channel (PT-455) that fails low. The crew will enter ABN-705, Pressurizer Pressure Malfunction, Section 2.0, place the Pressurizer Master Pressure Controller in MANUAL, transfer to an Alternate Channel, and restore Pressurizer Pressure Control to AUTO. The SRO will refer to Technical Specifications.

The next event is a high failure of Steam Generator (1-01) Steam Flow Instrument, FT-512. Operator actions are per ABN-707, Steam Flow Instrument Malfunction, Section 2.0. The crew must manually control Steam Generator level, transfer to an Alternate Channel, and restore Steam Generator (SG) Feedwater Flow Control to AUTO.

The next event is a sheared shaft of the running Centrifugal Charging Pump (CCP). When low flow alarms are received, the initial operator actions of ABN-105, Chemical and Volume Control System Malfunction, Section 3.0, will be performed (start the standby CCP). Any delay in determining the cause of the low Charging flow will result in the isolation of Letdown which will be restored prior to proceeding. The SRO will refer to Technical Specifications.

When Technical Specifications have been referenced, the Low Pressure Heater Bypass Valve fails open. Entry into ABN-302, Feedwater, Condensate, Heater Drain System Malfunction, Section 7.0, is required and Rod Control is returned to AUTO and a Manual Turbine Runback to 900 MWe is performed. During this event, Control Rod position may drop below the Rod Insertion Limit (RIL) and when informed, the SRO will refer to Technical Specifications.

When plant conditions are stable, a Feed Line Break will commence on a 600 second ramp outside Containment downstream of Steam Generator (SG) 1-01 Feed Line Isolation Valve HS-2134. The crew will observe lowering Pressurizer pressure and level and manually initiate a Reactor Trip and Safety Injection. EOP-0.0A, Reactor Trip or Safety Injection, is entered and actions implemented until it is determined that SG 1-01 pressure is lower than the other Steam Generators and a transition into EOP-2.0A, Faulted Steam Generator Isolation, is performed.

The scenario includes a failure of Train A and Train B Safety Injection to automatically actuate and a Feedwater Isolation Signal actuation failure on HS-2134, Main Feedwater Line Isolation Valve which fails to close when the P-4 interlock is satisfied. Additionally, the Train B Containment Spray Pumps must be manually started due to a Safety Injection Sequencer failure.

This scenario is terminated when the Faulted Steam Generator is identified and isolated per EOP-2.0A and a transition to EOS-1.1A, Safety Injection Termination, is required.

Risk Significance:

- Failure of risk important system prior to trip: Centrifugal Charging Pump Sheared Shaft
- Risk significant core damage sequence: Feed Line Break Outside Containment
- Risk significant operator actions: Manually Initiate Turbine Runback
  Manually Initiate Safety Injection
  Start Train B Containment Spray Pumps
  Isolate Faulted Steam Generator

BOOTH OPERATOR INSTRUCTIONS for SIMULATOR SETUP

Initialize to IC-18 and LC21 NRC Scenario 1.

EVENT	TYPE	MALF #	DESCRIPTION	DEMAND VALUE	INITIATING PARAMETER
SETUP		RP07A	Train A Safety Injection Fails to Auto Actuate	FAIL	K0
		RP07B	Train B Safety Injection Fails to Auto Actuate	FAIL	K0
		CS02F	Train B CSP 1-02 SI Sequencer Start Failure	FAIL	K0
		CS02H	Train B CSP 1-02 SI Sequencer Start Failure	FAIL	K0
		FW38A	MFW Line Isolation Valve (HV-2134) Failure	OPEN	K0
1		RX08A	PRZR Pressure Transmitter (PT-455) Failure	1700 PSIG	K1
2		RX02A	SG (1-01) Steam Flow (FT-512) Failure	$5E^6$ lbm/hr	K2
3		CV31A	Centrifugal Charging Pump (1-01) Sheared Shaft	FAIL	K3
3	CVR05		CCP (1-01) Auxiliary Lube Oil Pump	OFF	K11
3	CVR06		CCP (1-02) Auxiliary Lube Oil Pump	AUTO	K11
4		FW22	LP Feedwater Heater Bypass Valve Failure	OPEN	K4
5		FW25A	Feed Line Break Outside Containment	$1E^7$ lbm/hr	K5 (600 sec. ramp)
6		RP07A	Train A Safety Injection Fails to Auto Actuate	FAIL	K0
6		RP07B	Train B Safety Injection Fails to Auto Actuate	FAIL	K0
7		CS02F	Train B CSP 1-02 SI Sequencer Start Failure	FAIL	K0
7		CS02H	Train B CSP 1-02 SI Sequencer Start Failure	FAIL	K0
8		FW38A	MFW Line Isolation Valve (HV-2134) Failure	OPEN	K0
8			HV-2134 Closes with Handswitch {DIFWHS2134 Value=1} DMF FW38A f:1	CLOSE	-

Booth Operator: **INITIALIZE to IC-18 and LC21 NRC Scenario 1.**
ENSURE all Simulator Annunciator Alarms are ACTIVE.
ENSURE all Control Board Tags are removed.
ENSURE Operator Aid Tags reflect current boron conditions.
ENSURE Rod Bank Update (RBU) is performed.
ENSURE Turbine Load Rate set at 10 MWe/minute.
ENSURE 60/90 buttons DEPRESSED on ASD.
ENSURE ASD speakers are ON to 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 #	1	Event #	1	Page	5	of	27
Event Description:	Pressurizer Pressure Channel Failure								

Time	Position	Applicant's Actions or Behavior
Booth Operator: When directed, EXECUTE Event 1 (Key 1). - RX08A, Pressurizer Pressure Channel (PT-455) fails low.		
Indications Available: **5B-3.4 – PRZR 1 OF 4 PRESS LO** **5B-4.4 – PRZR 1 OF 4 SI PRESS LO** **5C-3.3 – PRZR PRESS LO BACKUP HTRS ON** **5C-2.5 – 1 of 4 OT N16 HI** **1-PI-455A,PRZR PRESS CHAN I indication failed high**		
+1 min	RO	RESPOND to Annunciator Alarm Procedures.
	RO	RECOGNIZE PRZR pressure channel PI-455A has failed low.
	US	DIRECT performance of ABN-705, Pressurizer Pressure Malfunction, Section 2.0.
Examiner Note: Diamond steps (◊) are Initial Operator Actions.		
NOTE: • Diamond steps denote initial action. • A PORV is not considered INOPERABLE when its actuation instrumentation is not functioning. • Power should NOT be removed from a block valve closed in accordance with this procedure section.		
	◊ RO ◊	VERIFY PORV – CLOSED. [Step 2.3.1]
	◊ RO ◊	PLACE 1-PK-455A, PRZR MASTER PRESS CTRL in MANUAL. [Step 2.3.2]
	◊ RO ◊	ADJUST 1-PK-455A for current RCS pressure. [Step 2.3.3]
	RO	TRANSFER 1/1-PS-455F, PRZR PRESS CTRL CHAN SELECT to an Alternate Controlling Channel. [Step 2.3.4]
	RO	PLACE 1-PK-455A, PRZR MASTER PRESS CTRL in AUTO. [Step 2.3.5]

Time	Position	Applicant's Actions or Behavior
	RO	VERIFY automatic control restoring Pressurizer pressure to 2235 psig. [Step 2.3.6]
	RO	ENSURE valid channel to recorder 1/1-PS-455G, 1-PR-455 PRZR PRESS SELECT. [Step 2.3.7]
	RO	ENSURE 1/1-PCV-455A, PRZR PORV in AUTO. [Step 2.3.8]
	RO	ENSURE 1/1-8000A, PRZR PORV BLK VLV in OPEN position. [Step 2.3.9]
	US/RO	Within one hour, VERIFY PCIP Window 2.6 - PRZR PRESS SI BLK PERM P-11 – DARK. [Step 2.3.10]
	US/RO	VERIFY other instruments on common instrument line - NORMAL. [Step 2.3.11]
		• VERIFY Loop 1 Instruments LT-459 responding normally per Attachment 1.

NOTE:

- If the failed channel temperature was reading lower than the substituted channel, then AVE Tave will increase when the channel is defeated due to another channel being substituted for the defeated signal to maintain accurate averaging.
- Rod Control is not required to be placed in MANUAL until a Tave loop is defeated using u-TS-412T. As long as a Tave loop is defeated, Rod Control should remain in MANUAL. 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. The affected Tave loop does not need to be defeated until just prior to tripping bistables (tripping bistables will cause the N16 and Tave loop to fail low).

Examiner Note: The next two (2) steps are only performed following I&C maintenance.

Time	Position	Applicant's Actions or Behavior
		Within 72 hours, PERFORM the following: [Step 2.3.12]
		• PLACE 1/1-RBSS, CONTROL ROD BANK SELECT in MANUAL. [Step 2.3.12.a]
		• SELECT the failed channel on following switches: [Step 2.3.12.b]

Time	Position	Applicant's Actions or Behavior
		• 1-TS-412T, T_{AVE} CHAN DEFEAT • 1/1-JS-411E, N16 PWR CHAN DEFEAT
		• ENSURE valid N16 channel is supplying recorder: [Step 2.3.12.c]
		• 1/1-TS-411E, 1-TR-411 CHAN SELECT
		• CONTACT I&C to place bistable test switches for PT-455 in CLOSE. [Step 2.3.12.d]
		VERIFY appropriate alarms and trip status lights ON per Attachment 4. [Step 2.3.13]
		• OBSERVE TSLB-1, Window 1.7 – PRZR PRESS LO PB-455D is LIT.
		• OBSERVE TSLB-5, Window 1.2 – PRZR PRESS LO PB-455C is LIT.
		• OBSERVE TSLB-5, Window 1.8 – RC LOOP 1 OT N16 TB-411C is LIT.
		• OBSERVE TSLB-9, Window 1.4 – OT N16 ROD STOP & TURB RUNBACK TB-411D is LIT.
	US	EVALUATE Technical Specifications. [Step 2.3.14]
		• LCO 3.3.1.E, Reactor Trip System Instrumentation (Function 6, Overtemperature N-16 & 8.b, Pressurizer Pressure High).
		• CONDITION E - One channel inoperable. • ACTION E.1 - Place channel in trip within 72 hours, <u>OR</u> • ACTION E.2 - Be in MODE 3 within 78 hours.
		• LCO 3.3.1.M, Reactor Trip System Instrumentation (Function 8.a, Pressurizer Pressure Low).
		• CONDITION M - One channel inoperable. • ACTION M.1 - Place channel in trip within 72 hours, <u>OR</u> • ACTION M.2 - Reduce THERMAL POWER to < P-7 within 78 hours.
		• LCO 3.3.2.D, ESFAS Instrumentation (Function 1.d, Safety Injection, Pressurizer Pressure - Low).
		• CONDITION D - One channel inoperable. • ACTION D.1 - Place channel in trip within 72 hours, <u>OR</u> • ACTION D.2.1 - Be in MODE 3 within 78 hours, <u>AND</u> • ACTION D.2.2 - Be in MODE 4 within 84 hours.

Operating Test :	NRC	Scenario #	1	Event #	1	Page	8	of 27
Event Description:	Pressurizer Pressure Channel Failure							

Time	Position	Applicant's Actions or Behavior
		• LCO 3.3.2.L, ESFAS Instrumentation (Function 8.b, ESFAS Interlocks, Pressurizer Pressure - P-11).
		• CONDITION L - One or more required channel(s) inoperable. • ACTION L.1 - Verify interlock is in required state for existing unit condition within one hour, OR • ACTION L.2.1 - Be in MODE 3 within 7 hours, AND • ACTION L.2.2 - Be in MODE 4 within 13 hours.
	US	INITIATE a work request per STA-606. [Step 2.3.15]
+10 min	US	INITIATE a Condition Report per STA-421. [Step 2.3.16]
When Technical Specifications are addressed, or at Lead Examiner discretion, PROCEED to Event 2.		

Time	Position	Applicant's Actions or Behavior
Booth Operator: **When directed, EXECUTE Event 2 (Key 2).** **- RX02A, SG 1-01 Steam Flow Transmitter (FT-512) fails high.**		
Indications Available: **8A-1.8 – SG 1 STM & FW FLO MISMATCH** **1-FI-512A, SG 1 STM FLO indication fails high**		
+30 sec	BOP	REFER to Annunciator Alarm Procedures.
	BOP	RECOGNIZE SG 1-01 Steam Flow Transmitter (FT-512) failed high.
Examiner Note: **A Steam Flow Channel failing HIGH will cause feedwater flow and Feedwater Pump speed to rise due to a larger programmed differential pressure between feedwater pressure and steam pressure. Without operator action, the Turbine will trip at 84% Steam Generator level.**		
	US	DIRECT implementation of ABN-707, Steam Flow Instrument Malfunction, Section 2.0.
	BOP	DETERMINE controlling Steam Flow Channel FT-512 has failed. [Step 2.3.1]
	BOP	• PLACE 1-FK-510, SG 1 FW FLO CTRL in MANUAL and CONTROL level. [Step 2.3.1.a RNO]
		• If necessary, PLACE 1-SK-509A, FWPT MASTER SPD CTRL FLO CTRL in MANUAL and CONTROL level. [Step 2.3.1.b RNO]
	BOP	VERIFY 1-FI-513A, SG 1 STM FLO channel indicating – NORMAL. [Step 2.3.2]
	BOP	VERIFY 1-LI-517, SG 1 LVL (NR) CHAN IV channel indicating – NORMAL. [Step 2.3.3]
	BOP	VERIFY 1-FI-512A, SG 1 STM FLO channel indicating – NORMAL. [Step 2.3.4]
	BOP	• SELECT alternate channel and PLACE 1-FS-512C, SG 1 STM FLO CHAN SELECT to FY-513B. [Step 2.3.4 RNO]

	BOP	VERIFY SG 1-01 level control restored to – NORMAL: [Step 2.3.5]
		• VERIFY Feedwater and Steam Flows matched. [Step 2.3.5.a]
		• VERIFY Steam Generator level stable at program. [Step 2.3.5.a]
	BOP	• PLACE 1-FK-510, SG 1 FW FLO CTRL in AUTO and MONITOR operation. [Step 2.3.5.b]
	BOP	• VERIFY SG 1-01 level control channel responding normally. [Step 2.3.5.b]
		• ENSURE 1-SK-509A, FWPT MASTER SPD CTRL FLO CTRL in AUTO and controlling normally. [Step 2.3.5.c]
	US	INITIATE a Condition Report per STA-421. [Step 2.3.6]
+10 min	US	INITIATE repairs per STA-606. [Step 2.3.7]
When Feedwater Control is restored, or at Lead Evaluator's discretion, PROCEED to Event 3.		

Operating Test : NRC	Scenario # 1	Event # 3	Page 11 of 27
Event Description: Centrifugal Charging Pump Sheared Shaft			

Time	Position	Applicant's Actions or Behavior
Booth Operator: When directed, EXECUTE Event 3 (Key 3). **- CV31A, Centrifugal Charging Pump 1-01 sheared shaft.**		
Indications Available: **5A-1.6 – ANY RCP SEAL WTR INJ FLO LO** **6A-1.4 – REGEN HX LTDN OUT TEMP HI** **6A-3.4 – CHG FLO HI / LO** **1-FI-121A, CHRG FLO lowers to zero (0) GPM**		
+1 min	RO	RESPOND to Annunciator Procedure Alarms.
	RO	RECOGNIZE Charging Pump 1-01 sheared shaft due to loss of Charging flow.
	US	DIRECT performance of ABN-105, Chemical and Volume Control System Malfunction, Section 3.0.
Examiner Note: Diamond steps (◊) are Initial Operator Actions.		
CAUTION: With NO Seal Injection flow AND NO Thermal Barrier cooling the affected RCP must be secured within ONE minute. Consideration should be given to ensure gas binding not a factor before starting a charging pump. Indications of potential gas binding are: • PDP SUCT STAB LVL HI-HI (6A-1.8) • CHRG FLO HI/LO (6A-3.4) • VCT LVL LO-LO (6A-4.5) • Fluctuating charging header pressure/flow prior to pump trip. Section 7.0 provides for recovery from gas binding of a charging pump.		
NOTE: Diamond steps 1 denotes Initial Operator Action. Step 1 RNO actions may be performed concurrently.		
	◊ RO ◊	START Centrifugal Charging Pump 1-02. [Step 3.3.1]

Operating Test :	NRC	Scenario #	1	Event #	3	Page	12	of	27
Event Description:	Centrifugal Charging Pump Sheared Shaft								

Time	Position	Applicant's Actions or Behavior
		NOTE: IF NO Charging Pump available, THEN Plant Management should be notified prior to shutdown due to NO boration path.
	RO	VERIFY one Centrifugal Charging Pump – RUNNING. [Step 3.3.2]
	RO	VERIFY Seal Injection Flow to each RCP – BETWEEN 6 GPM AND 13 GPM. [Step 3.3.3]
		Booth Operator: When contacted, REPORT shaft of CCP 1-01 is sheared between the motor and speed increaser.
		Booth Operator: When contacted, EXECUTE remote functions CVR05 and CVR06 for the Centrifugal Charging Pump (1-01 & 1-02) Auxiliary Lube Oil Pumps (Key 11).
	RO	VERIFY RCP parameters in – NORMAL OPERATING RANGE. [Step 3.3.4]

PARAMETER	RCP 1	RCP 2	RCP 3	RCP 4
LOW SEAL WTR BEARING TEMP (Pump Radial)	T0417A	T0437A	T0457A	T0477A
SEAL WTR IN TEMP	T0181A	T0182A	T0183A	T0184A
SEAL LKOFF FLO	u-FR-157	u-FR-156	u-FR-155	u-FR-154

Time	Position	Applicant's Actions or Behavior
	RO	VERIFY PRZR level – GREATER THAN 17% AND RISING. [Step 3.3.5]
		Examiner Note: ABN-706, Attachment 6 is used in the event Letdown is isolated in Step 1. Letdown flow is re-established using the Letdown Restoration Job Aid.
	RO	When Pressurizer level is greater than 17%, RESTORE Letdown per Attachment 6. [Step 3.3.6 RNO]
		• OPEN or VERIFY OPEN Letdown Isolation Valves 1/1-LCV-460 & 1/1-LCV 459. [Step 1]
		• Manually OPEN 1-PK-131, LTDN HX OUT PRESS CTRL to 30% (75 GPM) or 50% (120 GPM) DEMAND. [Step 2]

		• Manually OPEN 1-TK-130, LTDN HX OUT TEMP CTRL to 50% DEMAND. [Step 3]
		• ADJUST Charging to desired flow and MAINTAIN Seal Injection flow between 6 and 13 GPM. [Step 4]
		• OPEN selected Orifice Isolation Valves. [Step 5]
		• 1/1-8149A, LTDWN ORIFICE ISOL VLV (45 GPM) • 1/1-8149B, LTDWN ORIFICE ISOL VLV (75 GPM) • 1/1-8149C, LTDWN ORIFICE ISOL VLV (75 GPM)
		• ADJUST 1-PK-131, LTDN HX OUT PRESS CTRL to ~310 psig on 1-PI-131, LTDN HX OUT PRESS then PLACE in AUTO. [Step 6]
		• ADJUST 1-TK-130, LTDN HX OUT TEMP CTRL to obtain ~95ºF on 1-TI-130, LTDN HX OUT TEMP, then PLACE in AUTO. [Step 7]
	RO	VERIFY RCS leakage – NORMAL: [Step 3.3.7]
		• VERIFY PRZR level stable at or trending to program. [Step 3.3.7.a]
		• VERIFY Charging flow less than 15 GPM above Letdown flow. [Step 3.3.7.b]
<u>Examiner Note</u>: Technical Requirements Manual (TRM) TR LCO 13.1.31, Borating Injection System – Operating, may also be referenced.		
	US	EVALUATE Technical Specifications. [Step 3.3.8]
		• LCO 3.5.2.A, ECCS - Operating.
		• CONDITION A - One train inoperable because of the inoperability of a centrifugal charging pump. • ACTION A.1 - Restore pump to OPERABLE status within 7 days.
	US	INITIATE a work request per STA-606. [Step 3.3.9]
+5 min	US	INITIATE a Condition Report per STA-421. [Step 3.3.10]
When Technical Specifications are addressed, or at Lead Examiner discretion, PROCEED to Event 4.		

Operating Test : NRC	Scenario # 1	Event # 4	Page 14 of 27
Event Description: Low Pressure Feedwater Heater Bypass Valve Failure			

Time	Position	Applicant's Actions or Behavior
<u>Booth Operator</u>: When directed, EXECUTE Event 4 (Key 4). - FW22, Low Pressure Feedwater Heater Bypass Valve fails open.		
<u>Indications Available</u>: 8B-3.8 – CNDS LP HTR BYP VLV OPEN PV-2286 Reactor Power rising and Main Feedwater temperature lowering		
+1 min	BOP	RESPOND to Annunciator Alarm Procedures.
	RO/BOP	OBSERVE rising Reactor Power and lowering Main Feedwater temperatures.
	US	DIRECT performance of ABN-302, Feedwater, Condensate, Heater Drain System Malfunction, Section 7.0.
<u>Examiner Note</u>: Diamond steps (◊) are Initial Operator Actions.		
<u>CAUTION</u>: • LP FW HTR BYP VLV opening at power will cause reactor power to increase. • 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. <u>NOTE</u>: Diamond step 1 denotes Initial Operator Actions.		
	◊ US ◊	ENSURE Turbine Power – LESS THAN OR EQUAL TO 900 MWe. [Step 7.3.1]
	◊ RO ◊	• PLACE 1/1-RBSS, CONTROL ROD BANK SELECT Switch in AUTO.
	◊ BOP ◊	• MANUALLY RUNBACK Turbine Power to 900 MWe.
		• DEPRESS “900 MWe” Manual Runback button.
		• CLICK on “0/1” button.
		• CLICK on “EXECUTE” then VERIFY Runback in progress.
<u>Booth Operator</u>: If contacted to inspect 1-PV-2286 for cause of failure, REPORT that Instrument Air piping to 1-PV-2286 has been severed and the valve has FAILED OPEN.		

Booth Operator: After 3 minutes, REPORT no indication of piping or hanger damage.		
	US	Locally INSPECT Heater Drain System for signs of water hammer induced damage. [Step 7.3.2]
	BOP	ENSURE Feedwater Pump suction pressure > 250 PSIG. [Step 7.3.3]
		• 1-PI-2295, FWP A SUCT PRESS
		• 1-PI-2297, FWP B SUCT PRESS
	US/BOP	If required, RESET Turbine Runback per ABN-401. [Step 7.3.4]
Examiner Note: The following steps are from ABN-401, Main Turbine Malfunction, Section 8.0, Turbine Reloading after Runback.		
		• VERIFY alarm 6D-1.9, ANY TURB RUNBACK EFFECTIVE – DARK. [Step 8.3.1]
		• In the Load Control Section, ENSURE Load Rate Setpoint Controller is SET to support reload or current plant conditions. [Step 8.3.2]
		• In the Load Control Section, ENSURE Load Target Setpoint Controller is set for actual MWe. [Step 8.3.3]
		• 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]
		• VERIFY Runback is RESET. [Step 8.3.5]
		• VERIFY Runback – GREATER THAN 15% WITHIN ONE HOUR and CONTACT Chemistry. [Step 8.3.6]
		• CONTROL Turbine Load as required per IPO-003A. [Step 8.3.7]
Examiner Note: Combination of events prior to / 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.		

Operating Test :	NRC	Scenario #	1	Event #	4	Page	16	of 27
Event Description:	Low Pressure Feedwater Heater Bypass Valve Failure							

Time	Position	Applicant's Actions or Behavior
	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 (1) hour, <u>OR</u> • ACTION A.1.2 - Initiate Boration to restore SDM to within limit within one (1) hour, <u>AND</u> • ACTION A.2 - Restore control bank(s) to within limits within 2 hours.
	BOP	When Steam Dumps have closed - RESET C-7. [Step 7.3.5]
		• Momentarily PLACE 43/1-SD, STM DMP MODE SELECT in RESET.
		• VERIFY PCIP, Window 3.4 – TURB LOAD REJ STM DMP ARMED C-7 is DARK.
<u>NOTE</u>: Isolating the LP FW HTR BYP VLV will cause RCS temperature to initially decrease and steam flow to increase as more extraction steam is drawn from the turbine. Subsequently, this will cause feedwater temperatures increase which will result in an increase in RCS temperature and a decrease in reactor power.		
+15 min	BOP	Locally SLOWLY CLOSE one manual isolation valve for 1-CV-2286, while adjusting Turbine Load to maintain Reactor Power stable. [Step 7.3.6]
		• 1CO-0148, U1 CNDS LP HTR BYP VLV 2286 UPSTRM ISOL VLV.
		• 1CO-0149, U1 CNDS LP HTR BYP VLV 2286 DNSTRM ISOL VLV.
<u>Examiner Note</u>: The Shift Manager must be contacted and a Crew Brief conducted prior to isolating PV-2286. This evolution takes significant time and is performed locally, therefore, it is desirable to proceed with the next scenario event.		
When Technical Specifications have been referenced, or at Lead Examiner discretion, PROCEED to Events 5, 6, 7, and 8.		

Time	Position	Applicant's Actions or Behavior
Booth Operator: When directed, EXECUTE Events 5, 6, 7, and 8 (Key 5). **- MS03C, SG 1-03 Feed Line Break outside Containment at 1E^{7} lbm/hr on 600 second ramp.** **- RP07A, Train A Safety Injection Auto Actuation failure.** **- RP07B, Train B Safety Injection Auto Actuation failure.** **- CS02F, Containment Spray Pump 1-02 SI Sequencer start failure.** **- CS02H, Containment Spray Pump 1-04 SI Sequencer start failure.** **- FW38A, Main Feedwater Line Isolation Valve (HV-2134) fails to close.**		
Indications Available: **8A-1.8 – SG 1 STM & FW FLO MISMATCH** **5C-3.3 – PRZR PRESS LO BACKUP HTRS ON**		
+30 sec	RO/BOP	RECOGNIZE lowering RCS temperature and pressure.
Booth Operator: If asked, REPORT steam and water in the Turbine Building.		
	RO/BOP	DETERMINE Reactor Trip required and manually TRIP Reactor.
	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]
		• VERIFY all Control Rod Position Rod Bottom Lights – ON. [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]

Operating Test :	NRC	Scenario #	1	Event #	5, 6, 7, & 8	Page	18 of 27
Event Description:	Feed Line Break Outside Containment / Train A & B Safety Injection Sequencer Failure / Train B Containment Spray Pumps SI Sequencer Start Failure / Main Feedwater Isolation Failure						

Time	Position	Applicant's Actions or Behavior
	RO	CHECK SI status: [Step 4]
	RO	• CHECK if SI is actuated. [Step 4.a]
CRITICAL TASK STATEMENT		**Manually Initiate Train A and Train B Safety Injection Signal Prior to Exiting EOP-0.0A, Reactor Trip or Safety Injection.**
CRITICAL TASK	RO	Manually INITIATE Train A and Train B Safety Injection Signal.
	RO	• PLACE 1/1-SIA2, SI MAN ACT Switch to ACT position at CB-07 and DETERMINE SI has actuated on both Trains. [Step 4.a RNO]
	RO	• VERIFY Both Trains SI Actuated: [Step 4.b]
		• SI Actuated blue status light – ON NOT FLASHING.
Examiner Note:		**EOP-0.0A, Attachment 2 steps performed by BOP are identified later in the scenario. The RCPs may be tripped if subcooling is observed to be < 25ºF.**
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]
	RO	VERIFY AFW Alignment: [Step 6]
		• VERIFY both MDAFW Pumps – RUNNING. [Step 6.a]
		• PLACE TDAFW Pump in PULLOUT per Foldout Page. [Step 6.b]

Operating Test :	NRC	Scenario #	1	Event #	5, 6, 7, & 8	Page	19	of	27
Event Description:	Feed Line Break Outside Containment / Train A & B Safety Injection Sequencer Failure / Train B Containment Spray Pumps SI Sequencer Start Failure / Main Feedwater Isolation Failure								

Time	Position	Applicant's Actions or Behavior
		• 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]
	RO	• START Containment Spray Pumps 1-02 & 1-04. [Step 7.a RNO]
Examiner Note:	**During validation, criteria for isolating the Main Steam Lines was NOT met, however, a Main Steam Isolation Signal may be initiated by the applicant.**	
	RO	CHECK if Main Steam lines should be ISOLATED: [Step 8]
		• VERIFY Containment pressure – GREATER THAN 6.0 PSIG. [Step 8.a]
		• VERIFY Steam Line pressure – LESS THAN 610 PSIG. [Step 8.a]
		• VERIFY Main Steam Line Isolation – COMPLETE. [Step 8.b]
	RO	CHECK RCS Temperature: [Step 9 - no]
		• VERIFY RCS Average Temperature – STABLE AT OR TRENDING TO 557°F. [Step 9]
		• STOP dumping steam. [Step 9.a RNO]
		• REDUCE AFW flow as necessary to minimize cooldown. [Step 9.b RNO]
		• CLOSE Main Steam Isolation Valves. [Step 9.c RNO]
	RO	Manually INITIATE a Main Steam Line Isolation. [Step 9.c RNO]
		• PLACE 1-HS-2337A, MSL ISOL MAN ACT / RESET in CLOSE position and VERIFY Main Steam Line Isolation Actuation.

Time	Position	Applicant's Actions or Behavior
		• PLACE 1-HS-2337B, MSL ISOL MAN ACT / RESET in CLOSE position and VERIFY Main Steam Line Isolation Actuation.
	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]
	RO	CHECK if RCPs Should Be Stopped: [Step 11]
		• VERIFY RCS subcooling – LESS THAN 25°F (55°F FOR ADVERSE CONTAINMENT). [Step 11.a]
		• GO to Step 12. [Step 11.a RNO]
	US/RO	CHECK if any SG is Faulted: [Step 12]
		• VERIFY any Steam Generator pressure – DECREASING IN AN UNCONTROLLED MANNER. [Step 12.a]
		• VERIFY Steam Generator 1-01 pressure – COMPLETELY DEPRESSURIZED. [Step 12.a]
		• 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 #	1	Event #	5, 6, 7, & 8	Page	21	of	27
Event Description:	Feed Line Break Outside Containment / Train A & B Safety Injection Sequencer Failure / Train B Containment Spray Pumps SI Sequencer Start Failure / Main Feedwater Isolation Failure								

Time	Position	Applicant's Actions or Behavior
+15 min	US/RO	CHECK Main Steam Line 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 1-01. [Step 3]

```
CAUTION:    If the turbine-driven AFW pump is the only available
            source of feed flow, steam supply to the turbine-driven
            AFW pump must be maintained from at least one SG.
```

Examiner Note: **Closing of 1-FCV-510, SG1 FW FLO CTRL will isolate Feedwater to SG 1-01.**

CRITICAL TASK STATEMENT		**Identify and Isolate Faulted Steam Generator Prior to Exiting EOP-2.0A, Faulted Steam Generator Isolation.**
CRITICAL TASK	RO/BOP	ISOLATE Faulted Steam Generator 1-01. [Step 4]
		• ISOLATE Main Feed Line to Steam Generator 1-01. [Step 4]
		• CLOSE 1-HS-2134, FWIV 1.
		• ISOLATE AFW flow to Steam Generator 1-01. [Step 4]
		• CLOSE 1-HS-2491, AFWIV 1.
		• PLACE 1-HS-2452-2, AFWPT STM SPLY VLV MSL 1 in PULLOUT. [Step 4]
		• ISOLATE Blowdown and Sample Lines to Steam Generator 1-01. [Step 4]
		• ENSURE Steam Generator 1-01 Atmospheric Relief Valve – CLOSED. [Step 4]
		• ENSURE Main Steam Line Drip Pot Isolation Valve – CLOSED. [Step 4]
	RO	CHECK CST Level – GREATER THAN 10%. [Step 5]

Operating Test :	NRC	Scenario #	1	Event #	5, 6, 7, & 8	Page	22	of	27
Event Description:	Feed Line Break Outside Containment / Train A & B Safety Injection Sequencer Failure / Train B Containment Spray Pumps SI Sequencer Start Failure / Main Feedwater Isolation Failure								

Time	Position	Applicant's Actions or Behavior
	US/BOP	VERIFY Faulted Steam Generator 1-01 Break Inside Containment. [Step 6]
		• PERFORM Attachment 2. [Step 6 RNO]
Examiner Note:		**EOP-2.0A, Attachment 2, MSIV Electrical Requirement Verification, is NOT performed in the Simulator.**
	US/RO	CHECK Secondary Radiation: [Step 7]
		• REQUEST periodic activity samples of all Steam Generators. [Step 7.a]
		• CHECK available secondary radiation monitors – NORMAL. [Step 7.b]
	US/RO	CHECK if ECCS Flow to Should Be Reduced: [Step 8]
		• VERIFY Secondary heat sink: [Step 8.a]
		• DETERMINE Total AFW Flow to intact SGs > 460 GPM.
		• DETERMINE Narrow Range Level in SGs 1-02, 1-03, & 1-04 > 50%.
		• DETERMINE RCS subcooling – GREATER THAN 25°F (55°F FOR ADVERSE CONTAINMENT). [Step 8.b]
		• VERIFY RCS pressure – STABLE OR INCREASING. [Step 8.c]
		• VERIFY PRZR level - GREATER THAN 13% (34% FOR ADVERSE CONTAINMENT). [Step 8.d]
		• GO to EOS-1.1A, Safety Injection Termination, Step 1. [Step 8.e]
When a transition to EOS-1.1A is reached, TERMINATE the scenario.		

Operating Test :	NRC	Scenario #	1	Event #	5, 6, 7, & 8	Page	23	of	27
Event Description:	Feed Line Break Outside Containment / Train A & B Safety Injection Sequencer Failure / Train B Containment Spray Pumps SI Sequencer Start Failure / Main Feedwater Isolation Failure								

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 EDG 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 Train B CCP – RUNNING. [Step 7.a]
		• VERIFY Letdown Relief Valve Isolation: [Step 7.b]
		• Letdown Orifice Isolation Valves – CLOSED. [Step 7.b.1)]
		• Letdown Isolation Valves 1/1-LCV-459 & 1/1-LCV-460 – CLOSED. [Step 7.b.2)]
	BOP	VERIFY ECCS flow: [Step 8]

Operating Test :	NRC	Scenario #	1	Event #	5, 6, 7, & 8	Page	24	of	27
Event Description:	Feed Line Break Outside Containment / Train A & B Safety Injection Sequencer Failure / Train B Containment Spray Pumps SI Sequencer Start Failure / Main Feedwater Isolation Failure								

Time	Position	Applicant's Actions or Behavior
		• CCP SI flow indicator – CHECK FOR FLOW. [Step 8.a]
		• 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. [Step 8.d RNO]
	BOP	VERIFY Feedwater Isolation Complete: [Step 9]
		• Feedwater Isolation Valves – CLOSED.
	BOP	• PLACE 1-HS-2134, FWIV 1 in CLOSE. [Step 9 RNO]
		• 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]
	BOP	INITIATE periodic monitoring of Spent Fuel Cooling. [Step 13]
		• Spent Fuel Pool temperature (T2900A, T2901A).
		• Spent Fuel Pool level (L4800A, L4801A, L4802A, L4803A).

Operating Test :	NRC	Scenario #	1	Event #	5, 6, 7, & 8	Page	25	of	27
Event Description:	Feed Line Break Outside Containment / Train A & B Safety Injection Sequencer Failure / Train B Containment Spray Pumps SI Sequencer Start Failure / Main Feedwater Isolation Failure								

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.

Time	Position	Applicant's Actions or Behavior			
	BOP	VERIFY Components on Table 1 are Properly Aligned. [Step 14]			
		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

Operating Test :	NRC	Scenario #	1	Event #	5, 6, 7, & 8	Page	26	of	27
Event Description:	Feed Line Break Outside Containment / Train A & B Safety Injection Sequencer Failure / Train B Containment Spray Pumps SI Sequencer Start Failure / Main Feedwater Isolation Failure								

Time	Position	Applicant's Actions or Behavior

	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 {NO}
	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 #	1	Event #	5, 6, 7, & 8	Page	27	of	27
Event Description:	Feed Line Break Outside Containment / Train A & B Safety Injection Sequencer Failure / Train B Containment Spray Pumps SI Sequencer Start Failure / Main Feedwater Isolation Failure								

Time	Position	Applicant's Actions or Behavior

<u>Examiner Note</u>: The next four (4) 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 <u>AND</u> to IMPLEMENT FRGs as required. [Step 14]

EOP-0.0A, Attachment 2 steps are now complete.

COMANCHE PEAK NUCLEAR POWER PLANT

UNIT 1

INTEGRATED PLANT OPERATING PROCEDURES MANUAL

FOR EMPLOYEE USE:
DATE VERIFIED/INITIALS ______ / ______ LATEST PCN/EFFECTIVE DATE PCN 18 / 1/17/13 1200

LEVEL OF USE:
CONTINUOUS USE

QUALITY RELATED

POWER OPERATIONS

PROCEDURE NO. IPO-003A

REVISION NO. 28

EFFECTIVE DATE: 10/26/10 1200

PREPARED BY (Print): Tom Nash EXT: 5513

TECHNICAL REVIEW BY (Print): EDITORIAL REVISION EXT: NA

APPROVED BY: Bart Smith DATE: 10/18/10
DIRECTOR, OPERATIONS

5.5 **Operating At Constant Turbine Load**

The following lists conditions and anticipatory responses that should be reviewed while operating at constant Turbine load:

A. Reactor Operation

- N-16 should be monitored as an indication of power along with NIS and Calorimetric power. N-16 may be the most accurate indicator of power during a transient since it is temperature compensated. During transient conditions, the highest indication of Reactor power (N-16 and NIS) should always be maintained within limits.
- Maintain the Axial Flux Difference within the AFD administrative band specified in NUC-204 and at or near the target AFD. The AFD administrative band specified by NUC-204 is identified as an administrative limit in this procedure.
- Contact Core Performance Engineering to obtain fuel conditioned power restrictions.
- An administrative AFD limit of ±2% about the target value should be maintained during steady state operation. If AFD deviates outside this limit or if AFD oscillations occur, immediate operator action should be initiated to restore AFD within its administrative limit. This limitation may be modified by Core Performance Engineering based on core operating data.
- If I-131 values increase to more than 25% above its equilibrium value, sample frequency and data collection should be implemented per STA-735. If failed fuel is detected, the Failed Fuel Action Guidelines of STA-735 should be reviewed for applicability. These guidelines may place additional restrictions on power level and ramp rates.
- Perform minimum control rod motion when operating at constant high power conditions to minimize flux oscillations.
- Control rod use should be minimized. Boration and dilution should be used to assist rod movement to compensate for the following:
  - Maintain T_{avg} within 1°F of T_{ref}.
  - To force the Axial Flux Difference to the target AFD during Reactor power changes.
  - To keep the Axial Flux Difference within the AFD administrative band during reduced power operation.
  - To dampen Xenon Oscillations as described on Attachment 2.

5.5 A. Reactor Operation (continued)

- If there is reason to believe Rods may step when going to Auto from Manual, Rod motion demand for automatic rod motion can be checked. Verify the Circuit 1 output LED (outward motion) and the Circuit 2 output LED (inward motion) are OFF. Located in RK-08, CF06, Card 41, labeled 1-SB-0412A and 1-SB-0412B.

- Alternate dilution may be used to compensate for fuel burnup as long as RCS hydrogen concentration can be maintained within specifications.

- Steady State implies that temperatures, pressures, and flows are stable such that the nominal value of reactor power remains stable, subject to statistical uncertainties and normal fluctuations (e.g., feedwater oscillations).

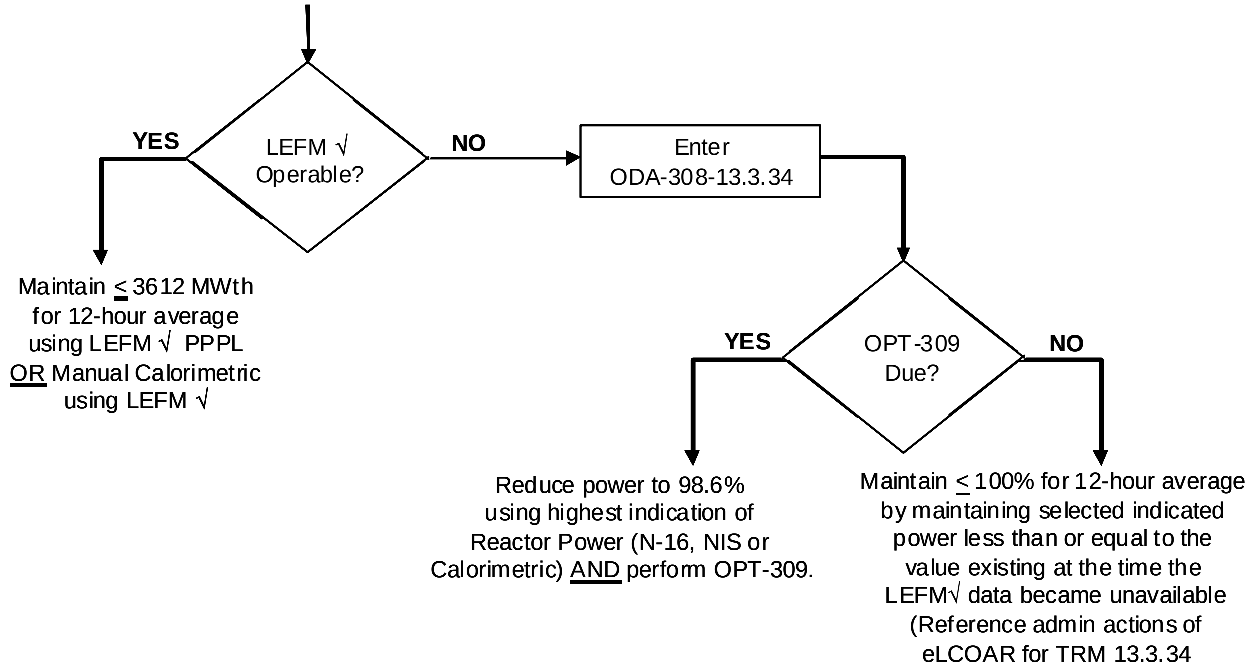
- The 2 hour and 12 hour averages are monitored and trended to ensure compliance with the licensed thermal limit. The 1 hour average is used to control/trend thermal power. Utilizing the 1 hour average ensures that the 2 hour and 12 hour averages are maintained < RTP. Other averages (1m, 15m, 30m, 1h, 8h) may be used for trending and anticipatory response to changing plant conditons. Averages < 1 hour are used for trending purposes only due to large variations associated with feedwater oscillations, changes in reactive load, etc.

- The average thermal power level over any 12 hour period shall not exceed:

  - 3612 MWth (100% RTP) when the LEFM✔ has been used to perform last calorimetric per SR 3.3.1.2, or

  - 3562 MWth (98.6% RTP) when the Feedwater Venturis (or MCB indication) have been used to perform the last calorimetric per SR 3.3.1.2 (TR 13.3.34).

5.5.A. • The following flowchart provides a simplified guideline for maintaining Unit 1 plant power. A detailed description is given in the subsequent paragraphs.



- The Plant Computer, Primary Plant Performance Calorimetric using the LEFM ✔ is the preferred method for measurement of Thermal Power per OPT-309. Thermal Power may be monitored using the Plant Computer, Primary Plant Performance Calorimetric form LEFM ✔ (POWERL) when this indication is available and LEFM ✔ has been used to perform last calorimetric. Operation at a RTP of 3612 MWth is allowed when the LEFM ✔ is used for feedwater flow in the calorimetric measurement. In this configuration, accident analysis requires a ± 0.6% RTP allowance for the calorimetric uncertainty.

- <u>IF</u> the LEFM ✔ becomes unavailable during the intervals between performance of SR 3.3.1.2 for the OPT-309 calorimetric measurement, <u>THEN</u> operation may continue using highest indication of Reactor power (N-16, NIS or Calorimetric). <u>A preparatory turbine power reduction of ~ 0.5MWe may be taken to ensure that power remains at or below 100%.</u>

- <u>WHEN</u> the LEFM ✔ or POWERL is NOT available, <u>THEN</u> the Plant Computer, Primary Plant Performance Calorimetric using the Corrected Feedwater Venturis (POWERC) provides the next desired method for measurement and monitoring of Thermal Power. Operation is restricted to a Thermal Power of 3562 MWth when the Feedwater Venturis are used for feedwater flow in the calorimetric measurement. In this configuration, the accident analysis requires a ± 2% RTP allowance for the calorimetric uncertainty.

5.5 A. Reactor Operation (continued)

- IF the Plant Computer is NOT available, THEN operation may continue using highest power indication of Reactor power from N-16 or NIS to monitor Thermal Power. OPT-309 manual calculation (using a validated computer program on the Control Room PC) may be used for measurement of Thermal Power if the Plant Computer, Primary Plant Performance Calorimetric is NOT available. Operation is restricted to a Thermal Power of 3562 MWth when the Feedwater Venturis are used for feedwater flow in the calorimetric measurement. In this configuration, the accident analysis requires a ± 2% RTP allowance for the calorimetric uncertainty.

- While maintaining power near the Rated Thermal Power limit, Reactor thermal power should be monitored at least once every thirty (30) minutes. This may be accomplished using the Plant Computer, Primary Plant Performance Calorimetric. IF a planned outage of the Plant Computer or LEFM ✔ is scheduled AND NIS or N16 indicates greater than 100% RTP (3612 MWth), THEN a calorimetric should be performed and the NIS and N16 channels should be adjusted per OPT-309.

- Performance of the calorimetric using venturis (POWERC, POWERV, or MANUAL with venturis) during extended power operation below 55% RTP AND a subsequent reduction in NIS Power Range or N-16 channel output has the potential to place the Unit in a condition outside the safety analysis limit (i.e reactor trip originating from Power Range or N-16 indication may be above that value assumed in the safety analysis). Therefore additional controls exist in ODA-308-13.3.34 for performance of a calorimetric using FW venturis with the Unit operating in extended power operation below 55% RTP.

- A power reduction, such as required by OPT-217A near end of core life requires special consideration for managing reactivity. The amount of boron used to reduce Reactor power must be minimized to limit the amount of dilution and subsequent time requirements for return to power. Utilizing BTRS or an unsaturated CVCS demineralizer should be considered to limit dilution volumes. Core Performance Engineering may be contacted to provide recommendations for ramp rates, ΔI control and a pre-planned core reactivity balance for scheduled power reductions. This information may be used as a job aid to provide general guidelines for conducting power reductions.

- Near end of core life, power coastdown may be initiated to extend the time to Refueling. Approximately 2% power/day will be required to maintain Tavg within 1°F of Tref. Core Performance Engineering may modify existing ΔI administrative controls, as required, to provide for optimal fuel utilization prior to reload.

- WHEN Reactor power will be increased by $\geq$20%, THEN ODA-308 should be reviewed to determine whether additional $F_Q(Z)$ measurements will be required.

5.5 A. Reactor Operation (continued)

- Power Change Log should be initiated during UP-POWER evolutions >20% when reactor power is >20% Rated Thermal Power OR during any UP-POWER when ramp rate limit is < 15% per hour (typically for fuel conditioning) when reactor power is >20%. |

[C]
- Thermal power changes $\geq$15% of Rated Thermal Power within 1 hour requires notification of Chemistry and Radiation Protection as soon as possible. This allows them to perform required sampling surveillances within the specified time limits (TS SR 3.4.16.2, ODCM 4.11.2.1.1.2 and 4.11.2.1.1.3)

5.5 B. Secondary Operation

- Operate the Turbine generator within the limits specified in TDM-401A.
- Attachment 6 may be utilized to reduce power, as required, to perform stroke testing on the Main Turbine Stop and Control Valves.
- Periodically monitor Circulating Water inlet temperature and operate CWPs to optimize efficiency per TDM-310A.
- Normal full flow through Turbine Gland Steam Condenser (1140 gpm) is based on erosion of tubes. Short term operation with flow >1140 gpm but <1280 gpm is permitted. 1CO-0255 may be throttled as necessary to maintain <1140 gpm as indicated on 1-FI-2243, TURB GLND STM CNDSR CNDS FLO.
- The Low Pressure Turbine installed during 1RF10 provides more extraction steam drain flow to the Heater Drain Tanks than the Heater Drain Pumps can forward flow. The inability of the Heater Drain Pumps to maintain Heater Drain Tank level will be indicated by the Heater Drain Pump discharge valve being full open or Heater Drain Tank alternate drain valve opening. The Condensate Pump Recirc valve may be placed in manual and opened to redirect a portion of the Condensate Pump flow back to the condenser. This will reduce the pressure at the discharge of the Heater Drain Pumps and increase Heater Drain Pump flow. Feedwater Pump suction pressure should be closely monitored while throttling 1-FV-2239. During throttling of 1-FV-2239, the following valves should be monitored for the desired effect:
  - 1-ZL-2594, HDT ALT DRN VLV - FULL CLOSED
  - 1-LK-2592,HDP DISCH VLV - Less than 100% OPEN
- When 1-FK-2239, CNDS PMP RECIRC CTRL is throttled for the purpose above, the TRIP-TO-AUTO feature shall be enabled using the Toggle Switch on the controller. With the Switch in the "TRIP-TO-AUTO ENABLE" position the controller will trip to Auto on a low flow condition.

5.5 C. General

- Inform Core Performance Engineering of any substantial reduction in power (>25%). |

- Maximum Generation Verification testing (ETP-110A-3, Comanche Peak Unit 1 Power Capability Verification) should be performed upon request from the QSE Generation Controller.

- When an electric grid “Hands Off” Condition has been declared OR QSE Generation Controller or TGM Transmission Grid Controller has informed unit that grid conditions exist such that inadequate voltage may exist on loss of a unit, perform the following:

    - Evaluate surveillance testing or high risk activities which may jeopardize unit availability can be minimized as much as practical.

    - Notify WCC Work Week Coordinator of declared condition.

    - For potential inadequate voltage, refer to ABN-601 for potentially degraded off-site power system voltage.

- When an outage is planned within the next four week period, review Attachment 5 to determine whether system alignments or other activities should be initiated prior to the outage.

[L] D. Normal Load adjustments during high power conditions to maintain 100% load.

1) If desired to use the "↑ 0.2MW" or "↓ 0.2MW" load adjustment controllers, perform the following:

a. OPEN the desired OSD

☐ ↑ 0.2MW

☐ ↓ 0.2MW

b. Verify the desired OSD is open:

☐ 0.2MW INCREASE

☐ 0.2MW REDUCTION

☐ c. Select the"0/1" button

☐ d. EXECUTE

e. Close the selected OSD

☐ 0.2MW INCREASE

☐ 0.2MW REDUCTION

2) Normal Load adjustments during high power conditions to maintain 100% load.

☐ a. OPEN the "LOAD TARGET" OSD.

☐ b. Verify the open OSD is the "LOAD TARGET".

☐ c. Determine new Load Target Value desired.

☐ d. Select the "Blue" Bar and enter the desired LOAD.

☐ e. ACCEPT

☐ f. Verify the value in the "Blue Bar" is the desired Load Target. (correct magnitude and direction)

☐ g. EXECUTE

☐ h. Verify "Load Target" changes to desired load.

☐ i. Close the "LOAD TARGET" OSD.

[L] 5.5 E. Adjusting Voltage with the Main Generator synchronized to the Grid and Voltage Control in Auto to control MVARs/Grid Voltage.

NOTE: When directed to adjust generator output voltage, actions to comply shall be performed within 5 minutes or provide an explanation to the entity that requested the change.

☐ 1) Open "GEN VOLTAGE TARGET" OSD.

☐ 2) Verify the open OSD is “GEN VOLTAGE TARGET”.

CAUTION: If the other Unit is synchronized to the Grid, coordinate with the other Unit to adjust MVARs.

☐ 3) Click the appropriate RAISE or LOWER "Blue" Arrow.

☐ 4) EXECUTE

☐ 5) Verify MVARs and SWYD Voltage respond in the correct direction.

☐ 6) WHEN the desired value is reached, THEN click the "Stop" Button.

☐ 7) Close the "GEN VOLTAGE TARGET" OSD.

NOTE:
- Operation with the LEFM calorimetric out of service is covered by TRM 13.3.34, and is not covered by the following guidance.
- The Plant Computer LEFM calorimetric calculation is calculated roughly once per minute. Due to normal fluctuations in the field instrumentation signals, the calculated value of The Plant Computer LEFM calorimetric calculation will vary slightly from minute to minute. As a result, the one-hour average value should be used as the primary basis for evaluating average Rx power level.
- With restoration of the LEFM Calorimetric Program from a failed condition OR reboot of the Plant Computer from a failed condition, all “POWER LEFM” VALUES (1M, 15M, 30M, 1H, 2H, 8H and 12H) on the POWERL Screen will be updated to the instantaneous value calculated by the LEFM Calorimetric Program. The resulting indication will remain as shown for the duration of the applicable time interval, which will not accurately reflect changes in the actual thermal power for the same duration. ODA-308-13.3.34-S01 provides guidance for the restoration of the LEFM.

F. Operational Guidance for operating above 99.00% RTP (3575.88 MWth).

1) No actions are allowed that would intentionally raise core thermal power above 3612.00. Small, short-term fluctuations in power that are not under the direct control of a license reactor operator (e.g., fluctuations caused by secondary-side control valve oscillations, grid fluctuations) are not considered intentional.

2) At no time shall the twelve-hour average calculated power level be allowed to exceed 3612.00 MWth.

5.5 F. 3) Following Rx power adjustments above 99.00% RTP (3575.88 MWth), the value of the Plant Computer LEFM 30 Minute Averaged calorimetric calculation should be monitored frequently for at least 30 minutes. This assessment is made to give the Unit RO reasonable assurance that the two hour average power level will be less than or equal to 3612.00 MWth.

4) At steady-state conditions, adjustments to keep the plant at 3612.00 MWth will be performed at varying frequencies depending upon plant conditions and time in core life. Positive adjustments to Rx power will be based on the current one-hour average power level.

5) Whenever the one-hour average Plant Computer LEFM calorimetric calculation indicates greater than 3612.00 MWth the Unit RO should assess the current calculated Rx power level and trend. The Unit RO should take action, as necessary, to ensure that avg Rx power is trending to a calculated value that is less than or equal to 3612.00 MWth.

6) Closely monitor thermal power during steady state power operation with the goal of maintaining the two-hour thermal power average at or below 3612.00. If the core thermal power average for a 2-hour period is found to exceed 3612.00, timely action shall be taken to ensure that thermal power is less than or equal to 3612.00. The Shift Operations Manager should be notified.

NOTE: A preparatory power reduction is not necessary for evolutions which results in a relatively slow increase in reactivity (e.g. routine dilution, rod step for ΔI control). During evolutions which may slowly increase reactor power, monitoring and adjustments should be performed as necessary to ensure the one hour average power remains < 3612.00 MWth.

7) For pre-planned evolutions that could affect primary or secondary temperatures, pressures or flows:

a. Determine if the evolution is expected to cause a transient increase in reactor power (e.g., TDAFWP run, cycling drip-pots)

b. If the evolution is expected to cause a transient increase in reactor power that will exceed the 3612.00, prudent action based on prior performance or evaluations should be taken to reduce power prior to performing the evolution (i.e. lowering power prior to starting the TDAFWP when it is anticipated that power may exceed 3612.00 is considered prudent action)

8) The following performance deficiencies should be documented on a SmartForm per STA-421:

a. <u>Raising power with the intent of exceeding 3612.00 MWth for any period of time.</u>

b. Failure to take timely action to lower thermal power to less than or equal to 3612.00 when the two hour average exceeds 3612.00.

c. Permitting the 12 hour average power to exceed 3612.00.

d. Failure to take action prior to a pre-planned evolution that is expected to cause a power increase that will exceed 3612.00 on the two hour average.

G. Electric Grid Support Activities:

1) Main Generator Voltage (345 KV Switchyard)

- Maintain generator voltage as directed by QSE or ONCOR TGM and in accordance with CPNPP Operating procedures.
- Automatic Voltage Regulator (AVR) should be maintained in “AUTO” when the Unit is online and released. If the AVR is transferred to “MANUAL”, then notify the QSE within 10 minutes and maintain voltage as directed.
- When directed to adjust generator output voltage, actions to comply shall be performed within 5 minutes or provide an explanation to the entity that requested the change.
- The Unit(s) shall not reduce high reactive loading on individual units during abnormal conditions without the consent of the QSE Generation Controller, unless equipment damage is imminent.

2) Logging activities: (Always include names of individuals contacted)

- Any change in real (MW) or reactive (MVAR) capability of the unit.
- Non-routine communications to/from Transmission Grid Controller or QSE Generation Controller.
- Voltage change requests - if the voltage change request cannot be performed, then notify the requesting entity and provide the technical justification for not complying with the request. Log the time of notification, the individual’s name notified, and the reason.

3) QSE Generation Controller notifications:

- Any failure, degradation, or mis-operation of automatic generator protection systems that resulted in, or could have resulted in:
  a) Loss of $\geq$ 1000 MW of generation.**
  b) Sustained switchyard voltage excursions $\geq$ 34.5 KV.**
  c) Major damage to plant components that changes generation output.**
  d) When a generator protective relay mis-operation occurs or has been identified as defined by Corporate Procedure G-3035.**
- Inability to comply with a voltage request. Provide the technical justification for not complying with the request. Log the time of notification, the individual’s name notified, and the reason.
- Any planned shutdown due to Technical Specifications or component problems. Then enter a forecasted condition into Nodal GAPS.
- Any change in real MW (25 MWe or more) or reactive (MVAR) power or capability of the unit. If possible, notify QSE prior to making load changes of more than 10 MWe*

G. 3)
- High reactive loading or reactive oscillations (as soon as possible) |
- When a Unit trips offline due to voltage or reactive problems (as soon as possible) |
- Any change in power ramp rate capability.
- Any change in the automatic voltage regulator (AVR) status (manual/auto).*

* Notifications are to be made to the QSE Generation Controller within 10 minutes and give restoration status (if known) and have QSE inform ERCOT Operations, input into Nodal GAPS, and a follow-up notification to the Transmission Grid Controller (for their RTCA model update).

The new corporate procedure has standard phraseology they recommend using such as:

““The Automatic Voltage Regulator for Comanche Peak Unit 1 is not in Automatic and is being operated in the Manual mode. The AVR is expected to return to Automatic mode at (time & date). Please communicate this information to ERCOT operations immediately.””

““The Automatic Voltage Regulator for Comanche Peak Unit 1 is now back in normal operation in the Automatic mode as of (time). Please communicate this information to ERCOT operations immediately.””

** Notify the Duty Manager of this “grid reportable” event for appropriate notifications To the Plant Manager. (STA-501 NR-41)

4) Testing: |

- Maximum Generation/Capacity verification per ETP-110A-3 should be performed when requested by the QSE Generation Controller.
- Maximum Reactive Capacity testing per ETP-110A-1 or 2 should be performed:

a) Biennially per POD schedule.

b) When requested by the QSE Generation Controller AND coordinated with Operations Management and Work control.

5) General: |

- Notifications, GAPS updates, and its respective logging activities should be done in a timely fashion following stabilization of the plant. Off site grid authorities need pertinent CPNPP information to ensure grid stability.
- Hands Off & Grid Notifications - OPGL 41
- Voltage/Frequency issues - ABN-601
- STA-501 ERCOT/NERC/DOE Report NR-41

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ATTACHMENT 2
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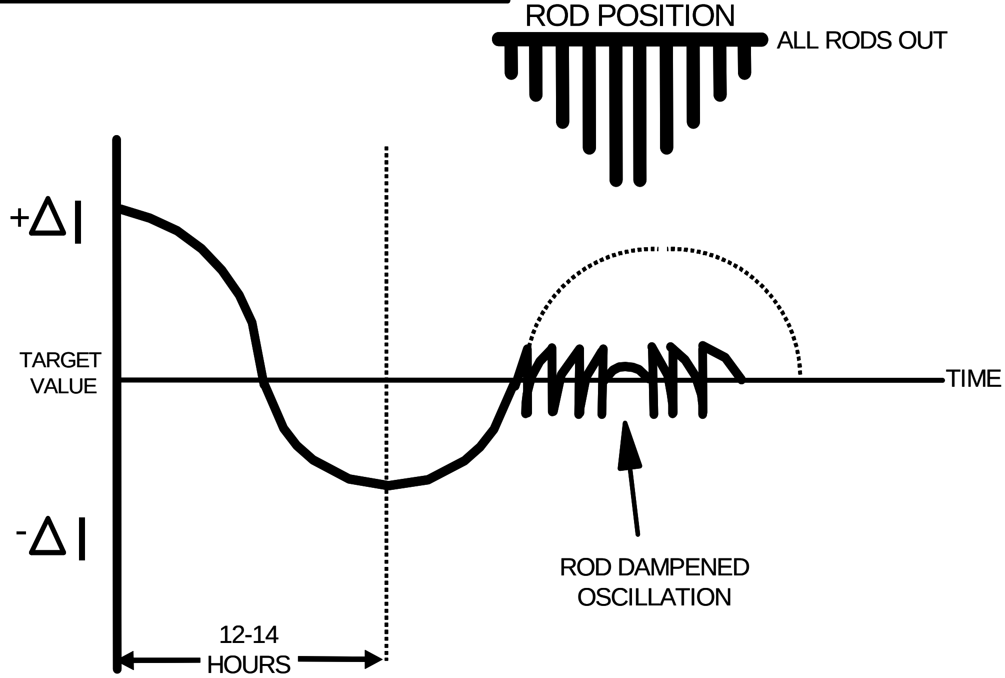
DELTA I CONTROL/DAMPENING XENON OSCILLATIONS

If a ΔI swing is greater than ±1.5%, or uncontrollable due to size or unavailability of rods, or the operator has any questions about controlling the ΔI swing, contact Core Performance Engineering for guidance in controlling ΔI. This attachment should be used as a general guideline during slow, controlled power changes.
Xenon oscillations should be dampened out. The method discussed in this attachment is only applicable to ΔI swings less than 1.5%. Xe swings are controlled by continually forcing ΔI to the target value. This method will usually dampen small Xe swings in approximately 12 hours or through one peak.

CONSTANT AXIAL OFFSET CONTROL



ΔI can be maintained using a combination of the following:

- With ΔI more negative than the target, initiate boration and use rod withdrawal to bring ΔI to the target and then maintain the target value.
- With ΔI more positive than the target, initiate dilution and use rod insertion to bring ΔI to the target and then maintain the target value.

IF THERE ARE ANY QUESTIONS OR THE ΔI SWING is >1.5%, CONTACT CORE PERFORMANCE ENGINEERING FOR GUIDANCE.

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ATTACHMENT 3
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POWER CHANGE WORKSHEET

Power Change Reactivity Calculation

Unit ____ Cycle ____ Date ________ Time ______ Page 1 of 3

A. Obtain Current Plant Conditions

A.1 RCS Boron __________ ppm A.4 Core Burnup __________ MWD/MTU

A.2 Power Level __________ % RTP A.5 Burnup Range __BOL __MOL __EOL

A.3 CBD Position __________ steps *[Reference NDR Section 5.1 for Burnup Range]*

Note: Core Burnup should be obtained from CHORE. If CHORE is not available, estimate Core Burnup using the following formula.

Burnup Estimate = [Number of Days the Cycle has Operated] x 44

B. Estimate Target CBD Position

B.1 Target Power Level (or Target MWe / HFP MWe x 100%) __________ % RTP

IF planning a Power DECREASE (B.1 < A.2), **THEN** B.2 =

$$\underset{\text{Current CBD Position [A.3]}}{\underline{\qquad}} + \left[\underset{\text{Target Power Level [B.1]}}{\underline{\qquad}} - \underset{\text{Current Power Level [A.2]}}{\underline{\qquad}}\right] \times \left[\underset{\text{Core Burnup [A.4]}}{\underline{\qquad}} + 8{,}000\right] / 12{,}000$$

IF planning a Power INCREASE (B.1 ≥ A.2), **THEN** B.2 =

$$\underset{\text{Current CBD Position [A.3]}}{\underline{\qquad}} + \left[\frac{\left(215 - \underset{\text{Current CBD Position [A.3]}}{\underline{\qquad}}\right) \times \left(\underset{\text{Target Power Level [B.1]}}{\underline{\qquad}} - \underset{\text{Current Power Level [A.2]}}{\underline{\qquad}}\right)}{\left(100 - \underset{\text{Current Power Level [A.2]}}{\underline{\qquad}}\right)}\right]$$

B.2 Target CBD Position = __________ steps

C. Power Defect Reactivity Change

Determine change in Reactivity due to Power Defect, based on current RCS Boron, using:

NDR Table 5.1 for BOL	*NDR Table 5.2 for MOL*	*NDR Table 5.3 for EOL*

C.1 Absolute Value of Power Defect at Current Power Level [A.2] = __________ pcm

C.2 Absolute Value of Power Defect at Target Power Level [B.1] = __________ pcm

C.3 Δ Power Defect = [C.1] - [C.2] = __________ pcm

NOTE: [C.1] and [C.2] should always be positive (+) values. [C.3], Δ Power Defect, will be positive (+) for a power DECREASE, negative (-) for a power INCREASE.

If desired, use pages 4-6 of Att 3 as a guide for NDR Table Interpolation.

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ATTACHMENT 3
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POWER CHANGE WORKSHEET

Power Change Reactivity Calculation

Unit ____ Cycle ____ Date __________ Time ______ Page 2 of 3

D. Control Rod Motion Reactivity Change

Determine change in Reactivity due to Control Rod Motion, using:

NDR Figure 5.16 for BOL *NDR Figure 5.17 for MOL* *NDR Figure 5.18 for EOL*

D.1 Absolute Value of CBD Integral Worth at Current CBD Position [A.3] = __________ pcm

D.2 Absolute Value of CBD Integral Worth at Target CBD Position [B.2] = __________ pcm

D.3 Δ Control Rod Worth = [D.1] - [D.2] = __________ pcm

NOTE: [D.1] and [D.2] should always be positive (+) values. [D.3], Δ CR worth, will be negative (-) for Rod INSERTION, and positive (+) for a Rod WITHDRAWAL.

E. Determine Reactivity Worth Required from Boron Adjustment

E.1 Δ Boron Worth = [__________ + __________] x [-1] = __________ pcm
(Δ CR Worth [D.3]) (Δ Power Defect [C.3])

NOTE: [E.1], Δ Boron Worth, will be negative (-) when BORATION is needed, and positive (+) when DILUTION is needed.

F. Determine Integral Boron Worth at Current Conditions

For this section, utilize the following NDR tables.

NDR Table 5.10 for BOL *NDR Table 5.11 for MOL* *NDR Table 5.12 for EOL*

Utilize a CORE AVERAGE TEMPERATURE value of 557 degrees F to determine the worth.

F.1 Integral Boron Worth at __________ ppm = __________ pcm
(Current RCS Boron [A.1])

NOTE: [F.1] will always be a negative (-) reactivity value.

If desired, use pages 4-6 of Att 3 as a guide for NDR Table Interpolation.

G. Determine Target RCS Boron Value

G.1 Target Integral Boron Worth = [__________ + __________] = __________ pcm
([F.1]) ([E.1])

G.2 Target RCS Boron value (using Tables from F above, at 557 deg F) = __________ ppm

NOTE: If desired, use pages 4-6 of Att 3 as a guide for NDR Table Interpolation.

H. Determine RCS Boration / Dilution Volume

Determine appropriate Boration OR Dilution volume using CHORE or TDM-201A/B, to change RCS Boron from [A.1] to [G.2]

H.1 Check appropriate method for RCS Boron change: ☐ Boration Volume ☐ Dilution Volume

H.2 Volume Required: = __________ gallons

CPNPP INTEGRATED PLANT OPERATING PROCEDURES MANUAL	UNIT 1	PROCEDURE NO. IPO-003A
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ATTACHMENT 3
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POWER CHANGE WORKSHEET

Power Change Reactivity Calculation

Unit ____ Cycle ____ Date __________ Time ______ Page 3 of 3

NOTE: This calculation does **NOT** include any adjustments for changes in Xenon worth from the equilibrium value at a power level of [A.1].

If Power is being **DECREASED** from steady state, Xenon will initially build in due to the decrease in flux, adding negative reactivity. Therefore boration should be reduced for a slower power change.

If Power is being **INCREASED** from steady state, the higher flux will result in an initial reduction in Xenon, adding positive reactivity. Therefore the dilution volume should be reduced from the estimate for a slower power change.

If possible, discuss Xenon impacts, AFD control strategies, and schedule with Core Performance Engineering prior to the power change.

I. Summary of Results

To change power immediately from __________ (Current Power Level [A.2]) to __________ (Target Power Level [B.1]), it is estimated that

__________ (Volume [H.2]) gallons of __________ (Bor or Dil [H.1]) will be required, and CBD final position will

be approximately __________ (Target CBD Position [B.2]) steps.

Comments: ____

____

____

____

____

____

____

Performed By (RO): ______________________ Date: __________
Reactor Operator Review: ______________________ Date: __________
Unit Supervisor: ______________________ Date: __________

CPNPP INTEGRATED PLANT OPERATING PROCEDURES MANUAL	UNIT 1	PROCEDURE NO. IPO-003A
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POWER CHANGE WORKSHEET

Interpolation Guide for Power Change NDR Reactivity Calculation

This attachment provides guidance for interpolation of values on Attachement 3 Pages 1-3, using the NDR Tables as referenced in the applicable step.

Value [C.1] - Power Defect at Current Conditions

X = Current Boron (ppm) [value A.1]	X = ________	ppm
Y = Current Power Level (% RTP) [value A.2]	Y = ________	% RTP
X_1 = First Boron on NDR Table LESS than or equal to X	X_1 = ________	ppm
X_2 = First Boron on NDR Table HIGHER than X	X_2 = ________	ppm
Y_1 = First Power on NDR Table LESS than or equal to Y	Y_1 = ________	% RTP
Y_2 = First Power on NDR Table HIGHER than Y	Y_2 = ________	% RTP

Step 1

(________) +
Power Defect (X_1, Y_1)

([________ - ________] / [________ - ________] x [________ - ________])
X, X_1, X_2, X_1, Power Defect (X_2, Y_1), Power Defect (X_1, Y_1)

= ________
Power Defect (X, Y_1)

Step 2

(________) +
Power Defect (X_1, Y_2)

([________ - ________] / [________ - ________] x [________ - ________])
X, X_1, X_2, X_1, Power Defect (X_2, Y_2), Power Defect (X_1, Y_2)

= ________
Power Defect (X, Y_2)

Step 3

(________) +
Power Defect (X, Y_1)

([________ - ________] / [________ - ________] x [________ - ________])
Y, Y_1, Y_2, Y_1, Power Defect (X, Y_2), Power Defect (X, Y_1)

[C.1] = ________
Power Defect (X, Y)

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POWER CHANGE WORKSHEET

Value [C.2] - Power Defect at Target Conditions

X = Current Boron (ppm) [value A.1]	X = ________ ppm
Y = Target Power Level (% RTP)	Y = ________ % RTP
X_1 = First Boron on NDR Table LESS than or equal to X	X_1 = ________ ppm
X_2 = First Boron on NDR Table HIGHER than X	X_2 = ________ ppm
Y_1 = First Power on NDR Table LESS than or equal to Y	Y_1 = ________ % RTP
Y_2 = First Power on NDR Table HIGHER than Y	Y_2 = ________ % RTP

Step 1

([______ - ______] / [______ - ______] x [______ - ______]) + (______)

$$\left(\frac{[X - X_1]}{[X_2 - X_1]} \times [\text{Power Defect }(X_2, Y_1) - \text{Power Defect }(X_1, Y_1)] \right) + (\text{Power Defect }(X_1, Y_1))$$

= ______ Power Defect (X, Y_1)

Step 2

([______ - ______] / [______ - ______] x [______ - ______]) + (______)

$$\left(\frac{[X - X_1]}{[X_2 - X_1]} \times [\text{Power Defect }(X_2, Y_2) - \text{Power Defect }(X_1, Y_2)] \right) + (\text{Power Defect }(X_1, Y_2))$$

= ______ Power Defect (X, Y_2)

Step 3

([______ - ______] / [______ - ______] x [______ - ______]) + (______)

$$\left(\frac{[Y - Y_1]}{[Y_2 - Y_1]} \times [\text{Power Defect }(X, Y_2) - \text{Power Defect }(X, Y_1)] \right) + (\text{Power Defect }(X, Y_1))$$

[C.2] = ______ Power Defect (X, Y)

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Value [F.1]

X = Current Boron (ppm) [value A.1] X = ______ ppm
X_1 = First Boron on NDR Table LESS than or equal to X X_1 = ______ ppm
X_2 = First Boron on NDR Table HIGHER than X X_2 = ______ ppm

Integral Boron Worth (X, 557) = ______ Int Boron Worth (X_1, 557)

+ ([______ X - ______ X_1] / [______ X_2 - ______ X_1] x [______ Int Boron Worth (X_2, 557) - ______ Int Boron Worth (X_1, 557)])

[F.1] = ______ Int Boron Worth (X, 557)

Value [G.2]

Y = Target Int Boron Worth [Value G.1] Y = ______ pcm
Y_1 = First Int Boron Worth at 557 degrees on NDR Table which is MORE POSITIVE than, or equal to, Y Y_1 = ______ pcm
Y_2 = First Int Boron Worth at 557 degrees on NDR Table which is MORE NEGATIVE than Y Y_2 = ______ pcm
X_1 = Boron on NDR Table which corresponds to Y_1 X_1 = ______ ppm
X_2 = Boron on NDR Table which corresponds to Y_2 X_2 = ______ ppm

Target RCS Boron = ______ X_1

+ ([______ Y - ______ Y_1] / [______ Y_2 - ______ Y_1] x [______ X_2 - ______ X_1])

[G.2] = ______ Target RCS Boron

COMMENTS:______

ATTACHMENT 6A
PAGE 1 OF 5

DOWN POWER TO APPROXIMATELY 700 MWE

NOTE:
- This section may be used for NODAL MARKET BACKDOWN or for other reasons requiring a power reduction to an intermediate value or minimum of approximately 700 MWE.
- Core Performance Engineering should be informed of any substantial reduction in power (>25%).
- Primary plant should lead secondary plant during Main Turbine load changes.

1. Notify QSE Generation Controller and update GAPS to "Create Current" from the "Forecasted Condition" prior to reducing load.

_______/_______
Initials Date

NOTE: For power changes greater than 5%, a reactivity plan should be developed using one of the sources below. (Listed in order of preference)
- IF time and resources support generation of a BEACON projection (for a pre-planned power maneuver), THEN contact Core Performance Engineering for support, and utilize the approved results as the reactivity plan.
- IF the power change closely matches one of the down-power scenarios available in the Reactivity Briefing Sheets (printed from CHORE), THEN utilize the appropriate currently approved reactivity plan (interpolation between values on the Boration Matrix is allowed). |
- IF the above two options are not available or do not fit the current scenario, THEN perform a NDR based reactivity calculation per Attachment 3 or equivalent CHORE output

[C] 2. IF Reactor power will be decreased by $\geq$15% within a one hour period, THEN notify Chemistry and Radiation Protection. (TS SR 3.4.16.2, ODCM 4.11.2.1.1.2, 4.11.2.1.1.3)

_______/_______
Initials Date

ATTACHMENT 6A
PAGE 2 OF 5

DOWN POWER TO APPROXIMATELY 700 MWE

NOTE:

- During the initial reduction in power, a combination of control rod insertion and boration should be used to compensate for changes in reactivity due to power defect. This will allow the control rods to be available to compensate for the reactivity due to Xenon following the power reduction.
- During a down power, operators should adjust the pots (1-SK-0509B and 1-SK-0509C) to maintain the difference between the FWPT speeds within the desirable range.
- FWPT speed deviation from commanded speed during a normal downpower may be an indication of binding in a FWPT control valve, guidance for this event is located in ABN-302 Sect. 9.0, FEEDWATER PUMP CONTROL SYSTEM MALFUNCTION.

3. Perform the following to reduce Turbine load to approximately 60% (700 MWE) or the desired intermediate load:

   A. IF desired, THEN determine the amount of boration required to reduce Reactor power to approximately 60% (700 MWE) or the desired intermediate load using using the appropriate currently approved Reactivity Projection. |

   .

   ______/______
   Initials Date

   B. IF desired, THEN determine the rate of boration required to allow slow control rod inward motion as the turbine load decreases, using the appropriate currently approved Reactivity Projection. |

   ______/______
   Initials Date

   C. Refer to Attachment 2 for guidance in controlling AFD during power ramps.

   ______/______
   Initials Date

   D. Initiate RCS boration/dilution using SOP-104A.

   ______/______
   Initials Date

ATTACHMENT 6A
PAGE 3 OF 5

DOWN POWER TO APPROXIMATELY 700 MWE

E. If desired to enhance boron mixing, energize additional Pressurizer Backup heaters.

_______/_______
Initials Date

F. On the TG Display in the "Load Control" Section, set in the desired unloading rate using the Load Rate Setpoint Controller

_______/_______
Initials Date

NOTE:	The load will immediately begin decreasing to the setpoint value at the rate set on the Load Rate Setpoint Controller. The LOAD RATE may be readjusted as necessary.

G. In the "Load Control" Section, lower the Load Target Setpoint Controller as necessary to obtain 700 MWE or the desired intermediate load to control turbine load.

_______/_______
Initials Date

H. IF MSR's are to be removed from service, THEN open:

- 1HD-0933, HTR DRN SYS MSR 1-A XS HTG STM ORIF UPSTRM ISOL VLV
- 1HD-0937, HTR DRN SYS MSR 1-B XS HTG STM ORIF UPSTRM ISOL VLV

_______/_______
Initials Date

I. Stabilize Turbine load at desired power level until released to return to 100%.

Initials/ Date

CAUTION:	• Observe Fuel conditioning limits during all Reactor power increases. • Control Rods should NOT be placed in automatic until the fuel is fully conditioned to 100% power.

NOTE:	• For power changes greater than 5%, a reactivity plan should be developed (BEACON, CHORE or NDR reactivity calculation). When calculating the boration/dilution volume refer to note 4.2.26 to determine the source of the reactivity plan. • Primary plant should lead secondary plant during Main Turbine load changes.

4. Perform the following to raise Reactor power to 98%:

A. IF desired, THEN determine the amount of dilution required to raise Reactor power to approximately 98% using the appropriate currently approved Reactivity Projection. |

_______/_______
Initials Date

ATTACHMENT 6A
PAGE 4 OF 5

DOWN POWER TO APPROXIMATELY 700 MWE

B. IF desired, THEN determine the rate of dilution required to allow slow control rod outward motion as the Turbine load increases, using the appropriate currently approved Reactivity Projection. |

_______ / _______
Initials Date

C. Refer to Attachment 2 for guidance in controlling AFD during power increases.

_______ / _______
Initials Date

D. Initiate RCS boration/dilution using SOP-104A.

_______ / _______
Initials Date

E. In the "Load Control" Section, set in the desired loading rate using the Load Rate Setpoint Controller.

_______ / _______
Initials Date

NOTE:
- The load will immediately begin increasing to the setpoint value at the rate set on the Load Rate Setpoint Controller. The LOAD RATE may be readjusted as necessary.
- It may be necessary to raise Turbine Load in increments to maintain Ramp Rate Restrictions.

F. In the "Load Control" Section, raise the Load Target Setpoint Controller as necessary to obtain a Turbine Load that corresponds to 98% Rx Power while controlling the rate of Turbine power increase.

_______ / _______
Initials Date

G. WHEN Reactor power is approximately 98%, THEN perform a calorimetric per OPT-309.

_______ / _______
Initials Date

ATTACHMENT 6A
PAGE 5 OF 5

DOWN POWER TO APPROXIMATELY 700 MWE

> CAUTION: Reactor power shall be closely monitored to avoid exceeding 100% Reactor power.

H. In the "Load Control" Section, raise the Load Target Setpoint Controller as necessary to maintain 3612 MWth Reactor power as indicated on the Plant Computer PPP Calorimetric (See flowchart in Section 5.5 for power limitations if PPPC is not available).

_______/_______
Initials Date

I. IF step 3.H was performed, THEN perform Attachment 6B to adjust MSR excess heating steam flow.

_______/_______
Initials Date

> CAUTION: Control Rods should NOT be placed in automatic until the fuel is fully conditioned to 100% power.

J. When Reactor power is at 100% or desired power level:

- Ensure 1/1-RBSS, CONTROL ROD BANK SELECTOR in AUTO.

  _______/_______
  Initials Date

- Notify QSE Generation Controller and update GAPS to "End Current Condition" to show that this power limitation is no longer applicable.

  _______/_______
  Initials Date

K. When improved boron mixing is no longer required, deenergize those additional Pressurizer Backup Heaters energized at Step 3.E.

_______/_______
Initials Date

L. Refer to Section 5.5 to maintain constant Turbine load.

_______/_______
Initials Date

UNIT SUPERVISOR RELIEF CHECKLIST

UNIT: 1

PART I TO BE PREPARED BY THE OFF-GOING UNIT SUPERVISOR.

1.0 SHIFT ACTIVITIES:

1.1 Activities Completed This Shift: None

1.2 Activities In-Progress: None

1.3 Planned Activities:
None

2.0 PLANT AND EQUIPMENT STATUS:

2.1 Technical Specification Related Equipment Summary
None

UNIT SUPERVISOR RELIEF CHECKLIST

2.2 Non-Technical Specification Equipment Summary:
None

3.0 General Information: Maintain steady state conditions in accordance with IPO-003A, Power Operation. Diluted 45 gallons three times last shift.

4.0 END OF SHIFT REVIEW:
LOGS – RO/BOP X LOGS-NEO X CLOSED eLCOARs ARCHIVED X
OPTS COMPLETED X DAILY ACTIVITIES LIST X LCOARs REVIEWED X
COMP ACTIONS REVIEWED X

PART II TO BE COMPLETED BY THE ON-COMING UNIT SUPERVISOR.

1.0 CRITICAL PARAMETERS:
MODE: 1 REACTOR POWER: 100% Mwe: 1265
RCS TAVE: 585 °F CONTROL ROD POSITION 215 ON BANK D
C_b: 908 ppm RCS PRESS: 2235 psig

2.0 STATUS REVIEW:
[X] UNIT LOGS
[C] [X] * * LCOAR AND SYSTEMS IMPORTANT TO SAFETY STATUS
[X] UNIT DIFFERENCES (If last watch was on opposite unit)
[X] SHIFT ORDERS
[X] BOARD WALKDOWN
[X] * POD
[C] [X] CONDITIONAL SURVEILLANCE STATUS BOARD
PROTECTED TRAIN [X] Train “A” [ ] Train “B”

* May be completed after turnover.
* * Each US’s (U1 & U2) status review is to include the U1 & Common LCOAR & SIS Logs for Common equipment.

Facility: CPNPP 1 & 2	Scenario No.: 3	Op Test No.: April 2013 NRC	
Examiners:		Operators:	

Initial Conditions: 100% power MOL - RCS Boron is 908 ppm (by sample).

Turnover: Maintain steady-state power conditions.

Critical Tasks:

- Restore Component Cooling Water Flow Prior to Tripping the Reactor per ABN-502, Component Cooling Water System Malfunctions. (Event 1)
- Initiate Train A and/or Train B Containment Isolation Phase B due to Failure to Automatically Actuate Prior to Exiting FRZ-0.1A, Response to High Containment Pressure. (Event 7)
- Initiate Train A and/or Train B Containment Spray Flow Prior to Exiting FRZ-0.1A, Response to High Containment Pressure. (Event 8)

Event No.	Malf. No.	Event Type*	Event Description
1 +10 min	CC02A CC03A	C (BOP, SRO) TS (SRO)	Train A Component Cooling Water Pump 1-01 Trip. Train B Component Cooling Water Pump 1-02 Auto Start Failure.
2 +20 min	CV16A	I (RO, SRO)	Volume Control Tank Level Transmitter (LT-112) Fails Low.
3 +30 min	ED07A	C (RO, BOP, SRO) TS (SRO)	Loss of Inverter (IV1PC1).
4 +35 min	RC17B	M (RO, BOP, SRO)	Reactor Coolant Leak Inside Containment on Loop 2 Hot Leg of 600 GPM on 600 second ramp.
5 +40 min	CV01E	C (BOP)	Centrifugal Charging Pump (1-02) Auto Start Failure on Safety Injection Signal.
6 +50 min	RC08B2	M (RO, BOP, SRO)	Large Break Loss of Coolant Accident Inside Containment on Loop 2 Hot Leg.
7 +50 min	RP10A RP10B	C (BOP)	Train A and B Containment Isolation Phase B Automatic Actuation Failure.
8 +50 min	CS07A CS07B	C (BOP)	Train A and B Containment Spray Heat Exchanger Outlet Valves Fail to Auto Open.

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

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

SCENARIO SUMMARY NRC 3

The crew will assume the watch at 100% power with no scheduled activities per IPO-003A, Power Operations. The first event is a trip of the Train A Component Cooling Water (CCW) Pump and auto start failure of the Train B CCW Pump. The crew will enter ABN-502, Component Cooling Water System Malfunction, Section 2.0, and transfer CCW flow to Train B. The SRO will refer to Technical Specifications.

When Technical Specifications are referenced, a low failure of the Volume Control Tank Level Transmitter will occur. The crew will reference annunciator ALM-0061A-4.5, VCT LEVEL LO, and ABN-105, Chemical and Volume Control System Malfunction, and establish an Alternate Operating Mode for the Reactor Makeup System.

The next event is a loss of Inverter IV1PC1. Actions are per ABN-603, Loss of Protection or Instrument Bus, Section 2.0, and include placing Rod Control in MANUAL, controlling Steam Generator (SG) level and RCS pressure, and adjusting Charging flow due to a loss of Letdown. The SRO will refer to Technical Specifications.

When the Alternate Power Supply is aligned in ABN-603, a Reactor Coolant Leak inside Containment will commence. Once it is determined that Pressurizer level cannot be maintained, the Reactor must be manually tripped and Safety Injection manually initiated. The crew will enter EOP-0.0A, Reactor Trip or Safety Injection, and then transition to EOP-1.0A, Loss of Reactor or Secondary Coolant.

The scenario is complicated by a Train A and B Containment Isolation Phase B and Train A and B Containment Spray Heat Exchanger Outlet Valve automatic actuation failures. Additionally, the Train B Centrifugal Charging Pump will fail to auto start upon actuation of the Safety Injection Sequencer.

When EOP-1.0A is entered, a Large Break Loss of Coolant Accident will occur. At that point, the Unit Supervisor should recognize that entry into FRZ-0.1A, Response to High Containment Pressure, is required due to a Critical Safety Function Status Tree ORANGE path inside Containment. When the actions of FRZ-0.1A are completed a transition to FRP-0.1A, Response to Imminent Pressurized Thermal Shock Condition, is required. FRP-0.1A will be exited at Step 1 RNO when it is determined that Reactor Coolant System pressure is less than 425 psig and Residual Heat Removal System flow is greater than 750 GPM.

The crew will return to EOP-1.0A, Loss of Reactor or Secondary Coolant, as this is the current procedure and step in effect. This scenario is terminated when the conditions are reached for a Transfer to Cold Leg Recirculation.

Risk Significance:

- Failure of risk important system prior to trip: Loss of Component Cooling Water
  Loss of Protection System Inverter
- Risk significant core damage sequence: Small then Large Break LOCA
- Risk significant operator actions: Restore Steam Generator Level Control
  Restore Pressurizer Pressure Control
  Start Train B Centrifugal Charging Pump
  Actuate Phase B Containment Isolation
  Initiate Containment Spray Flow

BOOTH OPERATOR INSTRUCTIONS for SIMULATOR SETUP

Initialize to IC-18 and LC21 NRC Scenario 3.

EVENT	TYPE	MALF #	DESCRIPTION	DEMAND VALUE	INITIATING PARAMETER
SETUP		CV01E	Centrifugal Charging Pump 1-02 Auto Start Failure	FAIL	K0
		RP10A	Train A Containment Isolation Phase B Failure	FAIL	K0
		RP10B	Train B Containment Isolation Phase B Failure	FAIL	K0
		CS07A	Train A Containment Spray Heat Exchanger Outlet Valve Fails to Open	FAIL	K0
		CS07B	Train A Containment Spray Heat Exchanger Outlet Valve Fails to Open	FAIL	K0
1		CC02A	Train A CCW Pump 1-01 Failure	TRIP	K1
1		CC03A	Train B CCW Pump 1-02 Start Failure	FAIL	K1
2		CV16A	Volume Control Tank Transmitter LT-112 Failure	0%	K2
3		ED07A	Loss of Inverter (IV1PC1)	OFF	K3
3	EDR01		Inverter (IV1PC1) Alternate Power Supply		K11
4		RC17B	Reactor Coolant Leak inside Containment **(NOTE 1)**	600 GPM	K11 (600 sec. ramp)
NOTE 1: RC17B will initiate when the alternate 1PC1 power supply is energized.					
5		RC08B2	LOCA on Transition to EOP-1.0A	-	K5
6		CV01E	Centrifugal Charging Pump 1-02 Auto Start Failure	FAIL	K0
7		RP10A	Train A Containment Isolation Phase B Failure	FAIL	K0
7		RP10B	Train B Containment Isolation Phase B Failure	FAIL	K0
8		CS07A	Train A Containment Spray Heat Exchanger Outlet Valve Fails to Open	FAIL	K0
8		CS07B	Train B Containment Spray Heat Exchanger Outlet Valve Fails to Open	FAIL	K0

Booth Operator: **INITIALIZE to IC-18 and LC21 NRC Scenario 3.**
ENSURE all Simulator Annunciator Alarms are ACTIVE.
ENSURE all Control Board Tags are removed.
ENSURE Operator Aid Tags reflect current boron conditions.
ENSURE Rod Bank Update (RBU) is performed.
ENSURE Turbine Load Rate set at 10 MWe/minute.
ENSURE 60/90 buttons DEPRESSED on ASD.
ENSURE ASD speakers are ON to 50%.
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 5 of 33
Event Description: Train A Component Cooling Water (CCW) Pump Trip / Train B CCW Pump Start Failure			

Time	Position	Applicant's Actions or Behavior
Booth Operator: When directed, EXECUTE Event 1 (Key 1). - CC02A, Train A CCW Pump (1-01) trip. - CC03A, Train B CCW Pump (1-02) start failure.		
Indications Available: **3B-2.3 – CCWP 1 / 2 OVRLOAD TRIP** **3B-3.3 – CCW TRN B SFGD LOOP PRESS LO** **Multiple CCW low flow alarms**		
+1 min	BOP	RESPOND to Annunciator Alarm Procedures.
	BOP	RECOGNIZE Train A CCW Pump trip with failure of Train B CCW Pump to start.
	US	DIRECT implementation of ABN-502, Component Cooling Water System Malfunctions, Section 2.0.
	BOP	VERIFY Train B CCW Pump – RUNNING. [Step 2.3.1]
CRITICAL TASK STATEMENT		**Restore Component Cooling Water Flow Prior to Tripping the Reactor per ABN-502, CCW System Malfunctions.**
CRITICAL TASK	RO	Manually START Train B CCW Pump 1-02. [Step 2.3.1 RNO]
Booth Operator: When asked about status of CCW Pump, REPORT that motor casing is hot. When asked about status of CCW Pump breaker, REPORT that the 50/51 overcurrent relays on Phases A & C are tripped.		
	BOP	VERIFY Train B Station Service Water Pump – RUNNING. [Step 2.3.2]
	RO/BOP	VERIFY Train B Safety Chiller Recirc Pump 1-06 – RUNNING. [Step 2.3.3]
	BOP	VERIFY CCW Heat Exchanger outlet flow – LESS THAN 17,500 GPM PER HEAT EXCHANGER. [Step 2.3.4]
		• 1-FI-4536A, CCW HX 1 OUT FLO
		• 1-FI-4537A, CCW HX 2 OUT FLO

Operating Test : NRC	Scenario # 3	Event # 1	Page 6 of 33
Event Description: Train A Component Cooling Water (CCW) Pump Trip / Train B CCW Pump Start Failure			

Time	Position	Applicant's Actions or Behavior
	BOP	VERIFY required Train B equipment for existing plant conditions – IN OPERATION. [Step 2.3.5]
		• Control Room Air Conditioning Units
		• Containment Spray System
		• UPS HVAC Unit
		• Excess Letdown
		• RHR System
<u>Examiner Note</u>: Equipment may be turned over to Unit 2.		
	BOP	STOP Train A equipment – AS NECESSARY. [Step 2.3.6]
		• Control Room Air Conditioning Units [Step 2.3.6]
		• Containment Spray System [Step 2.3.6]
		• UPS HVAC Unit [Step 2.3.6]
		• RHR System [Step 2.3.6]
		• Safety Chiller Recirculation Pump [Step 2.3.6]
	BOP	VERIFY CCW Heat Exchanger outlet temperature did NOT exceed 122ºF with pump running. [Step 2.3.7]
	US	INITIATE a Work Request per STA-606. [Step 2.3.8]
	US	EVALUATE Technical Specifications. [Step 2.3.9]
		• LCO 3.7.7.A, Component Cooling Water System.
		• CONDITION A - One CCW train inoperable. • ACTION A.1 - Restore CCW train to OPERABLE status within 72 hours.
+10 min	US	REFER to EPP-201. [Step 2.3.10]
When the Technical Specification actions are addressed, or at Lead Evaluator's discretion, PROCEED to Event 2.		

Time	Position	Applicant's Actions or Behavior
Booth Operator:		**When directed, EXECUTE Event 2 (Key 2).** **- CV16A, Volume Control Tank (LT-112) fails low.**
Indications Available:		**6A-3.5 – VCT LVL LO** **6A-4.5 – VCT LVL LO-LO** **1-LI-112A – VCT LVL level indication fails low**
+1 min	RO	RESPOND to Annunciator Alarm Procedures.
	RO	RECOGNIZE VCT level transmitter (LT-112) failed low.
Examiner Note:		**The following step is from 1-ALB-6A, Window 4.5 – VCT LVL LO-LO.**
	RO	STOP Auto Makeup; PLACE 1/1-MU, RCS MU MAN ACT in STOP. [Step 5.B.1)]
	US	DIRECT performance of ALM-0061A, 1-ALB-6A, Window 4.5 – VCT LVL LO-LO **or** ABN-105, Chemical and Volume Control System Malfunction, Section 6.0.
Booth Operator:		**When maintenance is contacted, DELETE malfunction CV16A and REPORT I&C vented the transmitter and it appears to be operating normally.**
Examiner Note:		**The following steps are from 1-ALB-6A, Window 4.5 – VCT LVL LO-LO.**
	RO	DETERMINE Charging Pump suction has NOT shifted to RWST and Positive Displacement Pump is NOT operating. [Step 1]
	RO	MONITOR VCT level on 1-LI-112A, VCT LVL and 1-LI-185, VCT LVL. [Step 2]
		• DETERMINE 1-LI-185, VCT LVL is NOT failed low. [Step 2.A]
		• DETERMINE no indication of gas intrusion into Charging Pump. [Step 2.B]
	RO	MONITOR Charging flow on 1-FI-121A, CHRG FLO and Letdown flow on 1-FI-132, LTDN FLO. [Step 3]

Time	Position	Applicant's Actions or Behavior
	RO	DETERMINE only 1-LI-112A, VCT LVL is failed low. [Step 4]
	RO	If VCT levels indicate different, PERFORM the following: [Step 5]
		• VERIFY 1-PI-115, VCT PRESS is approximately 30 psig. [Step 5.A].
		• CHECK 1-LT-112, CVCS VCT Level Transmitter for malfunction. [Step 5.B]
		• STOP Auto Makeup; PLACE 1/1-MU, RCS MU MAN ACT in STOP. [Step 5.B.1)]
		• If necessary, REDUCE VCT level to between 46% and 56% and PLACE 1/1-LCV-112A, VCT LVL CTRL VLV in HUT position. [Step 5.B.2)]
		• ENSURE 1-LI-185, VCT LVL and 1-PI-115, VCT PRESS are both lowering. [Step 5.B.3)]
		• REFER to ABN-105, Chemical and Volume Control System Malfunction. [Step 5.B.4)]

Examiner Note: **The following steps are from ABN-105, Chemical and Volume Control System Malfunction, Section 6.0, Reactor Makeup System Malfunction.**

NOTE: Normal Operating Mode of the Reactor Makeup System includes the following Modes:

- Automatic Mode
- Borate Mode
- Dilute Mode
- Alternate Dilute Mode

Time	Position	Applicant's Actions or Behavior
	RO	DETERMINE Reactor Makeup System NOT in Normal Operating Mode. [Step 6.3.1)]
		• If makeup is required, ESTABLISH Alternate Operating Mode per SOP-104A, Reactor Make-up and Chemical Control System. [Step 6.3.1 RNO]
	RO	VERIFY Automatic Operating Mode in service per SOP-104A, Reactor Makeup and Chemical Control System. [Step 6.3.1.a)]

Operating Test :	NRC	Scenario #	3	Event #	2	Page	9	of	33
Event Description:	Volume Control Tank Level Transmitter Failure								

Time	Position	Applicant's Actions or Behavior
Examiner Note:		**The following steps are from SOP-104A, Reactor Make-up and Chemical Control System, Section 5.2.4, Manual Blended Makeup (Alternate).**
		• PLACE 1/1-MU, RCS MU MAN ACT in STOP. [Step 5.2.4.C]
		• PLACE 43/1-MU, RCS MU MODE SELECT in MAN. [Step 5.2.4.D]
		• SET 1-FK-111, RMUW BLNDR FLO CTRL to total flowrate required. [Step 5.2.4.F.1)]
		• SET 1-FK-110, BA BLNDR FLO CTRL to obtain a blended flow. [Step 5.2.4.F.2)]
		• SET 1-FY-111B, RCS MU BATCH FLO to obtain desired total volume. [Step 5.2.4.F.3)]
		• SET 1-FY-110B, BA BATCH FLO as required. [5.2.4.F.4)]
+10 min	RO	When VCT Level Transmitter is vented, PLACE 1/1-MU, RCS MU MAN ACT in AUTO.
When VCT level control is restored, or at Lead Examiner discretion, PROCEED to Event 3.		

Time	Position	Applicant's Actions or Behavior
Booth Operator: When directed, EXECUTE Event 3 (Key 3). - ED07A, Loss of Protection Bus IV1PC1.		
Indications Available: 10B-1.16 – 118V CHAN I INV TRBL Channel 1 Windows on TSLB 1 through 7 and 9 Numerous Loss of Protection Bus 1PC1 Alarms		
+30 secs	RO/BOP	RESPOND to Annunciator Alarm Procedures.
	RO/BOP	RECOGNIZE loss of Protection Bus 1PC1.
Booth Operator: If contacted, REPORT Fan Failure Alarm is lit on 1PC1 Inverter.		
Examiner Note: Primary side actions include controlling Pressurizer pressure due to an increase in Charging flow and a loss of Letdown. Secondary side actions include controlling Steam Generator (SG) levels in SGs 1-01 and 1-04 when Main Feedwater Pump speed lowers.		
	US	DIRECT performance of ABN-603, Loss of Protection or Instrument Bus, Section 2.0.
	US/RO	VERIFY Reactor did NOT trip. [Step 2.3.1]
	US	DETERMINE Unit in MODE 1. [Step 2.3.2]
NOTE: Step 3 is a continuous action step.		
	RO/BOP	Manually CONTROL parameters to MAINTAIN or RESTORE to normal: [Step 2.3.3]
	RO	• PLACE 1/1-RBSS, CONTROL ROD BANK SELECT Switch in MANUAL. [Step 2.3.3.a]
NOTE: Step b. RNO should be performed for loss of uPC1 since HCV-182 is failed open. Alignment of charging to RCP seals only may be performed prior to this step and should be verified as part of step b. performance		

Operating Test : NRC	Scenario # 3	Event # 3	Page 11 of 33
Event Description: Loss of Protection Bus 1PC1			

Time	Position	Applicant's Actions or Behavior
	RO	• VERIFY RCP Seal Injection Flow – WITHIN NORMAL OPERATING RANGE. [Step 2.3.3.b]
		• Manually CONTROL 1-FK-121, CCP CHG FLO CTRL Valve. [Step 2.3.3.b RNO]
		• DETERMINE 1-HCV-182 failed OPEN and CLOSE 1/1-8105 OR 1/1-8106 Charging Pump to RCS Isolation Valve AND ADJUST Charging flow to RCP seals. [Step 2.3.3.b RNO]
	RO	• VERIFY Pressurizer level controlled – BETWEEN 25% and 70%. [Step 2.3.c]
NOTE: Step 3.d. RNO should be performed (pressurizer master controller in manual) if uPC1 is the lost bus. This will preclude potential PORV lift when the bus is re-energized.		
	RO	• VERIFY Pressurizer pressure – WITHIN NORMAL OPERATING RANGE. [Step 2.3.3.d]
	RO	• PLACE 1-PK-455A, PRZR MASTER PRESS CTRL in MANUAL. [Step 2.3.3.d RNO]
	BOP	• VERIFY Steam Generator levels being controlled – BETWEEN 60% AND 70%. [Step 2.3.3.e RNO]
		• PLACE 1-SK-509A, FWPT MASTER SPD CTRL in MANUAL. [Step 2.3.3.e RNO]
		• PLACE 1-FK-510, SG 1 FW FLO CTRL in MANUAL and CONTROL SG 1-01 level. [Step 2.3.3.e RNO]
		• PLACE 1-FK-540, SG 4 FW FLO CTRL in MANUAL and CONTROL SG 1-04 level. [Step 2.3.3.e RNO]
	US	• GO to Step 6. [Step 2.3.3.f]
Examiner Note: **When power is restored to 1PC1, the next event (RCS leak) is initiated on a 600 second ramp. Evaluating Technical Specifications may need to be completed when the scenario is terminated. Letdown flow will NOT be restored.**		

Operating Test :	NRC	Scenario #	3	Event #	3	Page	12	of	33
Event Description:	Loss of Protection Bus 1PC1								

Time	Position	Applicant's Actions or Behavior
Booth Operator: When contacted to reenergize 1PC1, EXECUTE remote function EDR01 (Key 11), Inverter IV1PC1 Alternate Power Supply.		
CAUTION: Reenergizing the affected protection bus may cause instrumentation spikes on controlling channels which may in turn initiate unwanted actions.		
	RO	VERIFY Unit – IN MODE 1. [Step 2.3.6]
NOTE: Rod Control should remain in MANUAL until all Tave channels are operable.		
	RO	• PLACE 1/1-RBSS, CONTROL ROD BANK SELECT Switch in MANUAL. [Step 2.3.6.a]
	RO	• SELECT LOOP 1 on 1-TS-412T, T_{AVE} CHAN DEFEAT Switch. [Step 2.3.6.b]
	RO/BOP	• DISPATCH an operator to REENERGIZE Protection Bus 1PC1. [Step 2.3.6.c]
	BOP	• VERIFY PCIP, Window 3.4 – TURB LOAD REJ STM DMP ARMED C-7, not ARMED. [Step 2.3.6.d]
	RO	• RESTORE 1-TS-412T, T_{AVE} CHAN DEFEAT Switch to the NONE Position. [Step 2.3.6.e]
CAUTION: To prevent rods from potentially stepping, allow a minimum of 2 minutes for Tavg circuitry to stabilize following manipulation of u-TS-412T before returning rod control to Auto.		
	RO	• PLACE 1/1-RBSS, CONTROL ROD BANK SELECT Switch in AUTO. [Step 2.3.6.f]
	US/RO	• INVESTIGATE and INITIATE Corrective Action on loss of power to Protection Bus. [Step 2.3.6.g]
	US	GO to Step 9. [Step 2.3.7]
	US/RO	VERIFY Unit – IN MODE 1. [Step 2.3.9]

Operating Test : NRC	Scenario # 3	Event # 3	Page 13 of 33
Event Description: Loss of Protection Bus 1PC1			

Time	Position	Applicant's Actions or Behavior
		<u>Examiner Note</u>: The following actions will be performed upon Bus 1PC1 restoration.
	US	CHECK Status of Affected Control Systems and Instrumentation. [Step 2.3.10]
	BOP	• RESTORE Feedwater System to normal operation. [Step 2.3.10.a]
		• PLACE 1-FK-510, SG 1 FW FLO CTRL in AUTO.
		• PLACE 1-FK-540, SG 4 FW FLO CTRL in AUTO.
		• PLACE 1-SK-509A, FWPT MASTER SPD CTRL in AUTO.
	RO	• PLACE N-41A, RATE MODE Switch to RESET on Drawer N-41A, Power Range Flux Rate Mode Selector and VERIFY Positive Rate Mode alarm light – DARK. [Step 2.3.10.b]
	RO	• RESTORE Charging and Letdown. [Step 2.3.10.c]
		• CLOSE 1-HC-182, Seal Flow Control Valve. [Step 2.3.10.c.1)]
		• OPEN 1/1-8105 **<u>or</u>** 1/1-8106, Charging Isolation Valves. [Step 2.3.10.c.2)]
		• ADJUST 1-HC-182, Seal Flow Control Valve and 1-FK-121, Charging Flow Control Valve to CONTROL RCP seal flow. [Step 2.3.10.c.3)]
		• RESTORE Letdown flow per Control Board Job Aid **<u>or</u>** ABN-105. [Step 2.3.10.c.4)]
	US	EVALUATE Technical Specifications. [Step 2.3.11]
		• LCO 3.8.7.A, Inverters - Operating.
		• CONDITION A - One required inverter inoperable. • ACTION A.1 - Restore inverter to OPERABLE status within 24 hours.

Operating Test :	NRC	Scenario #	3	Event #	3	Page	14	of	33
Event Description:	Loss of Protection Bus 1PC1								

Time	Position	Applicant's Actions or Behavior
<u>Examiner Note</u>: LCO 3.8.9.B is entered when power is lost and exited when power is restored.		
		• LCO 3.8.9.B, Distribution Systems - Operating.
		• CONDITION B - One AC vital bus subsystem inoperable. • ACTION B.1 - Restore AC vital bus subsystem to OPERABLE status within 2 hours.
	US	REFER to EPP-201. [Step 2.3.12]
	US	NOTIFY Engineering to expedite repairs. [Step 2.3.13]
	US	INITIATE a work request per STA-606, as necessary. [Step 2.3.14]
+10 min	US	INITIATE a Condition Report per STA-421. [Step 2.3.15]
When Technical Specifications are addressed, or at Lead Examiner discretion, PROCEED to Event 4.		

Time	Position	Applicant's Actions or Behavior
		Booth Operator: When directed, EXECUTE Event 4 (Key 11). **- RC17B, Reactor Coolant Leak inside Containment of 600 GPM on 600 second ramp.**
		Indications Available: **CAG197, Containment Air Gaseous Radiation Monitor in ALERT on PC-11** **2B-4.12 – CNTMT FAN CLR 1 & 2 CNDS FILL RATE HI** **2A-2.8 – ANY CNTMT SMP PMP RUN** **2B-3.12 – CNTMT FAN CLR 3 & 4 CNDS FILL RATE HI** **Containment Sump Pump AUTO start**
+1 min	RO	RESPOND to Annunciator Alarm Procedures.
	RO	RECOGNIZE RCS leak into Containment.
	US	DIRECT performance of ABN-103, Excessive Reactor Coolant Leakage, Section 2.0.
		NOTE: The symbol [R] has been located throughout this procedure where real or potential radiation hazards are positively identified. This identification technique should not preclude workers from following good radiation work practices throughout this procedure to ensure their occupational exposure is maintained As Low As Is Reasonably Achievable (ALARA).
	RO	VERIFY Charging Pump – AT LEAST ONE RUNNING. [Step 2.3.1]
	RO	ENSURE Pressurizer level – AT OR TRENDING TO PROGRAM LEVEL SETPOINT. [Step 2.3.2]
		• PLACE Charging Pump Flow Controller in MANUAL and ADJUST Charging flow to maintain Pressurizer level let setpoint [Step 2.3.2 RNO]
	US	• If Pressurizer level decreases in an uncontrolled manner, PERFORM the following: [Step 2.3.2 RNO]
	RO	• TRIP the Reactor. [Step 2.3.2 RNO]
		• PLACE 1/1-RTC, RX TRIP BKR Switch in TRIP position and VERIFY Reactor Trip at CB-07.

Operating Test :	NRC	Scenario #	3	Event #	4	Page	16	of	33
Event Description:	Reactor Coolant System Leak								

Time	Position	Applicant's Actions or Behavior
	RO	• ACTUATE Safety Injection. [Step 2.3.2 RNO]
		• PLACE 1/1-SIA2, SI MAN ACT Switch to ACT position at CB-07 and DETERMINE SI has actuated.
	US	• GO to EOP-0.0A. [Step 2.3.2 RNO]
When Reactor is tripped, or at Lead Examiner discretion, PROCEED to Events 5, 6, 7, and 8.		

Time	Position	Applicant's Actions or Behavior
Booth Operator: When directed, EXECUTE Events 5, 6, 7, and 8 (Key 5). - CV01E, Centrifugal Charging Pump 1-02 AUTO start failure on SI sequencer. - RC08B2, Large Break LOCA on Loop 2 Hot Leg when EOP-1.0A is entered. - RP10A, Train A Containment Isolation Phase B Auto Actuation failure. - RP10B, Train B Containment Isolation Phase B Auto Actuation failure. - CS07A, Train A Containment Spray HX Outlet Valve Auto Actuation failure. - CS07B, Train B Containment Spray HX Outlet Valve Auto Actuation failure.		
Indications Available: Multiple Reactor Trip alarms		
	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]
		• VERIFY all Control Rod Position Rod Bottom Lights – ON. [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]
		• VERIFY SI Actuated blue status light – ON: [Step 4.a]
		• VERIFY Both Trains SI Actuated: [Step 4.b]
		• SI Actuated blue status light – ON NOT FLASHING.

Operating Test :	NRC	Scenario #	3	Event #	5, 6, 7, & 8	Page	18	of	33
Event Description:	Train B Centrifugal Charging Pump Auto Start Failure / Large Break LOCA / Train A & B Containment Isolation Phase B Failure / Train A & B Containment Spray Heat Exchanger Outlet Valve Failure								

Time	Position	Applicant's Actions or Behavior
Examiner Note:		**EOP-0.0A, Attachment 2 steps performed by BOP are identified later in the scenario. The RCPs may be tripped if subcooling is observed to be < 25ºF.**
		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]
	RO	VERIFY AFW Alignment: [Step 6]
		• VERIFY both MDAFW Pumps – RUNNING. [Step 6.a]
		• PLACE TDAFW Pump in PULLOUT per Foldout Page. [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]

Operating Test :	NRC	Scenario #	3	Event #	5, 6, 7, & 8	Page	19	of	33
Event Description:	Train B Centrifugal Charging Pump Auto Start Failure / Large Break LOCA / Train A & B Containment Isolation Phase B Failure / Train A & B Containment Spray Heat Exchanger Outlet Valve Failure								

Time	Position	Applicant's Actions or Behavior
	RO	CHECK if Main Steam lines should be ISOLATED: [Step 8]
		• VERIFY Containment pressure – GREATER THAN 6.0 PSIG. [Step 8.a]
		• VERIFY Main Steam Line pressure – LESS THAN 610 PSIG. [Step 8.a]
		• GO to Step 9. [Step 8.a RNO]
	RO	CHECK RCS Temperature: [Step 9]
		• VERIFY RCS Average Temperature – STABLE AT OR TRENDING TO 557°F. [Step 9]
	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]
	RO	CHECK if RCPs Should Be Stopped: [Step 11]
		• VERIFY RCS subcooling less than 25ºF (55ºF FOR ADVERSE CONTAINMENT). [Step 11.a]
		• GO to Step 12. [Step 11.a RNO]
	RO/BOP	CHECK if Any Steam Generator Is Faulted: [Step 12]
		• VERIFY any Steam Generator pressure – DECREASING IN AN UNCONTROLLED MANNER. [Step 12.a]
		• VERIFY any Steam Generator pressure – COMPLETELY DEPRESSURIZED. [Step 12.a]
		• GO to Step 13. [Step 12.a RNO]
	RO/BOP	CHECK if Steam Generator Tubes Are NOT Ruptured: [Step 13]
		• VERIFY Condenser Off Gas radiation – NORMAL.
		• VERIFY Main Steam Line radiation – NORMAL.

Operating Test :	NRC	Scenario #	3	Event #	5, 6, 7, & 8	Page	20	of	33

Event Description: Train B Centrifugal Charging Pump Auto Start Failure / Large Break LOCA / Train A & B Containment Isolation Phase B Failure / Train A & B Containment Spray Heat Exchanger Outlet Valve Failure

Time	Position	Applicant's Actions or Behavior
		• VERIFY SG Blowdown Sample Radiation Monitor – NORMAL.
		• VERIFY levels in all Steam Generators – NORMAL.
	RO/BOP	CHECK if RCS is Intact: [Step 14]
		• VERIFY Containment pressure – LESS THAN 1.3 PSIG.
		• VERIFY Containment recirculation sump levels – NORMAL.
		• VERIFY Containment radiation levels – NORMAL.
		• GO to EOP-1.0A, Loss of Reactor or Secondary, Step 1. [Step 14 RNO]
<u>Examiner Note</u>: INITIATE Event 5, LBLOCA when the transition to EOP-1.0A is performed.		
	US	TRANSITION to EOP-1.0A, Loss of Reactor or Secondary Coolant, Step 1.
<u>Examiner Note</u>: Shortly after entry into EOP-1.0A, a transition to FRZ-0.1A, Response to High Containment Pressure, must be performed due to an ORANGE path. The Unit Supervisor should immediately exit EOP-1.0A and enter FRZ-0.1A, Response to High Containment Pressure.		
<u>Examiner Note</u>: FRZ-0.1A, Response to High Containment Pressure, steps begin here.		
	US/RO	CHECK Containment pressure – GREATER THAN 50 PSIG. [Step 1]
	RO/BOP	• DETERMINE proper Containment Spray alignment was NOT verified in EOP-0.A. [Step 1 RNO]
<u>Examiner Note</u>: The crew must perform a Containment Spray Alignment because it was NOT verified at Step 7 of EOP-0.0A, Reactor Trip or Safety Injection.		
	RO/BOP	VERIFY Containment Isolation Phase A – APPROPRIATE MLB LIGHT INDICATION. [Step 2]
	RO/BOP	VERIFY Containment Ventilation Isolation – APPROPRIATE MLB LIGHT INDICATION. [Step 3]

Operating Test :	NRC	Scenario #	3	Event #	5, 6, 7, & 8	Page	21	of	33
Event Description:	Train B Centrifugal Charging Pump Auto Start Failure / Large Break LOCA / Train A & B Containment Isolation Phase B Failure / Train A & B Containment Spray Heat Exchanger Outlet Valve Failure								

Time	Position	Applicant's Actions or Behavior
		NOTE: Component Cooling Water supply to the unit instrument air compressors isolates on a Phase B isolation signal.
	RO	CHECK if Containment Spray is Required: [Step 4]
		• VERIFY Containment pressure – GREATER THAN 18.0 PSIG. [Step 4.a]
		• STOP all RCPs. [Step 4.b]
		• VERIFY Containment Isolation Phase B Valves – CLOSED. [Step 4.c]
CRITICAL TASK STATEMENT		**Initiate Train A and/or Train B Containment Isolation Phase B due to Failure to Automatically Actuate Prior to Exiting FRZ-0.1A, Response to High Containment Pressure.**
CRITICAL TASK	BOP	• Manually INITIATE Train A and/or Train B of Containment Isolation Phase B. [Step 4.c RNO]
		• PLACE 1/1-CIPBA1A CS/CNTMT ISOL – PHASE B MAN ACT Switch in ACT position.
		• PLACE 1/1-CIPBA2A CS/CNTMT ISOL – PHASE B MAN ACT Switch in ACT position.
		• VERIFY appropriate MLB indication for CNTMT SPRAY (blue windows) AND PHASE B (orange windows). [Step 4.c]
		• VERIFY ECA-1.1A, Loss of Emergency Coolant Recirculation – NOT IN EFFECT. [Step 4.d]
		• VERIFY Containment Spray Pumps – RUNNING. [Step 4.e]
		• VERIFY Containment Spray System valve alignment – PROPER EMERGENCY ALIGNMENT PER ATTACHMENT 4. [Step 4.f]
		• Manually ALIGN Valve(s) as necessary. [Step 4.f RNO]

Operating Test :	NRC	Scenario #	3	Event #	5, 6, 7, & 8	Page	22 of	33
Event Description:	Train B Centrifugal Charging Pump Auto Start Failure / Large Break LOCA / Train A & B Containment Isolation Phase B Failure / Train A & B Containment Spray Heat Exchanger Outlet Valve Failure							

Time	Position	Applicant's Actions or Behavior
CRITICAL TASK STATEMENT		**Initiate Train A and/or Train B Containment Spray Flow Prior to Exiting FRZ-0.1A, Response to High Containment Pressure.**
CRITICAL TASK	RO/BOP	• Manually OPEN Train A and/or Train B of Containment Spray Heat Exchanger Outlet Valves. [Step 4.f RNO]
		• PLACE 1-HS-4776, Train A Containment Spray Heat Exchanger Outlet Valve to OPEN.
		• PLACE 1-HS-4777, Train B Containment Spray Heat Exchanger Outlet Valve to OPEN.
		• VERIFY Containment Spray flow. [Step 4.g]
Examiner Note: **If referenced, FRZ-0.1A, Attachment 4, Containment Spray Alignment - Injection Phase, steps begin here.**		
NOTE: The following steps are used to verify proper alignment for the injection phase of Containment Spray.		
	RO/BOP	VERIFY 1-MLB-4A3 AND 4B3 - BLUE LIGHTS LIT. [Step 1]
	RO/BOP	VERIFY 1-HS-4753 and 1-HS-4752, CHEM ADD TK DISCH VLVs - OPEN [Step 2]
	RO/BOP	VERIFY 1-HS-4782 and 1-HS-4783, CNTMT SMP TO CSP 1 & 3 AND 2 & 4 SUCT ISOL VLVs – CLOSED. [Step 3]
	RO/BOP	VERIFY 1-HS-4758 and 1-HS-4759, RWST TO CSP 1 & 3 AND 2 & 4 SUCT VLVs – OPEN. [Step 4]
	RO/BOP	NOTIFY Unit Supervisor Attachment 4 instructions – COMPLETE.
Examiner Note: **FRZ-0.1A, Response to High Containment Pressure, steps continue here.**		
	US/RO	VERIFY Main Steam Line Isolation Valves – CLOSED. [Step 5]

Operating Test :	NRC	Scenario #	3	Event #	5, 6, 7, & 8	Page	23	of	33

Event Description: Train B Centrifugal Charging Pump Auto Start Failure / Large Break LOCA / Train A & B Containment Isolation Phase B Failure / Train A & B Containment Spray Heat Exchanger Outlet Valve Failure

Time	Position	Applicant's Actions or Behavior
		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/BOP	CHECK IF Feedwater Flow should be isolated to any SG. [Step 6]
		• GO to Step 7. [Step 6.a RNO]
Examiner Note:		**The Unit Supervisor should exit FRZ-0.1A, Response to High Containment Pressure and enter FRP-0.1A, Response to Imminent Pressurized Thermal Shock Condition due to a Critical Safety Function Status Tree ORANGE path.**
	US	RETURN to Procedure and Step in Effect. [Step 7]
Examiner Note:		**FRP-0.1A, Response to Imminent Pressurized Thermal Shock Condition, steps begin here.**
	US	VERIFY RCS pressure – GREATER THAN 325 PSIG (425 PSIG FOR ADVERSE CONTAINMENT). [Step 1]
	RO/BOP	• VERIFY RHR Pump flow greater than 750 GPM and RETURN to procedure and step in effect. [Step 1 RNO]
Examiner Note:		**The Unit Supervisor should exit FRP-0.1A, Response to Imminent Pressurized Thermal Shock Condition and return to EOP-1.0A, Loss of Reactor or Secondary Coolant, which is the Procedure and Step in effect.**
Examiner Note:		**EOP-1.0A, Loss of Reactor or Secondary Coolant, steps begin here.**

Operating Test :	NRC	Scenario #	3	Event #	5, 6, 7, & 8	Page	24	of	33
Event Description:	Train B Centrifugal Charging Pump Auto Start Failure / Large Break LOCA / Train A & B Containment Isolation Phase B Failure / Train A & B Containment Spray Heat Exchanger Outlet Valve Failure								

Time	Position	Applicant's Actions or Behavior
		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.
	US/RO	CHECK If RCPs Should Be Stopped: [Step 1]
		• VERIFY RCS subcooling less than 25ºF (55ºF FOR ADVERSE CONTAINMENT). [Step 1.a]
		• VERIFY ECCS Pumps (CCP or SI) – AT LEAST ONE RUNNING. [Step 1.b]
	RO	• STOP all RCPs. [Step 1.c]
	RO/BOP	CHECK if Any Steam Generator Is Faulted: [Step 2]
		• VERIFY any Steam Generator pressure – DECREASING IN AN UNCONTROLLED MANNER. [Step 2.a]
		• VERIFY any Steam Generator pressure – COMPLETELY DEPRESSURIZED. [Step 2.a]
		• GO to Step 3. [Step 2.a RNO]
	US	CHECK Intact Steam Generator Levels: [Step 3]
		• VERIFY Narrow range level – GREATER THAN 43% (50% FOR ADVERSE CONTAINMENT). [Step 3.a]
		• MAINTAIN total AFW flow greater than 460 GPM until narrow range level GREATER THAN 43% (50% FOR ADVERSE CONTAINMENT). [Step 3.a RNO]
	US	CHECK Secondary Radiation NORMAL: [Step 4]
		• VERIFY Condenser off gas radiation – NORMAL. [Step 4]

Time	Position	Applicant's Actions or Behavior
		• VERIFY Main Steam Line radiation – NORMAL. [Step 4]
		• VERIFY SG Blowdown Sample Radiation Monitor – NORMAL. [Step 4]
		• VERIFY levels in all Steam Generators – NORMAL. [Step 4]

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.

Time	Position	Applicant's Actions or Behavior
	US	CHECK PRZR PORVs and Block Valves: [Step 5]
		• VERIFY power Block Valves – AVAILABLE. [Step 5.a]
		• VERIFY PORVs – CLOSED. [Step 5.b]
		• VERIFY Block Valves – AT LEAST ONE OPEN. [Step 5.c]

Time	Position	Applicant's Actions or Behavior
	US/RO	CHECK if ECCS Flow Should Be Reduced: [Step 6]
		• VERIFY Secondary heat sink conditions – SATISFIED. [Step 6.a]
		• VERIFY RCS subcooling – GREATER THAN 25°F (55°F FOR ADVERSE CONTAINMENT). [Step 6.b]
		• GO to Step 7 and OBSERVE CAUTIONS Prior to Step 7. [Step 6.b RNO]

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.

Operating Test :	NRC	Scenario #	3	Event #	5, 6, 7, & 8	Page	26	of	33
Event Description:	Train B Centrifugal Charging Pump Auto Start Failure / Large Break LOCA / Train A & B Containment Isolation Phase B Failure / Train A & B Containment Spray Heat Exchanger Outlet Valve Failure								

Time	Position	Applicant's Actions or Behavior
	RO/BOP	RESET ESF Actuation Signals. [Step 7]
	RO/BOP	PLACE both EDG EMERG STOP/START handswitches in START. [Step 7.a]
Examiner Note:		**When Safety Injection is properly RESET, Annunciator 1-ALB-2B, Window 2.8, SFGD SEQR TRN A/B AUTO TEST TRBL, will RESET.**
	RO/BOP	RESET SI. [Step 7.b]
		• DEPRESS 1/1-SIRA, TRAIN A SI RESET pushbutton.
		• DEPRESS 1/1-SIRB, TRAIN A SI RESET pushbutton.
	RO/BOP	RESET SI Sequencers. [Step 7.c]
		• 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.d]
		• 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.e]
		• DEPRESS 1/1-CSRA, TRAIN A CS RESET pushbutton.
		• DEPRESS 1/1-CSRB, TRAIN B CS RESET pushbutton.

Operating Test : NRC	Scenario # 3	Event # 5, 6, 7, & 8	Page 27 of 33
Event Description:	Train B Centrifugal Charging Pump Auto Start Failure / Large Break LOCA / Train A & B Containment Isolation Phase B Failure / Train A & B Containment Spray Heat Exchanger Outlet Valve Failure		

Time	Position	Applicant's Actions or Behavior
		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]
	RO/BOP	• VERIFY RCS pressure – GREATER THAN 325 PSIG (425 PSIG FOR ADVERSE CONTAINMENT). [Step 8.a.1)]
		• GO to Step 10. [Step 8.a.1) RNO]
	US	CHECK If Diesel Generators Should Be Stopped: [Step 10]
	RO/BOP	• VERIFY both AC Safeguards Buses ENERGIZED by Offsite Power. [Step 10.a]
	RO/BOP	• PLACE both EDG EMERG STOP/START handswitches 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]
	RO	• VERIFY Cold Leg Recirculation capability: [Step 11.a]
		• VERIFY Train A RHR Pump – AVAILABLE. [Step 11.a.1)]
		• VERIFY CCW to Train A RHR Pump – AVAILABLE. [Step 11.a.1)]
		• VERIFY 1/1-8811A, CNTMT SMP TO RHRP 1 SUCT ISOL VLV AVAILABLE. [Step 11.a.1)]
		• VERIFY Train B RHR Pump – AVAILABLE. [Step 11.a.1)]
		• VERIFY CCW to Train B RHR Pump – AVAILABLE. [Step 11.a.1)]

Operating Test :	NRC	Scenario #	3	Event #	5, 6, 7, & 8	Page	28	of	33
Event Description:	Train B Centrifugal Charging Pump Auto Start Failure / Large Break LOCA / Train A & B Containment Isolation Phase B Failure / Train A & B Containment Spray Heat Exchanger Outlet Valve Failure								

Time	Position	Applicant's Actions or Behavior
		• VERIFY 1/1-8811B, CNTMT SMP TO RHRP 2 SUCT ISOL VLV – AVAILABLE. [Step 11.a.1)]
		• VERIFY 1/1-8804A, RHRP 1 TO CCP SUCT VLV – AVAILABLE. [Step 11.a.2)]
		• VERIFY 1/1-8804B, RHRP 2 TO SIP SUCT VLV – AVAILABLE. [Step 11.a.2)]
	RO/BOP	• CHECK Auxiliary Building and Safeguards Building radiation – NORMAL: [Step 11.b]
		• CHECK PC-11 monitors – NORMAL <u>OR</u> Notify Radiation Protection to take local Radiation Surveys. [Step 11.b]
	US	• NOTIFY Chemistry to obtain RCS samples to assist in determining extent of the accident. [Step 11.c]
	US	• CONTACT Plant Staff to EVALUATE plant equipment. [Step 11.d]
	US	CHECK if RCS Cooldown and Depressurization Is Required: [Step 12]
	RO/BOP	• VERIFY RCS pressure – GREATER THAN 325 PSIG (425 PSIG FOR ADVERSE CONTAINMENT). [Step 12.a]
	RO/BOP	• VERIFY RHR Pump flow greater than 750 GPM and GO to Step 13. [Step 12.a RNO]
	US	CHECK If Transfer to Cold Leg Recirculation Is Required. [Step 13]
	RO/BOP	• VERIFY RWST Level – LESS THAN LO-LO LEVEL. [Step 13.a]
When EOP-1.0A, Step 13 is reached, TERMINATE the scenario.		

Operating Test :	NRC	Scenario #	3	Event #	5, 6, 7, & 8	Page	29	of	33
Event Description:	Train B Centrifugal Charging Pump Auto Start Failure / Large Break LOCA / Train A & B Containment Isolation Phase B Failure / Train A & B Containment Spray Heat Exchanger Outlet Valve Failure								

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 EDG 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 Train B CCW Pump – RUNNING. [Step 5]
	BOP	VERIFY RHR Pumps – RUNNING. [Step 6]
	BOP	VERIFY Proper CVCS Alignment: [Step 7]
		• VERIFY both CCPs – RUNNING. [Step 7.a]
	RO/BOP	• Manually START Train B CCP 1-02. [Step 7.a RNO]
		• VERIFY Letdown Relief Valve Isolation: [Step 7.b]
		• Letdown Orifice Isolation Valves – CLOSED. [Step 7.b.1)]
		• Letdown Isolation Valves 1/1-LCV-459 & 1/1-LCV-460 – CLOSED. [Step 7.b.2)]

Operating Test :	NRC	Scenario #	3	Event #	5, 6, 7, & 8	Page	30	of	33
Event Description:	Train B Centrifugal Charging Pump Auto Start Failure / Large Break LOCA / Train A & B Containment Isolation Phase B Failure / Train A & B Containment Spray Heat Exchanger Outlet Valve Failure								

Time	Position	Applicant's Actions or Behavior
	BOP	VERIFY ECCS flow: [Step 8]
		• CCP SI flow indicator – CHECK FOR FLOW. [Step 8.a]
		• 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. [Step 8.d RNO]
	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 both 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]
	BOP	INITIATE periodic monitoring of Spent Fuel Cooling. [Step 13]
		• Spent Fuel Pool temperature (T2900A, T2901A).
		• Spent Fuel Pool level (L4800A, L4801A, L4802A, L4803A).

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.

Time	Position	Applicant's Actions or Behavior			
	BOP	VERIFY Components on Table 1 are Properly Aligned. [Step 14]			
		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

Operating Test : NRC	Scenario # 3	Event # 5, 6, 7, & 8	Page 33 of 33				
Event Description:	Train B Centrifugal Charging Pump Auto Start Failure / Large Break LOCA / Train A & B Containment Isolation Phase B Failure / Train A & B Containment Spray Heat Exchanger Outlet Valve Failure						
Time	Position	Applicant's Actions or Behavior					

<u>Examiner Note</u>: The next four (4) 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

Time	Position	Applicant's Actions or Behavior
	BOP	NOTIFY Unit Supervisor attachment instructions complete <u>AND</u> to IMPLEMENT FRGs as required. [Step 14]

EOP-0.0A, Attachment 2 steps are now complete.

COMANCHE PEAK NUCLEAR POWER PLANT

UNIT 1

INTEGRATED PLANT OPERATING PROCEDURES MANUAL

FOR EMPLOYEE USE:
DATE VERIFIED/INITIALS ______ / ______ LATEST PCN/EFFECTIVE DATE PCN 18 / 1/17/13 1200

LEVEL OF USE:
CONTINUOUS USE

QUALITY RELATED

POWER OPERATIONS

PROCEDURE NO. IPO-003A

REVISION NO. 28

EFFECTIVE DATE: 10/26/10 1200

PREPARED BY (Print): Tom Nash EXT: 5513

TECHNICAL REVIEW BY (Print): EDITORIAL REVISION EXT: NA

APPROVED BY: Bart Smith DATE: 10/18/10
DIRECTOR, OPERATIONS

5.5 **Operating At Constant Turbine Load**

The following lists conditions and anticipatory responses that should be reviewed while operating at constant Turbine load:

A. Reactor Operation

- N-16 should be monitored as an indication of power along with NIS and Calorimetric power. N-16 may be the most accurate indicator of power during a transient since it is temperature compensated. During transient conditions, the highest indication of Reactor power (N-16 and NIS) should always be maintained within limits.

- Maintain the Axial Flux Difference within the AFD administrative band specified in NUC-204 and at or near the target AFD. The AFD administrative band specified by NUC-204 is identified as an administrative limit in this procedure.

- Contact Core Performance Engineering to obtain fuel conditioned power restrictions.

- An administrative AFD limit of ±2% about the target value should be maintained during steady state operation. If AFD deviates outside this limit or if AFD oscillations occur, immediate operator action should be initiated to restore AFD within its administrative limit. This limitation may be modified by Core Performance Engineering based on core operating data.

- If I-131 values increase to more than 25% above its equilibrium value, sample frequency and data collection should be implemented per STA-735. If failed fuel is detected, the Failed Fuel Action Guidelines of STA-735 should be reviewed for applicability. These guidelines may place additional restrictions on power level and ramp rates.

- Perform minimum control rod motion when operating at constant high power conditions to minimize flux oscillations.

- Control rod use should be minimized. Boration and dilution should be used to assist rod movement to compensate for the following:

  - Maintain T_{avg} within 1°F of T_{ref}.

  - To force the Axial Flux Difference to the target AFD during Reactor power changes.

  - To keep the Axial Flux Difference within the AFD administrative band during reduced power operation.

  - To dampen Xenon Oscillations as described on Attachment 2.

5.5 A. Reactor Operation (continued)

- If there is reason to believe Rods may step when going to Auto from Manual, Rod motion demand for automatic rod motion can be checked. Verify the Circuit 1 output LED (outward motion) and the Circuit 2 output LED (inward motion) are OFF. Located in RK-08, CF06, Card 41, labeled 1-SB-0412A and 1-SB-0412B.

- Alternate dilution may be used to compensate for fuel burnup as long as RCS hydrogen concentration can be maintained within specifications.

- Steady State implies that temperatures, pressures, and flows are stable such that the nominal value of reactor power remains stable, subject to statistical uncertainties and normal fluctuations (e.g., feedwater oscillations).

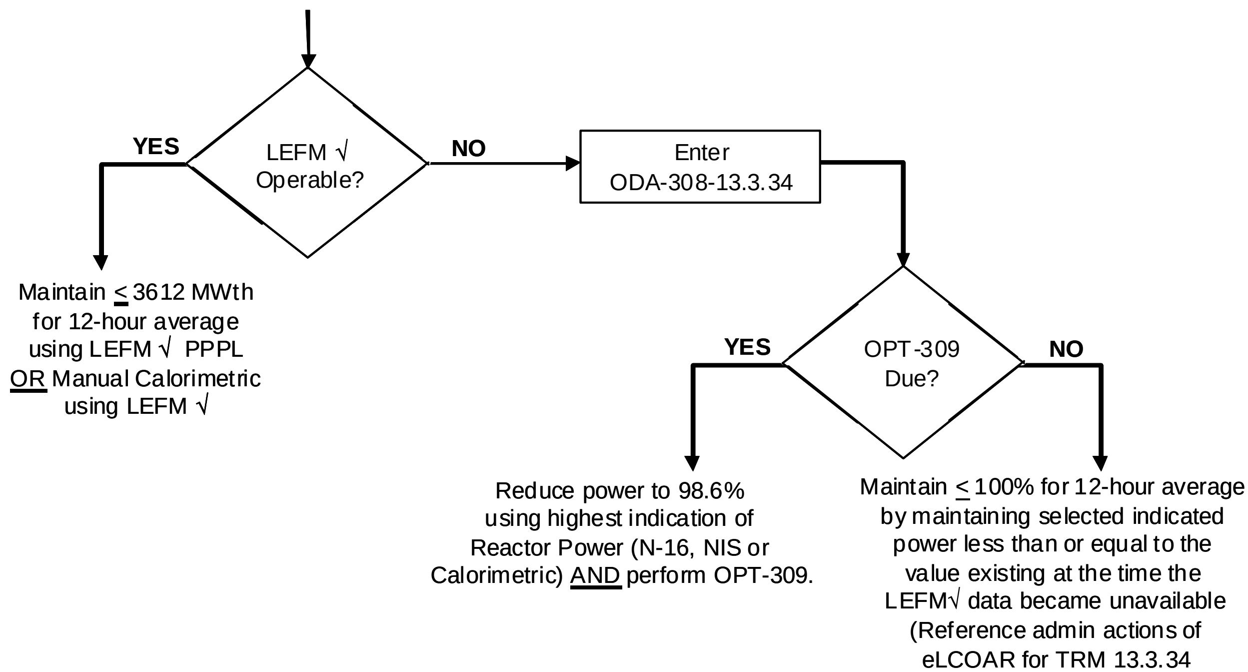
- The 2 hour and 12 hour averages are monitored and trended to ensure compliance with the licensed thermal limit. The 1 hour average is used to control/trend thermal power. Utilizing the 1 hour average ensures that the 2 hour and 12 hour averages are maintained < RTP. Other averages (1m, 15m, 30m, 1h, 8h) may be used for trending and anticipatory response to changing plant conditons. Averages < 1 hour are used for trending purposes only due to large variations associated with feedwater oscillations, changes in reactive load, etc.

- The average thermal power level over any 12 hour period shall not exceed:

  - 3612 MWth (100% RTP) when the LEFM✔ has been used to perform last calorimetric per SR 3.3.1.2, or

  - 3562 MWth (98.6% RTP) when the Feedwater Venturis (or MCB indication) have been used to perform the last calorimetric per SR 3.3.1.2 (TR 13.3.34).

5.5.A. • The following flowchart provides a simplified guideline for maintaining Unit 1 plant power. A detailed description is given in the subsequent paragraphs.



- The Plant Computer, Primary Plant Performance Calorimetric using the LEFM ✔ is the preferred method for measurement of Thermal Power per OPT-309. Thermal Power may be monitored using the Plant Computer, Primary Plant Performance Calorimetric form LEFM ✔ (POWERL) when this indication is available and LEFM ✔ has been used to perform last calorimetric. Operation at a RTP of 3612 MWth is allowed when the LEFM ✔ is used for feedwater flow in the calorimetric measurement. In this configuration, accident analysis requires a ± 0.6% RTP allowance for the calorimetric uncertainty.

- IF the LEFM ✔ becomes unavailable during the intervals between performance of SR 3.3.1.2 for the OPT-309 calorimetric measurement, THEN operation may continue using highest indication of Reactor power (N-16, NIS or Calorimetric). A preparatory turbine power reduction of ~ 0.5MWe may be taken to ensure that power remains at or below 100%.

- WHEN the LEFM ✔ or POWERL is NOT available, THEN the Plant Computer, Primary Plant Performance Calorimetric using the Corrected Feedwater Venturis (POWERC) provides the next desired method for measurement and monitoring of Thermal Power. Operation is restricted to a Thermal Power of 3562 MWth when the Feedwater Venturis are used for feedwater flow in the calorimetric measurement. In this configuration, the accident analysis requires a ± 2% RTP allowance for the calorimetric uncertainty.

5.5 A. Reactor Operation (continued)

- IF the Plant Computer is NOT available, THEN operation may continue using highest power indication of Reactor power from N-16 or NIS to monitor Thermal Power. OPT-309 manual calculation (using a validated computer program on the Control Room PC) may be used for measurement of Thermal Power if the Plant Computer, Primary Plant Performance Calorimetric is NOT available. Operation is restricted to a Thermal Power of 3562 MWth when the Feedwater Venturis are used for feedwater flow in the calorimetric measurement. In this configuration, the accident analysis requires a ± 2% RTP allowance for the calorimetric uncertainty.

- While maintaining power near the Rated Thermal Power limit, Reactor thermal power should be monitored at least once every thirty (30) minutes. This may be accomplished using the Plant Computer, Primary Plant Performance Calorimetric. IF a planned outage of the Plant Computer or LEFM ✔ is scheduled AND NIS or N16 indicates greater than 100% RTP (3612 MWth), THEN a calorimetric should be performed and the NIS and N16 channels should be adjusted per OPT-309.

- Performance of the calorimetric using venturis (POWERC, POWERV, or MANUAL with venturis) during extended power operation below 55% RTP AND a subsequent reduction in NIS Power Range or N-16 channel output has the potential to place the Unit in a condition outside the safety analysis limit (i.e reactor trip originating from Power Range or N-16 indication may be above that value assumed in the safety analysis). Therefore additional controls exist in ODA-308-13.3.34 for performance of a calorimetric using FW venturis with the Unit operating in extended power operation below 55% RTP.

- A power reduction, such as required by OPT-217A near end of core life requires special consideration for managing reactivity. The amount of boron used to reduce Reactor power must be minimized to limit the amount of dilution and subsequent time requirements for return to power. Utilizing BTRS or an unsaturated CVCS demineralizer should be considered to limit dilution volumes. Core Performance Engineering may be contacted to provide recommendations for ramp rates, ΔI control and a pre-planned core reactivity balance for scheduled power reductions. This information may be used as a job aid to provide general guidelines for conducting power reductions.

- Near end of core life, power coastdown may be initiated to extend the time to Refueling. Approximately 2% power/day will be required to maintain Tavg within 1°F of Tref. Core Performance Engineering may modify existing ΔI administrative controls, as required, to provide for optimal fuel utilization prior to reload.

- WHEN Reactor power will be increased by $\geq$20%, THEN ODA-308 should be reviewed to determine whether additional $F_Q(Z)$ measurements will be required.

5.5 A. Reactor Operation (continued)

- Power Change Log should be initiated during UP-POWER evolutions >20% when reactor power is >20% Rated Thermal Power OR during any UP-POWER when ramp rate limit is < 15% per hour (typically for fuel conditioning) when reactor power is >20%.

[C]
- Thermal power changes $\geq$15% of Rated Thermal Power within 1 hour requires notification of Chemistry and Radiation Protection as soon as possible. This allows them to perform required sampling surveillances within the specified time limits (TS SR 3.4.16.2, ODCM 4.11.2.1.1.2 and 4.11.2.1.1.3)

5.5 B. Secondary Operation

- Operate the Turbine generator within the limits specified in TDM-401A.
- Attachment 6 may be utilized to reduce power, as required, to perform stroke testing on the Main Turbine Stop and Control Valves.
- Periodically monitor Circulating Water inlet temperature and operate CWPs to optimize efficiency per TDM-310A.
- Normal full flow through Turbine Gland Steam Condenser (1140 gpm) is based on erosion of tubes. Short term operation with flow >1140 gpm but <1280 gpm is permitted. 1CO-0255 may be throttled as necessary to maintain <1140 gpm as indicated on 1-FI-2243, TURB GLND STM CNDSR CNDS FLO.
- The Low Pressure Turbine installed during 1RF10 provides more extraction steam drain flow to the Heater Drain Tanks than the Heater Drain Pumps can forward flow. The inability of the Heater Drain Pumps to maintain Heater Drain Tank level will be indicated by the Heater Drain Pump discharge valve being full open or Heater Drain Tank alternate drain valve opening. The Condensate Pump Recirc valve may be placed in manual and opened to redirect a portion of the Condensate Pump flow back to the condenser. This will reduce the pressure at the discharge of the Heater Drain Pumps and increase Heater Drain Pump flow. Feedwater Pump suction pressure should be closely monitored while throttling 1-FV-2239. During throttling of 1-FV-2239, the following valves should be monitored for the desired effect:
  - 1-ZL-2594, HDT ALT DRN VLV - FULL CLOSED
  - 1-LK-2592,HDP DISCH VLV - Less than 100% OPEN
- When 1-FK-2239, CNDS PMP RECIRC CTRL is throttled for the purpose above, the TRIP-TO-AUTO feature shall be enabled using the Toggle Switch on the controller. With the Switch in the "TRIP-TO-AUTO ENABLE" position the controller will trip to Auto on a low flow condition.

5.5 C. General

- Inform Core Performance Engineering of any substantial reduction in power (>25%). |

- Maximum Generation Verification testing (ETP-110A-3, Comanche Peak Unit 1 Power Capability Verification) should be performed upon request from the QSE Generation Controller.

- When an electric grid "Hands Off" Condition has been declared OR QSE Generation Controller or TGM Transmission Grid Controller has informed unit that grid conditions exist such that inadequate voltage may exist on loss of a unit, perform the following:

  - Evaluate surveillance testing or high risk activities which may jeopardize unit availability can be minimized as much as practical.

  - Notify WCC Work Week Coordinator of declared condition.

  - For potential inadequate voltage, refer to ABN-601 for potentially degraded off-site power system voltage.

- When an outage is planned within the next four week period, review Attachment 5 to determine whether system alignments or other activities should be initiated prior to the outage.

[L] D. Normal Load adjustments during high power conditions to maintain 100% load.

1) If desired to use the "↑ 0.2MW" or "↓ 0.2MW" load adjustment controllers, perform the following:

a. OPEN the desired OSD

☐ ↑ 0.2MW

☐ ↓ 0.2MW

b. Verify the desired OSD is open:

☐ 0.2MW INCREASE

☐ 0.2MW REDUCTION

☐ c. Select the"0/1" button

☐ d. EXECUTE

e. Close the selected OSD

☐ 0.2MW INCREASE

☐ 0.2MW REDUCTION

2) Normal Load adjustments during high power conditions to maintain 100% load.

☐ a. OPEN the "LOAD TARGET" OSD.

☐ b. Verify the open OSD is the "LOAD TARGET".

☐ c. Determine new Load Target Value desired.

☐ d. Select the "Blue" Bar and enter the desired LOAD.

☐ e. ACCEPT

☐ f. Verify the value in the "Blue Bar" is the desired Load Target. (correct magnitude and direction)

☐ g. EXECUTE

☐ h. Verify "Load Target" changes to desired load.

☐ i. Close the "LOAD TARGET" OSD.

[L] 5.5 E. Adjusting Voltage with the Main Generator synchronized to the Grid and Voltage Control in Auto to control MVARs/Grid Voltage.

> NOTE: When directed to adjust generator output voltage, actions to comply shall be performed within 5 minutes or provide an explanation to the entity that requested the change.

☐ 1) Open "GEN VOLTAGE TARGET" OSD.

☐ 2) Verify the open OSD is “GEN VOLTAGE TARGET”.

> CAUTION: If the other Unit is synchronized to the Grid, coordinate with the other Unit to adjust MVARs.

☐ 3) Click the appropriate RAISE or LOWER "Blue" Arrow.

☐ 4) EXECUTE

☐ 5) Verify MVARs and SWYD Voltage respond in the correct direction.

☐ 6) WHEN the desired value is reached, THEN click the "Stop" Button.

☐ 7) Close the "GEN VOLTAGE TARGET" OSD.

> NOTE:
> - Operation with the LEFM calorimetric out of service is covered by TRM 13.3.34, and is not covered by the following guidance.
> - The Plant Computer LEFM calorimetric calculation is calculated roughly once per minute. Due to normal fluctuations in the field instrumentation signals, the calculated value of The Plant Computer LEFM calorimetric calculation will vary slightly from minute to minute. As a result, the one-hour average value should be used as the primary basis for evaluating average Rx power level.
> - With restoration of the LEFM Calorimetric Program from a failed condition OR reboot of the Plant Computer from a failed condition, all “POWER LEFM” VALUES (1M, 15M, 30M, 1H, 2H, 8H and 12H) on the POWERL Screen will be updated to the instantaneous value calculated by the LEFM Calorimetric Program. The resulting indication will remain as shown for the duration of the applicable time interval, which will not accurately reflect changes in the actual thermal power for the same duration. ODA-308-13.3.34-S01 provides guidance for the restoration of the LEFM.

F. Operational Guidance for operating above 99.00% RTP (3575.88 MWth).

1) No actions are allowed that would intentionally raise core thermal power above 3612.00. Small, short-term fluctuations in power that are not under the direct control of a license reactor operator (e.g., fluctuations caused by secondary-side control valve oscillations, grid fluctuations) are not considered intentional.

2) At no time shall the twelve-hour average calculated power level be allowed to exceed 3612.00 MWth.

5.5 F. 3) Following Rx power adjustments above 99.00% RTP (3575.88 MWth), the value of the Plant Computer LEFM 30 Minute Averaged calorimetric calculation should be monitored frequently for at least 30 minutes. This assessment is made to give the Unit RO reasonable assurance that the two hour average power level will be less than or equal to 3612.00 MWth.

4) At steady-state conditions, adjustments to keep the plant at 3612.00 MWth will be performed at varying frequencies depending upon plant conditions and time in core life. Positive adjustments to Rx power will be based on the current one-hour average power level.

5) Whenever the one-hour average Plant Computer LEFM calorimetric calculation indicates greater than 3612.00 MWth the Unit RO should assess the current calculated Rx power level and trend. The Unit RO should take action, as necessary, to ensure that avg Rx power is trending to a calculated value that is less than or equal to 3612.00 MWth.

6) Closely monitor thermal power during steady state power operation with the goal of maintaining the two-hour thermal power average at or below 3612.00. If the core thermal power average for a 2-hour period is found to exceed 3612.00, timely action shall be taken to ensure that thermal power is less than or equal to 3612.00. The Shift Operations Manager should be notified.

NOTE: A preparatory power reduction is not necessary for evolutions which results in a relatively slow increase in reactivity (e.g. routine dilution, rod step for ΔI control). During evolutions which may slowly increase reactor power, monitoring and adjustments should be performed as necessary to ensure the one hour average power remains < 3612.00 MWth.

7) For pre-planned evolutions that could affect primary or secondary temperatures, pressures or flows:

a. Determine if the evolution is expected to cause a transient increase in reactor power (e.g., TDAFWP run, cycling drip-pots)

b. If the evolution is expected to cause a transient increase in reactor power that will exceed the 3612.00, prudent action based on prior performance or evaluations should be taken to reduce power prior to performing the evolution (i.e. lowering power prior to starting the TDAFWP when it is anticipated that power may exceed 3612.00 is considered prudent action)

8) The following performance deficiencies should be documented on a SmartForm per STA-421:

a. Raising power with the intent of exceeding 3612.00 MWth for any period of time.

b. Failure to take timely action to lower thermal power to less than or equal to 3612.00 when the two hour average exceeds 3612.00.

c. Permitting the 12 hour average power to exceed 3612.00.

d. Failure to take action prior to a pre-planned evolution that is expected to cause a power increase that will exceed 3612.00 on the two hour average.

G. Electric Grid Support Activities:

1) Main Generator Voltage (345 KV Switchyard)

- Maintain generator voltage as directed by QSE or ONCOR TGM and in accordance with CPNPP Operating procedures.
- Automatic Voltage Regulator (AVR) should be maintained in “AUTO” when the Unit is online and released. If the AVR is transferred to “MANUAL”, then notify the QSE within 10 minutes and maintain voltage as directed.
- When directed to adjust generator output voltage, actions to comply shall be performed within 5 minutes or provide an explanation to the entity that requested the change.
- The Unit(s) shall not reduce high reactive loading on individual units during abnormal conditions without the consent of the QSE Generation Controller, unless equipment damage is imminent.

2) Logging activities: (Always include names of individuals contacted)

- Any change in real (MW) or reactive (MVAR) capability of the unit.
- Non-routine communications to/from Transmission Grid Controller or QSE Generation Controller.
- Voltage change requests - if the voltage change request cannot be performed, then notify the requesting entity and provide the technical justification for not complying with the request. Log the time of notification, the individual’s name notified, and the reason.

3) QSE Generation Controller notifications:

- Any failure, degradation, or mis-operation of automatic generator protection systems that resulted in, or could have resulted in:

  a) Loss of $\geq$ 1000 MW of generation.**

  b) Sustained switchyard voltage excursions $\geq$ 34.5 KV.**

  c) Major damage to plant components that changes generation output.**

  d) When a generator protective relay mis-operation occurs or has been identified as defined by Corporate Procedure G-3035.**

- Inability to comply with a voltage request. Provide the technical justification for not complying with the request. Log the time of notification, the individual’s name notified, and the reason.
- Any planned shutdown due to Technical Specifications or component problems. Then enter a forecasted condition into Nodal GAPS.
- Any change in real MW (25 MWe or more) or reactive (MVAR) power or capability of the unit. If possible, notify QSE prior to making load changes of more than 10 MWe*

G. 3)
- High reactive loading or reactive oscillations (as soon as possible) |
- When a Unit trips offline due to voltage or reactive problems (as soon as possible) |
- Any change in power ramp rate capability.
- Any change in the automatic voltage regulator (AVR) status (manual/auto).*

  * Notifications are to be made to the QSE Generation Controller within 10 minutes and give restoration status (if known) and have QSE inform ERCOT Operations, input into Nodal GAPS, and a follow-up notification to the Transmission Grid Controller (for their RTCA model update).

  The new corporate procedure has standard phraseology they recommend using such as:

  ““The Automatic Voltage Regulator for Comanche Peak Unit 1 is not in Automatic and is being operated in the Manual mode. The AVR is expected to return to Automatic mode at (time & date). Please communicate this information to ERCOT operations immediately.””

  ““The Automatic Voltage Regulator for Comanche Peak Unit 1 is now back in normal operation in the Automatic mode as of (time). Please communicate this information to ERCOT operations immediately.””

  ** Notify the Duty Manager of this “grid reportable” event for appropriate notifications To the Plant Manager. (STA-501 NR-41)

4) Testing: |

- Maximum Generation/Capacity verification per ETP-110A-3 should be performed when requested by the QSE Generation Controller.
- Maximum Reactive Capacity testing per ETP-110A-1 or 2 should be performed:

  a) Biennially per POD schedule.

  b) When requested by the QSE Generation Controller <u>AND</u> coordinated with Operations Management and Work control.

5) General: |

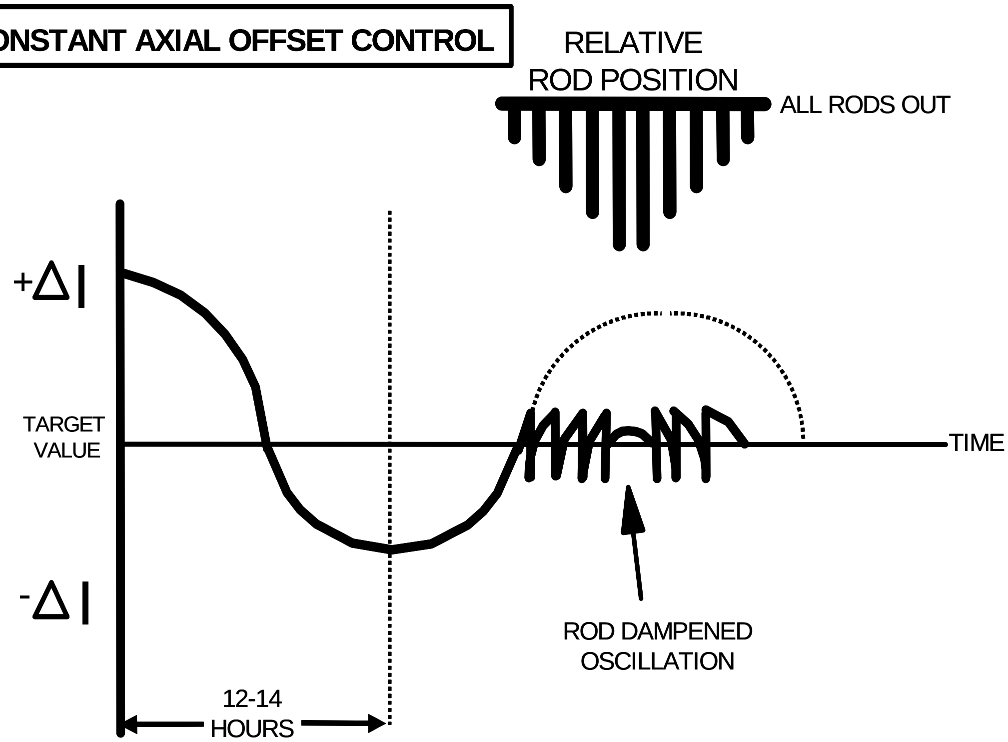
- Notifications, GAPS updates, and its respective logging activities should be done in a timely fashion following stabilization of the plant. Off site grid authorities need pertinent CPNPP information to ensure grid stability.
- Hands Off & Grid Notifications - OPGL 41
- Voltage/Frequency issues - ABN-601
- STA-501 ERCOT/NERC/DOE Report NR-41

ATTACHMENT 2
PAGE 1 OF 1

DELTA I CONTROL/DAMPENING XENON OSCILLATIONS

If a ΔI swing is greater than ±1.5%, or uncontrollable due to size or unavailability of rods, or the operator has any questions about controlling the ΔI swing, contact Core Performance Engineering for guidance in controlling ΔI. This attachment should be used as a general guideline during slow, controlled power changes.
Xenon oscillations should be dampened out. The method discussed in this attachment is only applicable to ΔI swings less than 1.5%. Xe swings are controlled by continually forcing ΔI to the target value. This method will usually dampen small Xe swings in approximately 12 hours or through one peak.

CONSTANT AXIAL OFFSET CONTROL



ΔI can be maintained using a combination of the following:

- With ΔI more negative than the target, initiate boration and use rod withdrawal to bring ΔI to the target and then maintain the target value.

- With ΔI more positive than the target, initiate dilution and use rod insertion to bring ΔI to the target and then maintain the target value.

IF THERE ARE ANY QUESTIONS OR THE ΔI SWING is >1.5%, CONTACT CORE PERFORMANCE ENGINEERING FOR GUIDANCE.

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POWER CHANGE WORKSHEET

Power Change Reactivity Calculation

Unit ____ Cycle ____ Date __________ Time ______ Page 1 of 3

A. Obtain Current Plant Conditions

A.1 RCS Boron __________ ppm
A.2 Power Level __________ % RTP
A.3 CBD Position __________ steps
A.4 Core Burnup __________ MWD/MTU
A.5 Burnup Range ___BOL ___MOL ___EOL
[Reference NDR Section 5.1 for Burnup Range]

Note: Core Burnup should be obtained from CHORE. If CHORE is not available, estimate Core Burnup using the following formula.

Burnup Estimate = [Number of Days the Cycle has Operated] x 44

B. Estimate Target CBD Position

B.1 Target Power Level (or Target MWe / HFP MWe x 100%) __________ % RTP

IF planning a Power DECREASE (B.1 < A.2), **THEN** B.2 =

$$\underset{\text{Current CBD Position [A.3]}}{\underline{\qquad}} + \left[\underset{\text{Target Power Level [B.1]}}{\underline{\qquad}} - \underset{\text{Current Power Level [A.2]}}{\underline{\qquad}}\right] \times \left[\underset{\text{Core Burnup [A.4]}}{\underline{\qquad}} + 8{,}000\right] / 12{,}000$$

IF planning a Power INCREASE (B.1 ≥ A.2), **THEN** B.2 =

$$\underset{\text{Current CBD Position [A.3]}}{\underline{\qquad}} + \left[\frac{\left(215 - \underset{\text{Current CBD Position [A.3]}}{\underline{\qquad}}\right) \times \left(\underset{\text{Target Power Level [B.1]}}{\underline{\qquad}} - \underset{\text{Current Power Level [A.2]}}{\underline{\qquad}}\right)}{\left(100 - \underset{\text{Current Power Level [A.2]}}{\underline{\qquad}}\right)}\right]$$

B.2 Target CBD Position = __________ steps

C. Power Defect Reactivity Change

Determine change in Reactivity due to Power Defect, based on current RCS Boron, using:

NDR Table 5.1 for BOL	*NDR Table 5.2 for MOL*	*NDR Table 5.3 for EOL*

C.1 Absolute Value of Power Defect at Current Power Level [A.2] = __________ pcm
C.2 Absolute Value of Power Defect at Target Power Level [B.1] = __________ pcm
C.3 Δ Power Defect = [C.1] - [C.2] = __________ pcm

NOTE: [C.1] and [C.2] should always be positive (+) values. [C.3], Δ Power Defect, will be positive (+) for a power DECREASE, negative (-) for a power INCREASE.

If desired, use pages 4-6 of Att 3 as a guide for NDR Table Interpolation.

ATTACHMENT 3
PAGE 2 OF 6

POWER CHANGE WORKSHEET

Power Change Reactivity Calculation

Unit ____ Cycle ____ Date __________ Time ______ Page 2 of 3

D. Control Rod Motion Reactivity Change

Determine change in Reactivity due to Control Rod Motion, using:

NDR Figure 5.16 for BOL	*NDR Figure 5.17 for MOL*	*NDR Figure 5.18 for EOL*

D.1 Absolute Value of CBD Integral Worth at Current CBD Position [A.3] = __________ pcm

D.2 Absolute Value of CBD Integral Worth at Target CBD Position [B.2] = __________ pcm

D.3 Δ Control Rod Worth = [D.1] - [D.2] = __________ pcm

NOTE: [D.1] and [D.2] should always be positive (+) values. [D.3], Δ CR worth, will be negative (-) for Rod INSERTION, and positive (+) for a Rod WITHDRAWAL.

E. Determine Reactivity Worth Required from Boron Adjustment

E.1 Δ Boron Worth = [__________ (Δ CR Worth [D.3]) + __________ (Δ Power Defect [C.3])] x [-1] = __________ pcm

NOTE: [E.1], Δ Boron Worth, will be negative (-) when BORATION is needed, and positive (+) when DILUTION is needed.

F. Determine Integral Boron Worth at Current Conditions

For this section, utilize the following NDR tables.

NDR Table 5.10 for BOL	*NDR Table 5.11 for MOL*	*NDR Table 5.12 for EOL*

Utilize a CORE AVERAGE TEMPERATURE value of 557 degrees F to determine the worth.

F.1 Integral Boron Worth at __________ (Current RCS Boron [A.1]) ppm = __________ pcm

NOTE: [F.1] will always be a negative (-) reactivity value.

If desired, use pages 4-6 of Att 3 as a guide for NDR Table Interpolation.

G. Determine Target RCS Boron Value

G.1 Target Integral Boron Worth = [__________ ([F.1]) + __________ ([E.1])] = __________ pcm

G.2 Target RCS Boron value (using Tables from F above, at 557 deg F) = __________ ppm

NOTE: If desired, use pages 4-6 of Att 3 as a guide for NDR Table Interpolation.

H. Determine RCS Boration / Dilution Volume

Determine appropriate Boration OR Dilution volume using CHORE or TDM-201A/B, to change RCS Boron from [A.1] to [G.2]

H.1 Check appropriate method for RCS Boron change: ☐ Boration Volume ☐ Dilution Volume

H.2 Volume Required: = __________ gallons

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POWER CHANGE WORKSHEET

Power Change Reactivity Calculation

Unit ____ Cycle ____ Date __________ Time ______ Page 3 of 3

NOTE: This calculation does **NOT** include any adjustments for changes in Xenon worth from the equilibrium value at a power level of [A.1].

If Power is being **DECREASED** from steady state, Xenon will initially build in due to the decrease in flux, adding negative reactivity. Therefore boration should be reduced for a slower power change.

If Power is being **INCREASED** from steady state, the higher flux will result in an initial reduction in Xenon, adding positive reactivity. Therefore the dilution volume should be reduced from the estimate for a slower power change.

If possible, discuss Xenon impacts, AFD control strategies, and schedule with Core Performance Engineering prior to the power change.

I. Summary of Results

To change power immediately from ____________ (Current Power Level [A.2]) to ____________ (Target Power Level [B.1]), it is estimated that

__________ (Volume [H.2]) gallons of __________ (Bor or Dil [H.1]) will be required, and CBD final position will

be approximately __________ (Target CBD Position [B.2]) steps.

Comments: ____

____

____

____

____

____

____

Performed By (RO): ______________________ Date: __________
Reactor Operator Review: ______________________ Date: __________
Unit Supervisor: ______________________ Date: __________

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POWER CHANGE WORKSHEET

Interpolation Guide for Power Change NDR Reactivity Calculation

This attachment provides guidance for interpolation of values on Attachement 3 Pages 1-3, using the NDR Tables as referenced in the applicable step.

Value [C.1] - Power Defect at Current Conditions

X = Current Boron (ppm) [value A.1]	X = ________	ppm
Y = Current Power Level (% RTP) [value A.2]	Y = ________	% RTP
X_1 = First Boron on NDR Table LESS than or equal to X	X_1 = ________	ppm
X_2 = First Boron on NDR Table HIGHER than X	X_2 = ________	ppm
Y_1 = First Power on NDR Table LESS than or equal to Y	Y_1 = ________	% RTP
Y_2 = First Power on NDR Table HIGHER than Y	Y_2 = ________	% RTP

Step 1

(________) +
Power Defect (X_1, Y_1)

([________ - ________] / [________ - ________] x [________ - ________])
X, X_1, X_2, X_1, Power Defect (X_2, Y_1), Power Defect (X_1, Y_1)

= ________
Power Defect (X, Y_1)

Step 2

(________) +
Power Defect (X_1, Y_2)

([________ - ________] / [________ - ________] x [________ - ________])
X, X_1, X_2, X_1, Power Defect (X_2, Y_2), Power Defect (X_1, Y_2)

= ________
Power Defect (X, Y_2)

Step 3

(________) +
Power Defect (X, Y_1)

([________ - ________] / [________ - ________] x [________ - ________])
Y, Y_1, Y_2, Y_1, Power Defect (X, Y_2), Power Defect (X, Y_1)

[C.1] = ________
Power Defect (X, Y)

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POWER CHANGE WORKSHEET

Value [C.2] - Power Defect at Target Conditions

X = Current Boron (ppm) [value A.1]	X = ________	ppm
Y = Target Power Level (% RTP)	Y = ________	% RTP
X_1 = First Boron on NDR Table LESS than or equal to X	X_1 = ________	ppm
X_2 = First Boron on NDR Table HIGHER than X	X_2 = ________	ppm
Y_1 = First Power on NDR Table LESS than or equal to Y	Y_1 = ________	% RTP
Y_2 = First Power on NDR Table HIGHER than Y	Y_2 = ________	% RTP

Step 1

(________) +
Power Defect (X_1, Y_1)

([________ - ________] / [________ - ________] x [________ - ________])
X, X_1, X_2, X_1, Power Defect (X_2, Y_1), Power Defect (X_1, Y_1)

= ________
Power Defect (X, Y_1)

Step 2

(________) +
Power Defect (X_1, Y_2)

([________ - ________] / [________ - ________] x [________ - ________])
X, X_1, X_2, X_1, Power Defect (X_2, Y_2), Power Defect (X_1, Y_2)

= ________
Power Defect (X, Y_2)

Step 3

(________) +
Power Defect (X, Y_1)

([________ - ________] / [________ - ________] x [________ - ________])
Y, Y_1, Y_2, Y_1, Power Defect (X, Y_2), Power Defect (X, Y_1)

[C.2] = ________
Power Defect (X, Y)

ATTACHMENT 3
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Value [F.1]

X = Current Boron (ppm) [value A.1] X = ________ ppm
X_1 = First Boron on NDR Table LESS than or equal to X X_1 = ________ ppm
X_2 = First Boron on NDR Table HIGHER than X X_2 = ________ ppm

Integral Boron Worth (X, 557) = ________
Int Boron Worth (X_1, 557)

+ ([________ - ________ **]** / [________ - ________ **] x [** ________ - ________ **])**
X, X_1, X_2, X_1, Int Boron Worth (X_2, 557), Int Boron Worth (X_1, 557)

[F.1] = ________
Int Boron Worth (X, 557)

Value [G.2]

Y = Target Int Boron Worth [Value G.1] Y = ________ pcm
Y_1 = First Int Boron Worth at 557 degrees on NDR Table which is MORE POSITIVE than, or equal to, Y Y_1 = ________ pcm
Y_2 = First Int Boron Worth at 557 degrees on NDR Table which is MORE NEGATIVE than Y Y_2 = ________ pcm
X_1 = Boron on NDR Table which corresponds to Y_1 X_1 = ________ ppm
X_2 = Boron on NDR Table which corresponds to Y_2 X_2 = ________ ppm

Target RCS Boron = ________
X_1

+ ([________ - ________ **]** / [________ - ________ **] x [** ________ - ________ **])**
Y, Y_1, Y_2, Y_1, X_2, X_1

[G.2] = ________
Target RCS Boron

COMMENTS:____

____

ATTACHMENT 6A
PAGE 1 OF 5

DOWN POWER TO APPROXIMATELY 700 MWE

NOTE:
- This section may be used for NODAL MARKET BACKDOWN or for other reasons requiring a power reduction to an intermediate value or minimum of approximately 700 MWE.
- Core Performance Engineering should be informed of any substantial reduction in power (>25%).
- Primary plant should lead secondary plant during Main Turbine load changes.

1. Notify QSE Generation Controller and update GAPS to "Create Current" from the "Forecasted Condition" prior to reducing load.

_______/_______
Initials Date

NOTE: For power changes greater than 5%, a reactivity plan should be developed using one of the sources below. (Listed in order of preference)

- IF time and resources support generation of a BEACON projection (for a pre-planned power maneuver), THEN contact Core Performance Engineering for support, and utilize the approved results as the reactivity plan.
- IF the power change closely matches one of the down-power scenarios available in the Reactivity Briefing Sheets (printed from CHORE), THEN utilize the appropriate currently approved reactivity plan (interpolation between values on the Boration Matrix is allowed). |
- IF the above two options are not available or do not fit the current scenario, THEN perform a NDR based reactivity calculation per Attachment 3 or equivalent CHORE output

[C] 2. IF Reactor power will be decreased by ≥15% within a one hour period, THEN notify Chemistry and Radiation Protection. (TS SR 3.4.16.2, ODCM 4.11.2.1.1.2, 4.11.2.1.1.3)

_______/_______
Initials Date

ATTACHMENT 6A
PAGE 2 OF 5

DOWN POWER TO APPROXIMATELY 700 MWE

NOTE:

- During the initial reduction in power, a combination of control rod insertion and boration should be used to compensate for changes in reactivity due to power defect. This will allow the control rods to be available to compensate for the reactivity due to Xenon following the power reduction.
- During a down power, operators should adjust the pots (1-SK-0509B and 1-SK-0509C) to maintain the difference between the FWPT speeds within the desirable range.
- FWPT speed deviation from commanded speed during a normal downpower may be an indication of binding in a FWPT control valve, guidance for this event is located in ABN-302 Sect. 9.0, FEEDWATER PUMP CONTROL SYSTEM MALFUNCTION.

3. Perform the following to reduce Turbine load to approximately 60% (700 MWE) or the desired intermediate load:

   A. IF desired, THEN determine the amount of boration required to reduce Reactor power to approximately 60% (700 MWE) or the desired intermediate load using using the appropriate currently approved Reactivity Projection. |

   .

   ______/______
   Initials Date

   B. IF desired, THEN determine the rate of boration required to allow slow control rod inward motion as the turbine load decreases, using the appropriate currently approved Reactivity Projection. |

   ______/______
   Initials Date

   C. Refer to Attachment 2 for guidance in controlling AFD during power ramps.

   ______/______
   Initials Date

   D. Initiate RCS boration/dilution using SOP-104A.

   ______/______
   Initials Date

ATTACHMENT 6A
PAGE 3 OF 5

DOWN POWER TO APPROXIMATELY 700 MWE

E. If desired to enhance boron mixing, energize additional Pressurizer Backup heaters.

_______/_______
Initials Date

F. On the TG Display in the “Load Control” Section, set in the desired unloading rate using the Load Rate Setpoint Controller

_______/_______
Initials Date

NOTE: The load will immediately begin decreasing to the setpoint value at the rate set on the Load Rate Setpoint Controller. The LOAD RATE may be readjusted as necessary.

G. In the “Load Control” Section, lower the Load Target Setpoint Controller as necessary to obtain 700 MWE or the desired intermediate load to control turbine load.

_______/_______
Initials Date

H. IF MSR’s are to be removed from service, THEN open:

- 1HD-0933, HTR DRN SYS MSR 1-A XS HTG STM ORIF UPSTRM ISOL VLV
- 1HD-0937, HTR DRN SYS MSR 1-B XS HTG STM ORIF UPSTRM ISOL VLV

_______/_______
Initials Date

I. Stabilize Turbine load at desired power level until released to return to 100%.

Initials/ Date

CAUTION:
- Observe Fuel conditioning limits during all Reactor power increases.
- Control Rods should NOT be placed in automatic until the fuel is fully conditioned to 100% power.

NOTE:
- For power changes greater than 5%, a reactivity plan should be developed (BEACON, CHORE or NDR reactivity calculation). When calculating the boration/dilution volume refer to note 4.2.26 to determine the source of the reactivity plan.
- Primary plant should lead secondary plant during Main Turbine load changes.

4. Perform the following to raise Reactor power to 98%:

A. IF desired, THEN determine the amount of dilution required to raise Reactor power to approximately 98% using the appropriate currently approved Reactivity Projection. |

_______/_______
Initials Date

DOWN POWER TO APPROXIMATELY 700 MWE

B. IF desired, THEN determine the rate of dilution required to allow slow control rod outward motion as the Turbine load increases, using the appropriate currently approved Reactivity Projection. |

_______/_______
Initials Date

C. Refer to Attachment 2 for guidance in controlling AFD during power increases.

_______/_______
Initials Date

D. Initiate RCS boration/dilution using SOP-104A.

_______/_______
Initials Date

E. In the "Load Control" Section, set in the desired loading rate using the Load Rate Setpoint Controller.

_______/_______
Initials Date

NOTE:

- The load will immediately begin increasing to the setpoint value at the rate set on the Load Rate Setpoint Controller. The LOAD RATE may be readjusted as necessary.
- It may be necessary to raise Turbine Load in increments to maintain Ramp Rate Restrictions.

F. In the "Load Control" Section, raise the Load Target Setpoint Controller as necessary to obtain a Turbine Load that corresponds to 98% Rx Power while controlling the rate of Turbine power increase.

_______/_______
Initials Date

G. WHEN Reactor power is approximately 98%, THEN perform a calorimetric per OPT-309.

_______/_______
Initials Date

ATTACHMENT 6A
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DOWN POWER TO APPROXIMATELY 700 MWE

> CAUTION: Reactor power shall be closely monitored to avoid exceeding 100% Reactor power.

H. In the “Load Control” Section, raise the Load Target Setpoint Controller as necessary to maintain 3612 MWth Reactor power as indicated on the Plant Computer PPP Calorimetric (See flowchart in Section 5.5 for power limitations if PPPC is not available).

_______ / _______
Initials Date

I. IF step 3.H was performed, THEN perform Attachment 6B to adjust MSR excess heating steam flow.

_______ / _______
Initials Date

> CAUTION: Control Rods should NOT be placed in automatic until the fuel is fully conditioned to 100% power.

J. When Reactor power is at 100% or desired power level:

- Ensure 1/1-RBSS, CONTROL ROD BANK SELECTOR in AUTO.

  _______ / _______
  Initials Date

- Notify QSE Generation Controller and update GAPS to “End Current Condition” to show that this power limitation is no longer applicable.

  _______ / _______
  Initials Date

K. When improved boron mixing is no longer required, deenergize those additional Pressurizer Backup Heaters energized at Step 3.E.

_______ / _______
Initials Date

L. Refer to Section 5.5 to maintain constant Turbine load.

_______ / _______
Initials Date

UNIT SUPERVISOR RELIEF CHECKLIST

UNIT: 1

PART I TO BE PREPARED BY THE OFF-GOING UNIT SUPERVISOR.

1.0 SHIFT ACTIVITIES:

1.1 Activities Completed This Shift: None

1.2 Activities In-Progress: None

1.3 Planned Activities:
None

2.0 PLANT AND EQUIPMENT STATUS:

2.1 Technical Specification Related Equipment Summary
None

UNIT SUPERVISOR RELIEF CHECKLIST

2.2 Non-Technical Specification Equipment Summary:

None

3.0 General Information: Maintain steady state conditions in accordance with IPO-003A, Power Operation. Diluted 45 gallons three times last shift.

4.0 END OF SHIFT REVIEW:

LOGS – RO/BOP X LOGS-NEO X CLOSED eLCOARs ARCHIVED X

OPTS COMPLETED X DAILY ACTIVITIES LIST X LCOARs REVIEWED X

COMP ACTIONS REVIEWED X

PART II TO BE COMPLETED BY THE ON-COMING UNIT SUPERVISOR.

1.0 CRITICAL PARAMETERS:

MODE: 1 REACTOR POWER: 100% Mwe: 1265

RCS TAVE: 585 °F CONTROL ROD POSITION 215 ON BANK D

C_b: 908 ppm RCS PRESS: 2235 psig

2.0 STATUS REVIEW:

	X	UNIT LOGS
[C]	X	* * LCOAR AND SYSTEMS IMPORTANT TO SAFETY STATUS
	X	UNIT DIFFERENCES (If last watch was on opposite unit)
	X	SHIFT ORDERS
	X	BOARD WALKDOWN
	X	* POD
[C]	X	CONDITIONAL SURVEILLANCE STATUS BOARD

PROTECTED TRAIN [X] Train "A" [ ] Train "B"

* May be completed after turnover.

* * Each US's (U1 & U2) status review is to include the U1 & Common LCOAR & SIS Logs for Common equipment.

Facility: CPNPP 1 & 2 Scenario No.: 4 Op Test No.: April 2013 NRC

Examiners: ____________________ Operators: ____________________

____________________ ____________________

____________________ ____________________

Initial Conditions: ~3% power BOL - RCS Boron is 1659 ppm by Chemistry sample. Steam Dump System in service for Reactor Coolant System Temperature Control.

Turnover: Recirculate the Refueling Water Storage Tank prior to MODE 1 entry then raise Reactor Power from 3% to 8% in preparation for Turbine Startup.

Critical Tasks:

- Manually Trip Reactor Due to Reactor Protection System Failure Prior to Exiting EOP-0.0A, Reactor Trip or Safety Injection. (Event 7)
- Trip Reactor Coolant Pumps within 10 minutes upon a Loss of Subcooling per EOP-1.0A, Loss of Reactor or Secondary Coolant, Foldout Page. (Event 9)

Event No.	Malf. No.	Event Type*	Event Description
1 +10 min		N (BOP)	Recirculate the Refueling Water Storage Tank with Containment Spray Pump 1-01.
2 +20 min	RX12	C (RO/BOP)	Main Steam Header Pressure (PT-507) Fails High on 360 second ramp.
3 +40 min		R (RO) N (BOP, SRO)	Raise Power to 6% to 8% in Preparation for Synchronizing Main Generator to Electrical Grid.
4 +50 min	RX04A	I (BOP, SRO) TS (SRO)	Steam Generator (1-01) Level Channel (LT-551) Fails Low.
5 +55 min	CS02A	TS (SRO)	Containment Spray Pump (1-01) Trip.
6 +60 min	RP14B	M (RO, BOP, SRO)	Spurious Train B Safety Injection Actuation Signal.
7 +60 min	RP01	C (RO)	Automatic Reactor Trip Failure. Reactor Protection System Failure requires Manual Reactor Trip.
8 +60 min	RP09B	C (BOP)	Train B Containment Isolation Phase A Automatic Actuation Failure.
9 +80 min	RC08C1	M (RO, BOP, SRO)	Small Break Loss of Coolant Accident Inside Containment When Safety Injection Pump 1-02 is Secured in EOS-1.1A.

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

Actual	Target Quantitative Attributes
7	Total malfunctions (5-8)
3	Malfunctions after EOP entry (1-2)
2	Abnormal events (2-4)
2	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 SUMMARY NRC 4

The crew will assume the watch with power at approximately 3% per IPO-003A, Power Operations. Prior to raising power, the crew will recirculate the Refueling Water Storage Tank (RWST) using Containment Spray Pump 1-01 per SOP-204A, Containment Spray System, Section 5.1.3, Recirculation through the Recirculation Header.

The next event is a high failure of Main Steam Header Pressure Transmitter (PT-507) on a 360 second ramp. The crew enters ABN-709, Steam Header Pressure Instrument Malfunction, Section 3.0, and places the Steam Dump System in MANUAL to regain control of Reactor Coolant System (RCS) temperature. The controller will remain in MANUAL for the duration of the scenario.

When RCS temperature control is restored, the crew will continue with IPO-003A, Section 5.1, Warmup and Synchronization of the Turbine Generator, Step 5.1.16, and perform a power ascension using the Rod Control and Steam Dump Systems.

The next event is a Steam Generator Level Transmitter failure. Actions are per ABN-710, Steam Generator Level Instrumentation Malfunction. The BOP will be required to take manual control of the Feedwater Bypass Control Valve and then select an alternate controlling channel to return the Feedwater System to automatic control. The SRO will refer to Technical Specifications.

When conditions are stable, Containment Spray Pump 1-01 will trip. Actions are per ALM-0022A, 1-ALB-2B, Window 1.3 – ANY CSP OVRLD TRIP. The SRO will refer to Technical Specifications.

When Technical Specifications have been referenced, a spurious Train B Safety Injection Signal will actuate. The crew will determine that the Reactor did not automatically trip and initiate a Reactor Trip and Safety Injection and enter EOP-0.0A, Reactor Trip or Safety Injection. This scenario is complicated by Train B Containment Isolation Phase A Automatic actuation failure.

The crew will exit EOP-0.0A at Step 15 and enter EOS-1.1A, Safety Injection Termination. While in EOS-1.1A, Safeguards Signals are reset, the Charging flow path is realigned, and Safety Injection (SI) Pumps are stopped. When SI Pump 1-02 is stopped, a Small Break Loss of Coolant Accident will initiate. At this point, the crew will follow guidance on the EOS-1.1A Foldout Page that requires a transition to EOP-1.0A, Loss of Reactor or Secondary Coolant.

The scenario is terminated when it is determined in EOP-1.0A that Pressurizer pressure continues to slowly lower, and a transition to EOS-1.2 A, Post LOCA Cooldown and Depressurization, is required.

Risk Significance:

- Failure of risk important system prior to trip: Containment Spray Pump Trip
- Risk significant core damage sequence: Automatic Reactor Trip Failure; Small Break Loss of Coolant Accident
- Risk significant operator actions: Manually Trip Reactor; Manually Initiate Safety Injection; Initiate Train B Containment Isolation

BOOTH OPERATOR INSTRUCTIONS for SIMULATOR SETUP

Initialize to IC-10 and LC21 NRC Scenario 4.

EVENT	TYPE	MALF #	DESCRIPTION	DEMAND VALUE	INITIATING PARAMETER
SETUP		RP01	Automatic Reactor Trip Failure	FAIL	K0
		RP09B	Train B Containment Isolation Phase A Failure	FAIL	K0
1		-	Recirculate the RWST	-	N/A
2		RX12	Main Steam Header Pressure (PT-507) Failure	1500 psig	K2 (360 sec. ramp)
3		-	Raise power to 6% to 8%	-	N/A
4		RX04A	SG (1-01) Level Channel (LT-551) Failure	0%	K4
5		CS02A	Containment Spray Pump (1-01) Trip	TRIP	K5
6		RP14B	Spurious Train B Safety Injection Actuation	-	K6
7		RP01	Automatic Reactor Trip Failure	FAIL	K0
8		RP09B	Train B Containment Isolation Phase A Failure	FAIL	K0
9		RC08C1	Small Break LOCA in EOS-1.1A.	3"	SIP 1-02 Stopped
9	DISIAPSI2 Value = 1 IMF RC08C1 f:1				

Booth Operator:	**INITIALIZE to IC-10 and LC21 NRC Scenario 4.** **ENSURE all Simulator Annunciator Alarms are ACTIVE.** **ENSURE all Control Board Tags are removed.** **ENSURE Operator Aid Tags reflect current boron conditions.** **ENSURE Control Rods are in MANUAL with Control Rod Bank C @ 224 steps and Bank D @ 109 steps.** **ENSURE Rod Bank Update (RBU) is performed.** **REMOVE N-16 detectors from POLL on PC-11.** **ENSURE 1-HS-2484 & 1-HS-2485, Condensate Storage Tank Isolation Valves are OPEN.** **SET Plant Computer screen for MODE 2.** **ENSURE Reactivity Briefing Sheet printout provided with Turnover.** **PLACE Plant Computer, right hand RO and US Computer screens for MODE 2.** **PLACE Group Display LPTDIFF on the BOP Desktop Computer.** **ENSURE all PRZR Heaters energized.** **ENSURE procedures in progress are on SRO desk:** **- COPY of IPO-003A, Power Operations, Section 5.1, Warmup and Synchronization of the Turbine Generator, INITIALED to Step 5.1.15.** **- COPY of IPO-003A, Power Operations, Attachment 17, MODE 1 Bubble Chart.** **- COPY of SOP-204A, Containment Spray System, Section 5.1.3, Recirculation Through the Recirculation Header, INITIALED to Step 5.1.3.A.**

Significant 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 – CNDNSR AVAIL STM DUMP 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 WTHDRWL BLK C-5
PCIP-2.5 – SR RX TRIP BLK PERM P-6
PCIP-3.4 – TURB LOAD REJ STM DMP ARMED C-7
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
6D-1.1 – SR HI VOLT FAIL
7B-4.8 – FWP A/B RECIRC VLV NOT CLOSED
8A-1.3 – FWPT B TRIP
8A-1.10 – 1 OF 4 TURB STOP VLV CLOSE
Numerous 9A Feedwater alarms

Operating Test :	NRC	Scenario #	4	Event #	1	Page	5	of	32
Event Description:	Recirculate Refueling Water Storage Tank With Containment Spray Pump								

Time	Position	Applicant's Actions or Behavior
Booth Operator: ENSURE Simulator in RUN when crew is ready to assume the watch.		
Examiner Note: The Refueling Water Storage Tank is recirculated using a Containment Spray Pump per SOP-204A, Containment Spray System.		
+1 min	US	DIRECT performance of SOP-204A, Containment Spray System, Section 5.1.3, Recirculation Through the Recirculation Header.
NOTE: IF the containment spray system is being started for performance of OPT-205A, THEN the following valves will be positioned as directed by the performance of the operability test. • 1CT-0150, U1 CS CHEM EDUCT TST HDR ISOL VLV • 1CT-0137, CS PMP 1-01/1-03 CHEM EDUCT TST LN ISOL VLV • 1CT-0183, CS PMPS 1-02/1-04 CHEM EDUCT TST LN ISOL VLV • 1CT-0075, CS PMP 1-03 EDUCT SUCT ISOL VLV • 1CT-0023, CS PMP 1-04 EDUCT SUCT ISOL VLV • 1CT-0079, CS PMP 1-01 EDUCT SUCT ISOL VLV • 1CT-0027, CS PMP 1-02 EDUCT SUCT VLV		
	BOP	ENSURE the system is in standby per Section 5.1.1. [Step 5.1.3.A]
	BOP	VERIFY Train A Chemical Additive Tank Discharge Valve – CLOSED. [Step 5.1.3.B]
		• 1-HS-4754, CHEM ADD TK DISCH VLV, Train A
	BOP	INITIATE trend of Containment Spray Pump 1-01 parameters on Plant Computer. [Step 5.1.3.C]

Operating Test :	NRC	Scenario #	4	Event #	1	Page	6 of 32
Event Description:	Recirculate Refueling Water Storage Tank With Containment Spray Pump						

Time	Position	Applicant's Actions or Behavior

DESCRIPTION	CSP 1-01	CSP 1-02	CSP 1-03	CSP 1-04
CSP MOT OUTBD BRG TEMP	T9313A	T9318A	T9323A	T9328A
CSP MOT INBD BRG TEMP	T9314A	T9319A	T9324A	T9329A
CSP INBD BRG TEMP	T9315A	T9320A	T9325A	T9330A
CSP OUTBD BRG TEMP	T9316A	T9321A	T9326A	T9331A
CSP STAT WNDG TEMP	T9340A	T9341A	T9342A	T9343A

Time	Position	Applicant's Actions or Behavior
	BOP	VERIFY CS Pump 1-01 Recirculation Valve – OPEN. [Step 5.1.3.D]
		• 1-HS-4772-1, CSP 1 RECIRC VLV
	BOP	START Containment Spray Pump 1-01. [Step 5.1.3.E]
		• PLACE 1-HS-4764, CSP 1 in START position.

NOTE: The Containment Spray system is designed to operate with system temperature up to 300°F. When the system temperature exceeds 150°F; however, CCW flow must be aligned to the pump seal coolers to maintain integrity of the mechanical seals. In all cases, CCW flow must be available to both the Containment Spray Heat Exchanger and the mechanical seal cooler to declare the system operable per TS 3.6.6.

Time	Position	Applicant's Actions or Behavior
+10 min	BOP	IF CCW flow is NOT available, STOP Containment Spray Pump 1-01 when system temperature reaches 150°F. [Step 5.1.3.F]

When Containment Spray Pump flow and pressure are verified, or at Lead Examiner discretion, PROCEED to Event 2.

Operating Test :	NRC	Scenario #	4	Event #	2	Page	7	of	32
Event Description:	Main Steam Header Pressure Failure								

Time	Position	Applicant's Actions or Behavior
Booth Operator: When directed, EXECUTE Event 2 (Key 2). **- RX12, Steam Header Pressure Transmitter (PT-507) fails high on 360 second ramp.**		
Indications Available: **6D-1.10 – AVE T_{AVE} - T_{REF} DEV** **6D-3.10 – 1 OF 4 T_{AVE} LO-LO (WHEN $T_{AVE} \leq 553°F$)** **PCIP-3.6 – RCS TAVE LO-LO P-12 (WHEN $T_{AVE} < 553°F$, Steam Dump Valves will close)** **Steam Dump Valves opening then closing (IF $T_{AVE} < 553°F$)** **Reactor Coolant System temperature lowering** **1-PI-507 – MS HDR PRESS indication fails high**		
+30 secs	RO/BOP	RESPOND to Annunciator Alarm Procedures.
	RO/BOP	REPORT Reactor Coolant System temperature lowering, Steam Dump Valves opening, and PT-507, Steam Header Pressure Channel failure.
	US	DIRECT implementation of ABN-709, Steam Line Pressure, Steam Header Pressure, Turbine 1st Stage Pressure, and Feed Header Pressure Instrument Malfunction, Section 3.0.
	RO/BOP	CHECK 1-PI-507, MS HDR PRESS indicating HIGHER than Main Steam Line Pressure. [Step 3.3.1]
NOTE: Computer point P5446A, FW STM FLOW SETPOINT may aid the operator.		
	RO/BOP	MANUALLY CONTROL Feedwater Pumps. [Step 3.3.2]
		• PLACE 1-SK-509A, FWPT MASTER SPD CTRL in MANUAL. [Step 3.3.2.a]
	RO/BOP	MONITOR Steam Generator Levels: [Step 3.3.3]
		• VERIFY SG levels – STABLE AT OR TRENDING TO NORMAL PROGRAM. [Step 3.3.3.a]
		• Manually CONTROL Auxiliary Feedwater flow as necessary to maintain levels. [Step 3.3.3.b.2) RNO]

Operating Test :	NRC	Scenario #	4	Event #	2	Page	8	of 32
Event Description:	Main Steam Header Pressure Failure							

Time	Position	Applicant's Actions or Behavior
	US	DETERMINE Required Operational Mode of Steam Dumps: [Step 3.3.4]
	RO/BOP	• CHECK 43/1-SD, STM DMP MODE SELECT Switch in – T_{AVE}. [Step 3.3.4.a]
	RO/BOP	• VERIFY T_{AVE} and steam pressure – STABLE. [Step 3.3.4.b]
	RO/BOP	• If T_{AVE} and steam pressure less than normal for conditions then PLACE both STM DMP INTLK SELECT switches in OFF – RESET. [Step 3.3.4.b.1).a RNO]
		• 43/1-SDA in OFF – RESET.
		• 43/1-SDB in OFF – RESET.
	RO/BOP	• PLACE 1-PK-507, STM DMP PRESS CTRL in MANUAL and 0% DEMAND. [Step 3.3.4.b.1).b RNO]
	RO/BOP	• PLACE both STM DMP INTLK SELECT switches in ON. [Step 3.3.4.b.1).c RNO]
		• 43/1-SDA in ON.
		• 43/1-SDB in ON.
	RO/BOP	• PLACE 43/1-SD, STM DMP MODE SELECT Switch in RESET then in STM PRESS position. [Step 3.3.4.b.1).d RNO]
	RO/BOP	• Manually CONTROL 1-PK-507, STM DMP PRESS CTRL as necessary for conditions. [Step 3.3.4.b.2) RNO]
Examiner Note: **1-PK-507, STM DMP PRESS CTRL, will remain in MANUAL for the duration of the scenario.**		
	US	MANUALLY CONTROL 1-SK-509A, FWPT MASTER SPD CTRL to MAINTAIN differential pressure. [Step 3.3.5]
	US	INITIATE a Condition Report per STA-421. [Step 3.3.6]
+10 min	US	INITIATE repairs per STA-606. [Step 3.3.7]
When plant conditions are stable, or at Lead Evaluator's discretion, PROCEED to Event 3.		

Operating Test :	NRC	Scenario #	4	Event #	3	Page	9	of	32
Event Description:	Raise Reactor Power								

Time	Position	Applicant's Actions or Behavior
Booth Operator: MONITOR Simulator parameters while the crew transitions to IPO-003A.		
Examiner Note: The following steps are from IPO-003A, Power Operations, Section 5.1, Warmup and Synchronization of the Turbine Generator, Step 5.1.16.		
NOTE: • During operation at BOL with a zero or small negative moderator temperature coefficient, very little reactivity feedback will result from changes in temperature. During a startup significant temperature transients can occur with relatively little change to power. This could result in large transients in Pressurizer level and RCS pressure. Care should be taken to ensure changes in steam flow are done gradually to prevent transients in the RCS. • Steam dumps in automatic should be used to raise power. Steam drains and blowdown are not the preferred method as Operator action is required to change the steam flow. Using Steam Dumps in automatic can reduce the transients in the primary systems since the automatic control will reduce steam dump flow as the turbine speed/load is increased. • Nuclear Instrumentation may be conservatively calibrated following an extended outage period. Other indication of thermal power, such as calorimetric data, steam dump demand, etc., should also be monitored during the power increase. N-16 should be monitored as an indication of power along with NIS and Calorimetric power. N-16 may be the most accurate indicator of power during a transient since it is temperature compensated. During transient conditions, the highest indication of Reactor power (N-16, NIS, or Calorimetric) should always be maintained within limits. • If 1-ALB-6D, 1.14 IR HI FLUX ROD STOP C-1 is received prior to 1-PCIP, 1.6 RX ≥ 10% PWR P-10, Core Performance Engineering and I&C should be notified to evaluate.		
	BOP	If desired, ENSURE Feedwater Bypass Control Valve Controllers in AUTO. [Step 5.1.16.A]
	US	VERIFY Attachment 1 was COMPLETED & REVIEWED by the Shift Manager per the Turnover Sheet prior to exceeding 5% power. [Step 5.1.16.B]
	BOP	As Reactor power rises, manually ADJUST Steam Dump System to maintain Main Steam pressure at approximately 1092 psig. [Step 5.1.16.C]

Time	Position	Applicant's Actions or Behavior
Examiner Note: The next three (3) steps are guidance from the Unit Supervisor per OPGD-3, Operations Standards and Expectations, Section 5.0, Operating Tactics.		
	US	Direct WITHDRAWAL of Control Rods in no more than five (5) step increments to raise power.
	RO	WITHDRAW Control Rods in no more than five (5) step increments while monitoring Reactor power level.
	RO	VERIFY Power Range Channels respond appropriately as power level rises.
Examiner Note: Crew will likely use N-16 power indication from Plant Computer System.		
	US	When reactor power is greater than 5%, LOG entry into MODE 1. [Step 5.1.16.D]
	US	PERFORM OPT-102A for MODE 1 Surveillances. [Step 5.1.16.E]
Floor Cue: If requested, REPORT OPT-102A, Operations Shiftly Routine Tests was completed last shift.		
+15 min	RO	Slowly RAISE Reactor power to between 6% and 8%. [Step 5.1.16.F]
When power level is stabilized at 6% to 8%, or at Lead Examiner discretion, PROCEED to Event 4.		

Operating Test :	NRC	Scenario #	4	Event #	4	Page	11	of	32
Event Description:	Steam Generator Level Transmitter Failure								

Time	Position	Applicant's Actions or Behavior
Booth Operator: When directed, EXECUTE Event 4 (Key 4). **- RX04A, Steam Generator 1-01 Level Transmitter (LT-551) fails low.**		
Indications Available: **8A-1.6 – SG 1 LVL LO** **8A-1.8 – SG 1 STM & FW FLO MISMATCH (power level dependent)** **8A-1.12 – SG 1 LVL DEV (power level dependent)** **8A-1.14 – SG 1 1 OF 4 LVL LO-LO** **1-LI-551, SG 1 LVL (NR) CHAN I indication failed low**		
+30 sec	BOP	RESPOND to Annunciator Alarm Procedures.
	BOP	RECOGNIZE Steam Generator 1-01 Level Transmitter (LT-551) failed low.
Examiner Note: Steam Generator level channel failing LOW will cause the Feedwater Control Bypass Valve to OPEN. Unit 1 SG High Level Turbine Trip occurs at 84%.		
	US	DIRECT performance of ABN-710, Steam Generator Level Instrumentation Malfunction, Section 2.0.
	BOP	RECOGNIZE Steam Generator 1-01 Level Transmitter (LT-551) controlling level channel failed LOW. [Step 2.3.1]
	BOP	PLACE 1-LK-550, SG 1 BYP CTRL in MANUAL and CONTROL Steam Generator 1-01 at programmed level. [Step 2.3.2]
	BOP	VERIFY instruments on common instrument line indicate NORMAL. [Step 2.3.3]
		• VERIFY Loop 1 Instrument LT-501 responding normally per Attachment 1.

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.

Operating Test :	NRC	Scenario #	4	Event #	4	Page	12	of 32
Event Description:	Steam Generator Level Transmitter Failure							

Time	Position	Applicant's Actions or Behavior
	BOP	DETERMINE all HI-HI level bistable windows on Trip Status Light Box (TSLB-3) for Steam Generator 1-01 are DARK. [Step 2.3.4]
		• OBSERVE TSLB-3, Window 2.2 – SG 1 LVL HI-HI LB-519A is DARK.
		• OBSERVE TSLB-3, Window 3.2 – SG 1 LVL HI-HI LB-518A is DARK.
		• OBSERVE TSLB-3, Window 4.2 – SG 1 LVL HI-HI LB-517A 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 available: [Step 2.3.5]
		• OBSERVE alternate level control channel 1-LI-519A indication NORMAL. [Step 2.3.5.a]
		• DETERMINE automatic level control desired by Unit Supervisor. [Step 2.3.5.b]
	BOP	PLACE 1-LS-519C, Steam Generator 1 Level Channel Select to LY-519 position. [Step 2.3.6]
	BOP	VERIFY affected SG conditions for auto level control: [Step 2.3.7]
		• OBSERVE Feedwater and Steam Flows – MATCHED.
		• OBSERVE Steam Generator Level – STABLE AT PROGRAM.
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-LK-550, SG 1 BYP CTRL in AUTO and MONITOR operation. [Step 2.3.8]

Time	Position	Applicant's Actions or Behavior
<u>Examiner Note</u>: The next two (2) steps are performed after I&C troubleshooting is completed.		
		WITHIN 72 hours, CONTACT I&C to PLACE bistable test switches for Level Channel I in CLOSE per Attachments 2 and 3. [Step 2.3.9]
		VERIFY appropriate alarms and Trip Status Lights LIT per Attachment 3 and NOTE in the Unit Log. [Step 2.3.10]
		• OBSERVE TSLB-5, Window 1.4 – SG 1 LVL LO-LO LB-551B is LIT.
+10 min	US	EVALUATE Technical Specifications. [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 (Channel 1 LO-LO). • ACTION E.1 - Place channel in trip within 72 hours, <u>OR</u> • ACTION E.2 - Be in MODE 3 within 78 hours.
		• LCO 3.3.2.D, ESFAS Instrumentation. (Function 6.c, Steam Generator Water Level Low-Low)
		• CONDITION D - One channel inoperable. • ACTION D.1 - Place channel in trip within 72 hours, <u>OR</u> • ACTION D.2.1 - Be in MODE 3 within 78 hours, <u>AND</u> • ACTION D.2.2 - Be in MODE 4 within 84 hours.

Operating Test :	NRC	Scenario #	4	Event #	4	Page	14	of	32
Event Description:	Steam Generator Level Transmitter Failure								

Time	Position	Applicant's Actions or Behavior
		• LCO 3.3.2.I, ESFAS Instrumentation. (Function 5.b, SG Water Level High-High P-14)
		• CONDITION I - One channel inoperable (Channel 1 HI-HI). • ACTION I.1 - Place channel in trip within 72 hours, <u>OR</u> • ACTION I.2 - Be in MODE 3 within 78 hours.
	US	INITIATE a work request per STA-606. [Step 2.3.12]
+10 min	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 5.		

Operating Test : NRC	Scenario # 4	Event # 5	Page 15 of 32
Event Description: Containment Spray Pump Trip			

Time	Position	Applicant's Actions or Behavior
Booth Operator:		**When directed, EXECUTE Event 5 (Key 5).** **- CS02A, Containment Spray Pump 1-01 trip.**
Indications Available: **2B-1.3 – ANY CSP OVRLOAD / TRIP** **Containment Spray Pump 1-01 amber MISMATCH and white TRIP lights lit**		
+30 sec	BOP	RESPOND to Annunciator Alarm Procedures.
	BOP	RECOGNIZE 1-HS-4764, CSP 1, Containment Spray Pump 1-01 amber MISMATCH and white TRIP lights LIT.
	US	DIRECT performance of ALM-0022A, 1-ALB-2B, Window 1.3 – ANY CSP OVRLD TRIP.
CAUTION:		Do not place pump handswitch in STOP if pump has tripped (white TRIP light). This will reset 86M relay (white TRIP light) and may result in an automatic restart.
	BOP	DETERMINE Containment Spray Pump 1-01 affected pump. [Step 1]
Booth Operator:		**When asked about status of Containment Spray Pump, REPORT that the motor casing is hot.**
	BOP	DISPATCH a PEO to check for signs of damage. [Step 2]
Booth Operator:		**When asked about status of Containment Spray (CS) Pump breaker, REPORT that the 50/51 overcurrent relays on Phases B & C are tripped. CSP 1-01 Breaker (1EA1/8/BKR) indicates an overload condition exists.**
	BOP	DISPATCH a PEO to 1APCS1, CONTAINMENT SPRAY PUMP 1-01 MOTOR BREAKER (1EA1/8/BKR). [Step 3]
	BOP	VERIFY 1-HS-4776/4777, CS HX 1/2 OUT VLV is CLOSED. [Step 4]

Operating Test : NRC	Scenario # 4	Event # 5	Page 16 of 32
Event Description: Containment Spray Pump Trip			

Time	Position	Applicant's Actions or Behavior
	US	EVALUATE Technical Specifications. [Step 5]
		• LCO 3.6.6.A, Containment Spray System.
		• CONDITION A - One containment spray inoperable. • ACTION A.1 - Restore containment spray training to OPERABLE status within 72 hours. • CONDITION B - Required Action and associated Completion Time of Condition A not met. • ACTION B.1 - Be in MODE 3 within 6 hours, <u>AND</u> • ACTION B.2 - Be in MODE 5 within 84 hours.
<u>Examiner Note</u>: Both Train A Containment Spray (CS) Pumps may be taken to PULLOUT to avoid having the OPERABLE Train A CS Pump 1-03 experience a runout condition in the event a Containment H-3 signal is received.		
	US	SUBMIT a Condition Report per STA-421. [Step 2.3.6]
+10 min	US	INITIATE a work request per STA-606. [Step 2.3.6]
When Technical Specifications are addressed, or at Lead Examiner discretion, PROCEED to Events 6, 7, 8, and 9.		

Operating Test :	NRC	Scenario #	4	Event #	6, 7, 8, & 9	Page	17	of	32
Event Description:	Spurious Train B Safety Injection Actuation Signal / Automatic Reactor Trip Failure / Train B Containment Isolation Phase A Automatic Actuation Failure / Small Break Loss of Coolant Accident								

Time	Position	Applicant's Actions or Behavior
Booth Operator: When directed, EXECUTE Events 6, 7, 8, and 9 (Key 6). - RP14B, Spurious Train B Safety Injection Actuation Signal. - RP01, Automatic Reactor Trip failure. - RP09B, Train B Containment Isolation Phase A automatic actuation failure. - RC08C1, Small Break Loss of Coolant Accident inside Containment when Safety Injection Pump 1-02 is secured in EOS-1.1A, SI Termination.		
Indications Available: Multiple Spurious Train B Safety Injection System Alarms		
+30 sec	RO/BOP	RECOGNIZE Train B Safety Injection Actuation.
	RO/BOP	DETERMINE Reactor Trip required but NOT tripped.
CRITICAL TASK STATEMENT		**Manually Trip Reactor Due to Reactor Protection System Failure Prior to Exiting EOP-0.0A, Reactor Trip or Safety Injection.**
CRITICAL TASK	RO	Manually INITIATE a Reactor Trip.
	RO	• PLACE 1/1-RTC, RX TRIP Switch in TRIP at CB-07.
	BOP	• PLACE 1/1-RT, RX TRIP Switch in TRIP at CB-10.
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]
		• VERIFY all Control Rod Position Rod Bottom Lights – ON. [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]

Operating Test :	NRC	Scenario #	4	Event #	6, 7, 8, & 9	Page	18	of	32
Event Description:	Spurious Train B Safety Injection Actuation Signal / Automatic Reactor Trip Failure / Train B Containment Isolation Phase A Automatic Actuation Failure / Small Break Loss of Coolant Accident								

Time	Position	Applicant's Actions or Behavior
		• VERIFY both AC Safeguards Buses – ENERGIZED. [Step 3.b]
Examiner Note: Safety Injection must be manually actuated to place both Trains in service.		
	RO	CHECK SI status: [Step 4]
		• CHECK if SI is actuated. [Step 4.a]
		• VERIFY Both Trains SI Actuated: [Step 4.b]
		• SI Actuated blue status light – ON and FLASHING. [Step 4.b]
		• PLACE 1/1-SIA2, SI MAN ACT Switch to ACT position at CB-07 and DETERMINE SI has actuated on both Trains. [Step 4.b RNO]
Examiner Note: EOP-0.0A, Attachment 2 steps performed by the BOP are at the end of the scenario.		
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]
	RO	VERIFY AFW Alignment: [Step 6]
		• VERIFY both MDAFW Pumps – RUNNING. [Step 6.a]
		• If necessary, START TDAFW Pump. [Step 6.b]
		• VERIFY AFW total flow – GREATER THAN 460 GPM. [Step 6.c]
		• VERIFY AFW valve alignment - PROPER ALIGNMENT. [Step 6.d]

Operating Test :	NRC	Scenario #	4	Event #	6, 7, 8, & 9	Page	19	of	32

Event Description: Spurious Train B Safety Injection Actuation Signal / Automatic Reactor Trip Failure / Train B Containment Isolation Phase A Automatic Actuation Failure / Small Break Loss of Coolant Accident

Time	Position	Applicant's Actions or Behavior
	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 Train B Containment Spray Pumps – RUNNING. [Step 7.c]
	RO	CHECK if Main Steam lines should be ISOLATED: [Step 8]
		• VERIFY Containment pressure – GREATER THAN 6.0 PSIG OR Main Steam Line pressure less than 610 PSIG. [Step 8.a]
		• GO to Step 9. [Step 8.a RNO]
	RO	CHECK RCS Temperature: [Step 9]
		• VERIFY RCS Average Temperature – STABLE AT OR TRENDING TO 557°F. [Step 9]
	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]
	RO	CHECK If RCPs Should Be Stopped: [Step 11]
		• VERIFY RCS subcooling – LESS THAN 25°F (55°F FOR ADVERSE CONTAINMENT). [Step 11.a]
		• GO to Step 12. [Step 11.a RNO]

Operating Test :	NRC	Scenario #	4	Event #	6, 7, 8, & 9	Page	20	of	32
Event Description:	Spurious Train B Safety Injection Actuation Signal / Automatic Reactor Trip Failure / Train B Containment Isolation Phase A Automatic Actuation Failure / Small Break Loss of Coolant Accident								

Time	Position	Applicant's Actions or Behavior
	US/RO	CHECK if any SG is Faulted: [Step 12]
		• VERIFY any Steam Generator pressure – DECREASING IN AN UNCONTROLLED MANNER. [Step 12.a]
		• VERIFY any Steam Generator pressure – COMPLETELY DEPRESSURIZED. [Step 12.a]
		• GO to Step 12. [Step 12.a RNO]
	RO/BOP	CHECK if Steam Generator Tubes Are NOT Ruptured: [Step 13]
		• VERIFY Condenser Off Gas radiation – NORMAL.
		• VERIFY Main Steam Line radiation – NORMAL.
		• VERIFY SG Blowdown Sample Radiation Monitor – NORMAL.
		• VERIFY levels in all Steam Generators – NORMAL.
	RO/BOP	CHECK if RCS is Intact: [Step 14]
		• VERIFY Containment pressure – LESS THAN 1.3 PSIG. [Step 14]
		• VERIFY Containment recirculation sump levels – NORMAL. [Step 14]
		• VERIFY Containment radiation levels – NORMAL. [Step 14]
	US/RO	CHECK if ECCS Flow to Should Be Reduced: [Step 15]
		• VERIFY Secondary heat sink: [Step 15.a]
		• DETERMINE Total AFW Flow to intact SGs > 460 GPM.
		• DETERMINE Narrow Range Level in all SGs > 50%.
		• DETERMINE RCS subcooling – GREATER THAN 25°F (55°F FOR ADVERSE CONTAINMENT). [Step 15.b]
		• VERIFY RCS pressure – STABLE <u>OR</u> INCREASING. [Step 15.c]
		• VERIFY PRZR level - GREATER THAN 13% (34% FOR ADVERSE CONTAINMENT). [Step 15.d]
		• GO to EOS-1.1A, Safety Injection Termination, Step 1. [Step 15.e]
<u>Examiner Note</u>: EOS-1.1A, Safety Injection Termination steps begin here.		

Operating Test : NRC	Scenario # 4	Event # 6, 7, 8, & 9	Page 21 of 32

Event Description: Spurious Train B Safety Injection Actuation Signal / Automatic Reactor Trip Failure / Train B Containment Isolation Phase A Automatic Actuation Failure / Small Break Loss of Coolant Accident

Time	Position	Applicant's Actions or Behavior
Examiner Note:		**The following six (6) steps are performed per EOS-1.1A, Attachment 1.D.**
		CAUTION: If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment.
	BOP	[1.D] PLACE both Diesel EMER START/STOP handswitches in START. [Step 1]
Examiner Note:		**When Safety Injection is properly RESET, Annunciator 1-ALB-2B, Window 2.8, SFGD SEQR TRN A/B AUTO TEST TRBL, will RESET.**
	BOP	[1.D] RESET SI. [Step 2]
		• DEPRESS 1/1-SIRA, TRAIN A SI RESET pushbutton.
		• DEPRESS 1/1-SIRB, TRAIN A SI RESET pushbutton.
	BOP	[1.D] RESET SI Sequencers. [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.
	BOP	[1.D] RESET Containment Isolation Phase A and B. [Step 4]
		• 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.

Operating Test :	NRC	Scenario #	4	Event #	6, 7, 8, & 9	Page	22	of	32
Event Description:	Spurious Train B Safety Injection Actuation Signal / Automatic Reactor Trip Failure / Train B Containment Isolation Phase A Automatic Actuation Failure / Small Break Loss of Coolant Accident								

Time	Position	Applicant's Actions or Behavior
	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)]
		• OPEN 1-HS-3487, Containment Instrument Air Isolation Valve. [Step 6.a.2)]
		• ESTABLISH Nitrogen: [Step 6.b]
		• VERIFY 1-HC-3943, ACCUM 1●4 VENT CTRL Valve – CLOSED. [Step 6.b.1)]
		• OPEN 1/1-8880, SI/PORV ACCUM N_2 ISOL VLV. [Step 6.b.2)]
	RO	STOP all but one CCP and PLACE in Standby. [Step 7]
	US/RO	CHECK RCS Pressure – STABLE OR INCREASING. [Step 8]
Examiner Note: The following two (2) steps are performed per EOS-1.1A, Attachment 1.J.		
	RO	[1.J] ISOLATE CCP Injection Line Flow Path: [Step 9]
		• VERIFY CCP – SUCTION ALIGNED TO RWST. [Step 9.a]
		• ALIGN CCP Miniflow Valves: [Step 9.b]
		• OPEN 1/1-8110 and 1/1-8111, CCP Miniflow Valves. [Step 9.b.1)]
		• CLOSE 1/1-8511A and 1/1-8511B, CCP Alternate Miniflow Isolation Valves. [Step 9.b.2)]
		• PLACE Charging Flow Control Valve in MANUAL and 35% demand. [Step 9.c]
		• CLOSE 1/1-8801A and 1/1-8801B, CCP Injection Line Isolation Valves. [Step 9.d]

Operating Test :	NRC	Scenario #	4	Event #	6, 7, 8, & 9	Page	23	of 32
Event Description:	Spurious Train B Safety Injection Actuation Signal / Automatic Reactor Trip Failure / Train B Containment Isolation Phase A Automatic Actuation Failure / Small Break Loss of Coolant Accident							

Time	Position	Applicant's Actions or Behavior
+20 min	RO	[1.J] ESTABLISH Charging Flow Path: [Step 10]
		• OPEN 1/1-8105 and 1/1-8106, Charging Line Isolation Valves. [Step 10.a]
		• ADJUST Charging Flow Control Valve to establish Charging flow. [Step 10.b]
		• ADJUST RCP seal flow to maintain between 6 GPM and 13 GPM. [Step 10.c]
	RO	CONTROL Charging Flow to maintain PRZR Level. [Step 11]
Examiner Note:		**When Safety Injection Pump 1-02 is stopped, a Small Break Loss of Coolant Accident will occur. EOS-1.1A, Foldout Page criteria requires entry into EOP-1.0A, Loss of Reactor or Secondary Coolant, if RCS subcooling or Pressurizer level cannot be maintained.**
	RO	CHECK IF SI Pumps Should Be Stopped: [Step 12]
		• CHECK RCS pressure: [Step 12.a]
		• Pressure – STABLE OR INCREASING. [Step 12.a]
		• Pressure – GREATER THAN 1700 PSIG. [Step 12.a]
		• STOP SI pumps and PLACE in standby. [Step 12.b]
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.

Operating Test :	NRC	Scenario #	4	Event #	6, 7, 8, & 9	Page	24	of	32
Event Description:	Spurious Train B Safety Injection Actuation Signal / Automatic Reactor Trip Failure / Train B Containment Isolation Phase A Automatic Actuation Failure / Small Break Loss of Coolant Accident								

Time	Position	Applicant's Actions or Behavior
Examiner Note:		**When EOP-1.0A is entered, RCS subcooling has not lowered to the point where the RCPs must be tripped, however, this is a Continuous Action Step and must eventually be performed.**
CRITICAL TASK STATEMENT		**Trip Reactor Coolant Pumps within 10 minutes upon a Loss of Subcooling per EOP-1.0A, Loss of Reactor or Secondary Coolant, Foldout Page.**
CRITICAL TASK	RO	CHECK If RCPs Should Be Stopped: [Step 1].
		• VERIFY RCS subcooling – LESS THAN 25°F. [Step 1.a]
		• VERIFY ECCS Pumps (CCP or SI) – AT LEAST ONE RUNNING. [Step 1.b]
		• STOP all RCPs. [Step 1.c]
	RO/BOP	CHECK if Any Steam Generator Is Faulted: [Step 2]
		• VERIFY any Steam Generator pressure – DECREASING IN AN UNCONTROLLED MANNER. [Step 2.a]
		• VERIFY any Steam Generator pressure – COMPLETELY DEPRESSURIZED. [Step 2.a]
		• GO to Step 3. [Step 2.a RNO]
	US	CHECK Intact Steam Generator Levels: [Step 3]
		• VERIFY 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]
	US	CHECK Secondary Radiation NORMAL: [Step 4]
		• VERIFY Condenser off gas radiation – NORMAL. [Step 4]
		• VERIFY Main Steam Line radiation – NORMAL. [Step 4]
		• VERIFY SG Blowdown Sample Radiation Monitor – NORMAL. [Step 4]
		• VERIFY levels in all Steam Generators – NORMAL. [Step 4]

Operating Test :	NRC	Scenario #	4	Event #	6, 7, 8, & 9	Page	25	of 32
Event Description:	Spurious Train B Safety Injection Actuation Signal / Automatic Reactor Trip Failure / Train B Containment Isolation Phase A Automatic Actuation Failure / Small Break Loss of Coolant Accident							

Time	Position	Applicant's Actions or Behavior

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.

Time	Position	Applicant's Actions or Behavior
	US	CHECK PRZR PORVs and Block Valves: [Step 5]
		• VERIFY power Block Valves – AVAILABLE. [Step 5.a]
		• VERIFY PORVs – CLOSED. [Step 5.b]
		• VERIFY Block Valves – AT LEAST ONE OPEN. [Step 5.c]

Time	Position	Applicant's Actions or Behavior
	US/RO	CHECK if ECCS Flow Should Be Reduced: [Step 6]
		• VERIFY Secondary heat sink conditions – SATISFIED. [Step 6.a]
		• VERIFY RCS subcooling – GREATER THAN 25°F (55°F FOR ADVERSE CONTAINMENT). [Step 6.b]
		• GO to Step 7 and OBSERVE CAUTIONS Prior to Step 7. [Step 6.b RNO]

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.

Time	Position	Applicant's Actions or Behavior
	RO/BOP	RESET ESF Actuation Signals. [Step 7]

Operating Test : NRC	Scenario # 4	Event # 6, 7, 8, & 9	Page 26 of 32

Event Description: Spurious Train B Safety Injection Actuation Signal / Automatic Reactor Trip Failure / Train B Containment Isolation Phase A Automatic Actuation Failure / Small Break Loss of Coolant Accident

Time	Position	Applicant's Actions or Behavior
		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]
	RO/BOP	• VERIFY RCS pressure – GREATER THAN 325 PSIG (425 PSIG FOR ADVERSE CONTAINMENT). [Step 8.a]
		• VERIFY RCS pressure – STABLE OR INCREASING
		• VERIFY RHR Pumps – RUNNING AND ALIGNED TO RWST. [Step 8.b]
		• STOP RHR Pumps and PLACE in Standby. [Step 8.c]
		• RESET RHR Auto Switchover. [Step 8.d]
	US	CHECK RCS and SG Pressures: [Step 9]
	RO/BOP	• VERIFY RCS pressure – STABLE OR DECREASING. [Step 9]
	RO/BOP	• VERIFY SG pressures in all SGs – STABLE OR INCREASING. [Step 9]
	US	CHECK If Diesel Generators Should Be Stopped: [Step 10]
	RO/BOP	• VERIFY AC Safeguards Buses – ENERGIZED BY OFFSITE POWER. [Step 10.a]
	RO/BOP	• PLACE 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]
	RO	• VERIFY Cold Leg Recirculation capability: [Step 11.a]
		• VERIFY Train A RHR Pump – AVAILABLE. [Step 11.a.1)]

Time	Position	Applicant's Actions or Behavior
		• VERIFY CCW to Train A RHR Pump – AVAILABLE. [Step 11.a.1)]
		• VERIFY 1/1-8811A, CNTMT SMP TO RHRP 1 SUCT ISOL VLV AVAILABLE. [Step 11.a.1)]
		• VERIFY Train B RHR Pump – AVAILABLE. [Step 11.a.1)]
		• VERIFY CCW to Train B RHR Pump – AVAILABLE. [Step 11.a.1)]
		• VERIFY 1/1-8811B, CNTMT SMP TO RHRP 2 SUCT ISOL VLV – AVAILABLE. [Step 11.a.1)]
		• VERIFY 1/1-8804A, RHRP 1 TO CCP SUCT VLV – AVAILABLE. [Step 11.a.2)]
		• VERIFY 1/1-8804B, RHRP 2 TO SIP SUCT VLV – AVAILABLE. [Step 11.a.2)]
	RO/BOP	• CHECK Auxiliary Building and Safeguards Building radiation – NORMAL: [Step 11.b]
		• CHECK PC-11 monitors – NORMAL (Grid 4). [Step 11.b]
	US	• NOTIFY Chemistry to obtain RCS samples to assist in determining extent of the accident. [Step 11.c]
	US	• CONTACT Plant Staff to EVALUATE plant equipment. [Step 11.d]
	US	CHECK if RCS Cooldown and Depressurization Is Required: [Step 12]
	RO/BOP	• VERIFY RCS pressure – GREATER THAN 325 PSIG (425 PSIG FOR ADVERSE CONTAINMENT). [Step 12.a]
	RO/BOP	• GO to EOS-1.2 A, Post LOCA Cooldown and Depressurization, Step 1. [Step 12.b]
When transition to EOS-1.2 A, Post LOCA Cooldown and Depressurization is reached, terminate the scenario.		

Operating Test :	NRC	Scenario #	4	Event #	6, 7, 8, & 9	Page	28	of	32
Event Description:	Spurious Train B Safety Injection Actuation Signal / Automatic Reactor Trip Failure / Train B Containment Isolation Phase A Automatic Actuation Failure / Small Break Loss of Coolant Accident								

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 EDG 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]
		• PLACE 1/1-CIPAA1 CNTMT ISOL – PHASE A / CNTMT VENT ISOL Switch in ACT position. [Step 3 RNO]
	BOP	VERIFY Containment Ventilation Isolation (Train A) – 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 Centrifugal Charging Pumps – RUNNING. [Step 7.a]
		• VERIFY Letdown Relief Valve Isolation: [Step 7.b]
		• Letdown Orifice Isolation Valves – CLOSED. [Step 7.b.1)]
		• Letdown Isolation Valves 1/1-LCV-459 & 1/1-LCV-460 – CLOSED. [Step 7.b.2)]

Operating Test :	NRC	Scenario #	4	Event #	6, 7, 8, & 9	Page	29	of	32
Event Description:	Spurious Train B Safety Injection Actuation Signal / Automatic Reactor Trip Failure / Train B Containment Isolation Phase A Automatic Actuation Failure / Small Break Loss of Coolant Accident								

Time	Position	Applicant's Actions or Behavior
	BOP	VERIFY ECCS flow: [Step 8]
		• CCP SI flow indicator – CHECK FOR FLOW. [Step 8.a]
		• RCS pressure – LESS THAN 1700 PSIG (1800 PSIG FOR ADVERSE CONTAINMENT). [Step 8.b]
		• GO to Step 9. [Step 8.b RNO]
	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 both 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]
	BOP	INITIATE periodic monitoring of Spent Fuel Cooling. [Step 13]
		• Spent Fuel Pool temperature (T2900A, T2901A).
		• Spent Fuel Pool level (L4800A, L4801A, L4802A, L4803A).

Event Description: Spurious Train B Safety Injection Actuation Signal / Automatic Reactor Trip Failure / Train B Containment Isolation Phase A Automatic Actuation Failure / Small Break Loss of Coolant Accident

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.

Time	Position	Applicant's Actions or Behavior			
	BOP	VERIFY Components on Table 1 are Properly Aligned. [Step 14]			
		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

Operating Test :	NRC	Scenario #	4	Event #	6, 7, 8, & 9	Page	31 of 32
Event Description:	Spurious Train B Safety Injection Actuation Signal / Automatic Reactor Trip Failure / Train B Containment Isolation Phase A Automatic Actuation Failure / Small Break Loss of Coolant Accident						

Time	Position	Applicant's Actions or Behavior

	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

Examiner Note: **X-HS-3632 on CV-01 will NOT start due to loss of power.**

	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 #	6, 7, 8, & 9	Page	32	of 32
Event Description:	Spurious Train B Safety Injection Actuation Signal / Automatic Reactor Trip Failure / Train B Containment Isolation Phase A Automatic Actuation Failure / Small Break Loss of Coolant Accident							

Time	Position	Applicant's Actions or Behavior

<u>Examiner Note</u>: The next four (4) 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 <u>AND</u> to IMPLEMENT FRGs as required. [Step 14]

EOP-0.0A, Attachment 2 steps are now complete.

COMANCHE PEAK NUCLEAR POWER PLANT

UNIT 1

SYSTEM OPERATING PROCEDURES MANUAL

ELECTRONIC CONTROLLED COPY

CHANGES ARE NOT INDICATED

LATEST CHANGE NOTICE EFFECTIVE DATE PCN-2 03/24/11 1200

__________/________ Verify current status in the Document Control Database prior to use.
INITIAL & DATE

LEVEL OF USE:
CONTINUOUS USE

QUALITY RELATED

CONTAINMENT SPRAY SYSTEM

PROCEDURE NO. SOP-204A

REVISION NO. 15

EFFECTIVE DATE: 09/22/10 1200

PREPARED BY (Print): Greg Blythe Ext: 6769

TECHNICAL REVIEW BY (Print): Lisabeth Donley Ext: 6524

APPROVED BY: Alan Hall for Steven Sewell Date: 09/14/10
DIRECTOR, OPERATIONS

TABLE OF CONTENTS

1.0 APPLICABILITY

This procedure provides instructions for operating the Containment Spray System.

2.0 PREREQUISITES

2.1 Placing the System in Standby

NOTE: CCW flow to the Containment Spray Pumps and Heat Exchanger is not required provided system temperature is maintained ≤150˚F and the affected train is declared inoperable per TS 3.6.6.

- ☑ CCW is available and aligned to the pump seal coolers.
- ☑ CCW is available to the heat exchangers.
- ☑ SSW is available and aligned to the pump bearing coolers.
- ☑ Nitrogen is available to the Chemical Additive Tank.
- ☑ The Chemical Additive Tank is available for chemical addition.
- ☑ Both spray trains have been filled and vented and the respective Containment Spray Risers are above the low level alarm.
- ☑ The RWST is filled and aligned to the SI header.
- The following valve lineups are complete:
  - ☑ SOP-204A-CT-V01, Train A Valve Lineup
  - ☑ SOP-204A-CT-V02, RWST Valve Lineup
  - ☑ SOP-204A-CT-V03, Chem Add Tank Valve Lineup
  - ☑ SOP-204A-CT-V04, Train B Valve Lineup
- The following control switch lineups are complete:
  - ☑ SOP-204A-CT-C01, Train A Control Switch Lineup
  - ☑ SOP-204A-CT-C02, Train B Control Switch Lineup
- The following electrical lineups are complete:
  - ☑ SOP-204A-CT-E01, Train A Electrical Lineup
  - ☑ SOP-204A-CT-E02, Train B Electrical Lineup

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CONTAINMENT SPRAY SYSTEM	REVISION NO. 15 CONTINUOUS USE	PAGE 4 OF 50

2.2 Filling and Venting

2.2.1 Filling Train A

- The following valve lineups are complete:

  N/A ☐ • SOP-204A-CT-V01, Train A Valve Lineup

  ☐ • SOP-204A-CT-V02, RWST Valve Lineup

  ☐ • SOP-204A-CT-V03, Chem Add Tank Valve Lineup

☐ • The RWST is ≥ 25% and ALIGNED to the SI header.

☐ • Demin Water is available in Containment for Spray Riser fill.

☐ • The control switch lineup per SOP-204A-CT-C03, Train A Fill and Vent Control Switch Lineup is complete.

NOTE:	CCW flow to the Containment Spray Pumps and Heat Exchanger is not required provided system temperature is maintained ≤ 150˚F and the affected train is declared inoperable per TS 3.6.6.

NA

N/A ☐ • CCW is available and aligned to the pump seal coolers.

☐ • SSW is available and aligned to the pump bearing coolers.

2.2.2 Filling Train B

- The following valve lineups are complete:
  - NA ☐ SOP-204A-CT-V02, RWST Valve Lineup
  - ☐ SOP-204A-CT-V03, Chem Add Tank Valve Lineup
  - ☐ SOP-204A-CT-V04, Train B Valve Lineup
- ☐ The RWST is $\geq$ 25% and aligned to the SI header.
- ☐ Demin Water is available in Containment for Spray Riser fill.
- ☐ The control switch lineup per SOP-204A-CT-C04, Train B Fill and Vent Control Switch Lineup is complete.

NOTE:	CCW flow to the Containment Spray Pumps and Heat Exchanger is not required provided system temperature is maintained $\leq$ 150˚F and the affected train is declared inoperable per TS 3.6.6.
NA	

- NA ☐ CCW is available AND aligned to the pump seal coolers.
- ☐ SSW is available AND aligned to the pump bearing coolers.

2.2.3 Filling the Chemical Additive Tank

- ☐ Contact Chemistry in preparation for NaOH addition to tank.
- ☐ Demin Water is available at the Chem Add Tank.
- ☐ Nitrogen is available to the tank to supply cover gas.

3.0 PRECAUTIONS

- Thirty (30) percent by weight NaOH is highly basic and will cause caustic burns.

4.0 LIMITATIONS/NOTES

4.1 Limitations

- When at ambient temperature, two (2) consecutive starts are allowed with the motor coasting to rest between starts. Running time between additional starts should be 15 minutes. Time required at standstill between additional starts should be 45 minutes.
- When at rated temperature, one (1) additional start is allowed with the motor coasting to rest before the start. Running time between additional starts should be 15 minutes. Time required at standstill between additional starts should be 45 minutes.
- Two independent Containment Spray Systems shall be operable with each spray system capable of taking suction from the RWST and manually transferring suction to the containment sump any time the unit is in MODES 1, 2, 3 and 4 per TS 3.6.6.
- The Spray Additive System shall be operable with a spray additive tank level of between 91% and 94% of 28% to 30% NaOH solution by weight and four spray additive eductors each capable of adding NaOH solution from the chemical additive tank to a Containment Spray System pump flow in MODES 1, 2, 3 and 4 per TS 3.6.7 and TR 13.6.7.
- The Containment Spray System containment isolation valves shall be operable in MODES 1, 2, 3 and 4 per TS 3.6.3.
- The RWST shall be operable in MODES 1, 2, 3 and 4 per TS 3.5.4.
- Degraded Containment Spray Pump performance may be caused by gas instrusion into the Containment Spray System. Gas intrusion into the Containment Spray System may cause fluctuations in <u>OR</u> a reduction in Containment Spray Pump discharge pressure <u>OR</u> flow, <u>OR</u> increased pump vibration (Reference STA-698, "Gas Instrusion Program").

4.2 Notes

- The opening stroke time of the Containment Spray Heat Exchanger Discharge Valves (1-HV-4776 and 4777) is based on preventing an overcurrent trip of the Containment Spray Pump(s). The stroke time assumes a START of both pumps and an initial fill of the riser and associated piping in containment occurs. The following limitations apply:
    - IF a Containment Spray Pump is taken out-of-service, THEN the other pump in the same train should also be placed in pull out.
    - IF a Containment Spray Pump is taken out of standby due to the limitations above AND the pump is needed to support emergency operation, THEN the pump may be operated as required.
- The Containment Spray system is designed to operate with system temperature up to 300˚F. When the system temperature exceeds 150˚F, however, CCW flow must be aligned to the pump seal coolers to maintain integrity of the mechanical seals. In all cases, CCW flow must be available to both the Containment Spray Heat Exchanger and the mechanical seal cooler to declare the system operable per TS 3.6.6.
- Maintaining less than 25 inches vacuum for less than 12 hours, along with the sequence of instructions followed during the Containment Spray vacuum fill, ensures the Containment Spray System instrumentation which is vulnerable to damage from a vacuum is not exposed to conditions that may cause instrument damage or instrument drift.(EVAL-2000-003051-03 and -04)
- The Containment Spray Heat Exchanger CCW supply isolation valves, 1CC-0107 AND 1CC-0158, are butterfly valves which have holes drilled in the valve discs such that the valves operate functionally like an orifice. With the valves in their normal "LOCKED CLOSED" position, they allow the nominal CCW flow required for Containment Spray Heat Exchanger cooling.
- ENSURE oil level is always maintained in all CT Spray Pump oil bubblers prior to AND after all pump runs as well as after any Maintenance activities (i.e., oil samples or oil changes). Ref. CR-2010-005117

5.0 INSTRUCTIONS

5.1 Normal Operations

5.1.1 Placing the System in a Standby Condition

This section describes the steps to place the Containment Spray System in a standby condition.

☐ A. ENSURE the prerequisites in Section 2.1 are met.

B. VERIFY that the Chemical Additive Tank level is in the normal range. (91% to 94%).

- ☐ 1-LI-4752, CHEM ADD TK LVL
- ☐ 1-LI-4753, CHEM ADD TK LVL

NOTE:	Before declaring the system operable, ENSURE that the following breakers have been racked in per SOP-603A to VERIFY they provide power to the Containment Spray Pumps.

C. IF entering Mode 4 OR RCS temperature is > 200°F, THEN RACK IN the following pump breakers:

- ☐ 1EA1/8/BKR, CONTAINMENT SPRAY PUMP 1-01 MOTOR BREAKER (1APCS1)
- ☐ 1EA2/10/BKR, CONTAINMENT SPRAY PUMP 1-02 MOTOR BREAKER (1APCS2)
- ☐ 1EA1/6/BKR, CONTAINMENT SPRAY PUMP 1-03 MOTOR BREAKER (1APCS3)
- ☐ 1EA2/11/BKR, CONTAINMENT SPRAY PUMP 1-04 MOTOR BREAKER (1APCS4)

5.1.1

[IV] D. PLACE the following pump handswitches in AUTO:

- ☑ 1-HS-4764, CSP 1
- ☑ 1-HS-4766, CSP 2
- ☑ 1-HS-4765, CSP 3
- ☑ 1-HS-4767, CSP 4

E. VERIFY the following monitor lights are DARK:

<u>1-MLB-1A1</u>

- ☑ 2.6 CHEM ADD TK DISCH NOT OPEN 1-HV-4752

<u>1-MLB-1B1</u>

- ☑ 2.6 CHEM ADD TK DISCH NOT OPEN 1-HV-4753

<u>1-MLB-4A1</u>

- ☑ 1.2 CSP 1 RUN
- ☑ 2.2 CSP 3 RUN

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CONTAINMENT SPRAY SYSTEM	REVISION NO. 15 CONTINUOUS USE	PAGE 10 OF 50

5.1.1 E.

1-MLB-4A3

- ☑ ● 1.1 RWST TO CSP 1 & 3 SUCT CLOSE 1-HV-4758
- ☑ ● 1.6 CSP 1 RECIRC CLOSE 1-FV-4772-1
- ☑ ● 1.9 CHEM ADD TK DISCH OPEN 1-LV-4754
- ☑ ● 2.1 CNTMT SMP TO CSP 1 & 3 SUCT OPEN 1-HV-4782
- ☑ ● 2.6 CSP 3 RECIRC CLOSE 1-FV-4772-2
- ☑ ● 2.7 CS HX 1 OUT OPEN 1-HV-4776

1-MLB-4B1

- ☑ ● 1.2 CSP 2 RUN
- ☑ ● 2.2 CSP 4 RUN

1-MLB-4B3

- ☑ ● 1.1 RWST TO CSP 2 & 4 SUCT CLOSE 1-HV-4759
- ☑ ● 1.6 CSP 2 RECIRC CLOSE 1-FV-4773-1
- ☑ ● 1.9 CHEM ADD TK DISCH OPEN 1-LV-4755
- ☑ ● 2.1 CNTMT SMP TO CSP 2 & 4 SUCT OPEN 1-HV-4783
- ☑ ● 2.6 CSP 4 RECIRC CLOSE 1-FV-4773-2
- ☑ ● 2.7 CS HX 2 OUT OPEN 1-HV-4777

COMMENTS ______________________________

5.1.3 Recirculation Through the Recirculation Header

This section describes the steps required to align and start a Containment Spray Pump(s) AND recirculate to the RWST via the recirculation header.

NOTE: IF the containment spray system is being started for performance of OPT-205A, THEN the following valves will be positioned as directed by the performance of the operability test.

- 1CT-0150, U1 CS CHEM EDUCT TST HDR ISOL VLV
- 1CT-0137, CS PMP 1-01/1-03 CHEM EDUCT TST LN ISOL VLV
- 1CT-0183, CS PMPS 1-02/1-04 CHEM EDUCT TST LN ISOL VLV
- 1CT-0075, CS PMP 1-03 EDUCT SUCT ISOL VLV
- 1CT-0023, CS PMP 1-04 EDUCT SUCT ISOL VLV
- 1CT-0079, CS PMP 1-01 EDUCT SUCT ISOL VLV
- 1CT-0027, CS PMP 1-02 EDUCT SUCT VLV

☐ A. ENSURE the system is in standby per Section 5.1.1.

B. VERIFY the selected Train Chemical Additive Tank discharge valve is CLOSED.

- ☐ 1-HS-4754, CHEM ADD TK DISCH VLV, Train A
- ☐ 1-HS-4755, CHEM ADD TK DISCH VLV, Train B

5.1.3

☐ C. INITIATE a trend of the selected pump's parameters on the Plant Computer.

DESCRIPTION	CSP 1-01	CSP 1-02	CSP 1-03	CSP 1-04
CSP MOT OUTBD BRG TEMP	T9313A	T9318A	T9323A	T9328A
CSP MOT INBD BRG TEMP	T9314A	T9319A	T9324A	T9329A
CSP INBD BRG TEMP	T9315A	T9320A	T9325A	T9330A
CSP OUTBD BRG TEMP	T9316A	T9321A	T9326A	T9331A
CSP STAT WNDG TEMP	T9340A	T9341A	T9342A	T9343A

D. VERIFY the CS Pump recirculation valve is OPEN.

☐ • 1-HS-4772-1, CSP 1 RECIRC VLV

☐ • 1-HS-4772-2, CSP 3 RECIRC VLV

☐ • 1-HS-4773-1, CSP 2 RECIRC VLV

☐ • 1-HS-4773-2, CSP 4 RECIRC VLV

E. START the selected spray pump(s).

Train A

☐ • 1-HS-4764, CSP 1

☐ • 1-HS-4765, CSP 3

Train B

☐ • 1-HS-4766, CSP 2

☐ • 1-HS-4767, CSP 4

5.1.3

NOTE: The Containment Spray system is designed to operate with system temperature up to 300˚F. When the system temperature exceeds 150˚F; however, CCW flow must be aligned to the pump seal coolers to maintain integrity of the mechanical seals. In all cases, CCW flow must be available to both the Containment Spray Heat Exchanger and the mechanical seal cooler to declare the system operable per TS 3.6.6.

F. WHEN CCW flow is NOT available to the Containment Spray System, THEN STOP the running pump(s) if system temperature reaches 150˚F. 1-TI-4793, RWST TEMP, may be used as an indication of system temperature.

Train A

- ☐ • 1-HS-4764, CSP 1
- ☐ • 1-HS-4765, CSP 3

Train B

- ☐ • 1-HS-4766, CSP 2
- ☐ • 1-HS-4767, CSP 4

[IV] G. WHEN the recirculation is completed, THEN stop the running pump(s) and ENSURE the handswitch(es) is in AUTO.

Train A

- ☐ • 1-HS-4764, CSP 1
- ☐ • 1-HS-4765, CSP 3

Train B

- ☐ • 1-HS-4766, CSP 2
- ☐ • 1-HS-4767, CSP 4

COMMENTS ______________________________

COMANCHE PEAK NUCLEAR POWER PLANT

UNIT 1

INTEGRATED PLANT OPERATING PROCEDURES MANUAL

FOR EMPLOYEE USE:
DATE VERIFIED/INITIALS ______ / ______ LATEST PCN/EFFECTIVE DATE PCN 18 / 1/17/13 1200

LEVEL OF USE:
CONTINUOUS USE

QUALITY RELATED

POWER OPERATIONS

PROCEDURE NO. IPO-003A

REVISION NO. 28

EFFECTIVE DATE: 10/26/10 1200

PREPARED BY (Print): Tom Nash EXT: 5513

TECHNICAL REVIEW BY (Print): EDITORIAL REVISION EXT: NA

APPROVED BY: Bart Smith DATE: 10/18/10
DIRECTOR, OPERATIONS

3.0 PRECAUTIONS

3.1 Administrative

[C] 3.1.1 Thermal Power changes $\geq$15% of the Rated Thermal Power within a one hour period require an RCS isotopic analysis for iodine between 2 and 6 hours following the power change. Notification of Chemistry and Radiation Protection departments is required (TS SR 3.4.16.2, ODCM 4.11.2.1.1.2 and 4.11.2.1.1.3).

3.1.2 A plant vent grab sample shall be analyzed following shutdown, startup or a thermal power change $\geq$15% of rated thermal power within 1 hour, if analysis of the primary coolant shows dose equivalent I-131 concentration has increased by a factor of 3 or the noble gas monitor shows effluent activity has increased by a factor of 3 (ODCM 4.11.2.1.1.3).

3.1.3 Operations Management shall be notified if AFW discharge line temperature(s) exceed 250°F on the Main Control Board indicators.

3.1.4 Prior to opening the SG Atmospheric Relief Valves, Chemistry shall be notified to determine whether a release permit is required as stated in STA-603.

3.1.5 STA-735 describes the Fuel Integrity Program. This program includes additional Radiochemistry sampling requirements for Startup after fuel movement, Startup from the shutdown condition during a cycle, Shutdown, and Power condition. When I-131 values increase to more than 25% above the previous equilibrium value, sample frequency and data collection should be implemented per STA-735. When failed fuel is detected, the Failed Fuel Action Guidelines of STA-735 should be reviewed for applicability. These guidelines may place additional restrictions on power level or ramp rates.

3.1.6 IF main feedwater back leakage is indicated by abnormally high AFW pump discharge piping temperature, OR by high AFW temperature indication, THEN refer to ABN-305.

3.1.7 Any time temperature through the upper penetration is >250°F, the time shall be logged in the Unit Log. The maximum time allowable >250°F is 24 hours. Temperature should be restored to less than 250°F within 24 hours. If temperature >250°F for 24 hours, System Engineering should be contacted. Refer to ABN-302.

3.1.8 Reactor operation at low-power levels for extended periods of time is discouraged. Station management shall carefully consider the risk of operating during off-normal plant conditions such as low-power operation, develop appropriate contingencies, and provide training to operators before the evolution. Guidance should identify potential problems that could be encountered such as the possibility that the core may become subcritical and predefines conditions under which operators should shut down or manually scram the reactor.

3.2 Equipment

3.2.1 When changing RCS boron concentration, Pressurizer heaters and sprays should be utilized to minimize the differential between the Pressurizer and RCS loop boron concentrations to less than 50 ppm.

3.2.2 During Power Operations, boration or dilution is used to control temperature. Control Rods are used to control ΔI. Control Rods are normally in Auto at 100% power. Control Rods may be used in Manual if desired.

3.2.3 A Reactor Coolant Pump shall not be started while in MODE 2 or MODE 1 operation.

3.2.4 The Turbine Generator should be operated within the limits specified in TDM-401A and Back Pressure Limit Display between 105 MWe and 640 MWe (turbine power).

3.2.5 During normal operation, SG chemistry parameters shall be maintained within the limits specified in STA-610 and CHM-130.

3.2.6 During normal operation, RCS chemistry parameters shall be maintained within the limits specified in STA-609 and CHM-120.

3.2.7 Plant modifications such as changing the physical location of nuclear detectors or modifying existing nuclear detectors and changing the core loading pattern can affect Nuclear Instrumentation indication of Reactor power. N-16 Power should be used as an alternate indication of Reactor power level to verify the accuracy of nuclear instrumentation and power level indication during startup.

3.2.8 N-16 should be monitored as an indication of power along with NIS and Calorimetric power. N-16 may be the most accurate indicator of power during a transient since it is temperature compensated. During transient conditions, the highest indication of Reactor power (N-16, NIS, or Calorimetric) should always be maintained within limits.

3.2.9 Unless special testing is being conducted, the Main Turbine should not be operated for extended periods (>one hour) at 1800 RPM without being loaded. Uneven heating at no load conditions may result in excessive vibration and possible turbine damage.

3.2.10 The Main Turbine HP Stop Valves should not be opened during MSR prewarming. This will result in cross connecting the Main Steam and Auxiliary Steam headers.

3.2.11 The LP Turbine Monitoring System thermocouples are installed at 50% of the support arm wall thickness. The affects of operator initiated actions to reduce temperature will not be seen immediately.

3.2.12 When 1MT1 <u>AND</u> 1MT2 are deenergized with Liquid temperature less than 50°C, <u>ALL</u> the pumps should be off to prevent potential static electrification. This can be accomplished by placing 43F-1, 43F-2 <u>AND</u> 43F-3 (fan control switches inside the Main Transformer Control Panel) in OFF.

3.2.13 Control Rods should NOT be placed in automatic until the fuel is fully conditioned to 100% power.

3.2.14 The ARVs should not be opened greater than 80% during normal operation. This is to prevent steam from entering the main steam penetration room thus reducing oxidation and moisture damage to components.

3.2.15 ARVs may be used for RCS Temperature Control without operational restrictions. (SMF 2000-001634)

3.2.16 Below 40% Power, Main Steamline N16 Radiation Monitors are not accurate and spurious alarms may occur.

3.2.17 If 5A/6A or 5B/6B heater string(s) isolate (automatic closure of 1-HV-2611A/B or 2612A/B) due to level perturbations during startup or shutdown, the affected heater(s) shall only be realigned after the heater string(s) have been filled and vented per SOP-303A. The Main Feedwater Pumps could trip if the heater string is not filled and vented prior to restoring condensate flow through the heaters.

3.2.18 Intermediate Range should be monitored and/or trended to provide alternate indication of how power is trending. At low power, Power Range Instruments may not give an accurate trend of actual power.

3.2.19 Should the reactor become subcritical, proceed without delay to insert control rods, initiate boron addition, or open the reactor trip breakers to ensure the reactor remains shutdown.

3.2.20 Prior to energizing 1MT1/1MT2 displays “Vacuum Alarm”. This alarm is not unexpected and it should clear when the transformer warms up. When Vacuum Alarm is received while transformer is not energized, initiate Annunciator OOS with Comp Action to check alarm cleared after 1MT1/1MT2 energized (once per shift) per ODA-410 |

4.0 LIMITATIONS/NOTES

4.1 Limitations

4.1.1 Power Range channels shall be operable per TS 3.3.1.2 and 3.3.1.3.

4.1.2 Axial Flux Difference shall be maintained within the values specified in NUC-204 per TS 3.2.3.

4.1.3 Control Banks shall be within the insertion, sequence and overlap limits specified in the COLR per TS 3.1.6.

4.1.4 IF any fuel conditioning ramp rate limit is violated, THEN Core Performance Engineering and the Manager, Operations shall be notified AND a SMART form should be initiated per STA-421.

4.1.5 Core Performance Engineering should be contacted to obtain the fuel conditioned power limitations per NUC-114:

- During initial startup of each fuel cycle, prior to exceeding 20% Rated Thermal Power
- After extended low-power operation (>27 days)

4.1.6 Unless otherwise determined by Core Performance Engineering, fuel conditioning ramp rates are as follows:

- No single step increase in power shall exceed 3% full Reactor power.
- The rate of Reactor power increase between 40% and 100% of full power should be $\leq$3% in an hour.

4.1.7 After Fuel Conditioning is satisfied as determined by Core Performance Engineering, Reactor power increases will be made at the rate recommended by Core Performance Engineering with concurrence from the Operations Manager.

4.1.8 The rate of Reactor power increase should be administratively limited to <20% per hour when a more restrictive limit is not required (NUC-114).

4.1.9 When administrative control bank withdrawal limits are required to maintain a positive moderator temperature coefficient (MTC) within limits, rods shall be maintained below the withdrawal limits in NUC-116 per TS 3.1.3.

4.1.10 Four FWIVs, FCVs and associated bypass valves shall be operable per TS 3.7.3.

4.1.11 FWIV temperature should be verified $\geq$90°F at all times. If temperature is <90°F refer to TRM 13.7.38.

4.1.12 Prior to increasing power above 50%, reasonable AFD stability needs to exist. Power should not be increased until AFD can be steadily maintained inside the operating limits. An administrative AFD limit of ±2% about the target value should be maintained during steady state operation. If AFD deviates outside this limit or if AFD oscillations occur, immediate operator action should be initiated to restore AFD within its administrative limit. This limitation may be modified by Core Performance Engineering based on core operating data.

4.1.13 Auxiliary Feedwater piping upstream of the auxiliary feedwater supply line check valves may reach temperatures of 270°F for short excursions (less than 24 hour duration per excursion) provided the Reactor is operating at or below 30% of Rated Thermal Power.

4.1.14 A Condition Report should be initiated for Reactor Engineering to re-evaluate the safety analysis if power operation is restricted to less than 85% for greater than 2 consecutive weeks.

4.1.15 The following limitations apply to the LP Turbine (These limitations do not preclude use of Steam Dumps prior to synchronizing the Generator):

- Limit ΔT to prevent the bottom of the LP Turbine support arms from being hotter than the top by more than 50°F.
- If ΔT reaches 60°F, actions should be initiated to restore temperature within 15 minutes. When ΔT can not be reduced to <60°F within 15 minutes, the generator should be synchronized <u>OR</u> the turbine stop and control valves should be closed within the following 15 minutes.
- When the turbine must be shutdown due to high ΔT, the main condenser should be allowed to cool down by reducing Reactor power and subsequent Steam Dump operation. Turbine generator restart should not be initiated until the generator can be synchronized quickly.

4.1.16 Fuel Conditioning requirements for Rod withdrawal Limitation are as follows:

- Control rod withdrawal during the initial return-to-power should be kept to a minimum to limit local power increases.
- The withdrawal rate should be limited to 3 steps per hour above 50% of full power where rod withdrawal may occur concurrently with power increases up to the 3% per hour.
- Once the control rods have been withdrawn to some position at a given power level, during subsequent maneuvers there is no restriction on rod withdrawal to the previous position up to that power level.
- There is no Rod withdrawal Limitation on Control Bank D above 215 steps.

4.1.17 Automatic start of the Motor Driven AFW Pumps on the trip of both Main Feedwater Pumps is required Operable in MODES 1 and 2 (TS 3.3.2, Table 3.3.2-1 Function 6.g) to ensure a supply of water to at least one SG for heat sink availability. In MODE 1 or 2 with one MFP supplying flow to the SGs (AFW pumps stopped), the second MFP must remain tripped or have the trip oil pressure switches isolated to ensure compliance with TS 3.3.2. (CR-2010-000638)

4.2 Notes

4.2.1 Constant load operations will be monitored per Section 5.5.

4.2.2 Steps within this procedure which address a specific Reactor power level value or range to be maintained, may require modification based on plant response. Provided the mode change checklist (Att 1) is complete and reviewed, the Shift Manager may direct Reactor power to be adjusted as necessary to ensure plant availability. Any deviation from the Reactor power level specified within this procedure shall be approved by the Shift Manager prior to the deviation.

4.2.3 Operational events which could affect fuel performance should be reported to Core Performance Engineering by initiation of a Technical Evaluation. Examples of such events include rapid RCS cooldowns or heatups, unusual control rod movements, unusual nuclear instrumentation (NIS) indications, etc.

4.2.4 Performance of this procedure for startup, shutdown or turbine overspeed trip testing is considered as an Infrequently Performed Evolution which should be implemented in accordance with OWI-107.

4.2.5 A systematic step-by-step review and implementation of the procedure instructions (steps, notes and cautions) is required to implement this IPO. The Bubble Chart on Attachment 17 gives guidance as to what sequence the IPO steps may be performed when increasing or decreasing power.

4.2.6 During implementation of this IPO, the SRO directing IPO activities is expected to **initial AND date** steps once they have been performed, and notes and cautions once they have been evaluated for the applicable evolution.

Initialing the steps, notes and cautions provides a place-keeping aid to ensure the information has been reviewed and disseminated to the Shift Operations crew.

Providing a date for the steps, notes and cautions provides a time-frame with respect to when the instruction was completed, which may benefit planning an evolution that is being resumed following a time delay.

IPO steps reverified/reperformed following a delay where the step(s) had previously been signed off should be redated.

4.2.7 Any step which can not be performed in part or in its entirety due to equipment conditions, should be documented in the remarks section at the end of the procedure. The deviation shall not violate any Technical Specification limitation.

4.2.8 If desired to transition to another Integrated Plant Operating Procedure prior to completion of this procedure, the transition may be made, provided the Unit Supervisor and Shift Manager agree that the transition is appropriate.

4.2.9 Many graphs and tables formerly found in the TDM are now located in the cycle specific Nuclear Design Report (NDR).

4.2.10 Power Change Thumb rules (should NOT be used in place of an actual calculation, but may be used as a check to ensure calculations are reasonable).

- Power Defect 15 pcm/%
- Rod Worth 3 pcm/step
- Boron Worth 8 pcm/ppm
- Boration 10 gallons/ppm

4.2.11 When bringing on the second FWP, flow on the running FWP will be reduced by approximately ½. Running FWP flow should be ≥12000 gpm before attempting to forward flow the oncoming FWP. This ensures that both FWPs can be comfortably maintained above the recirc valve setpoint of 5000 gpm. The objective is to slowly increase oncoming FWP speed while closing down on its recirc valve. This is best accomplished by making a speed increase, followed by closing down on the recirc valve as far as possible without dipping below 5000 gpm on the oncoming FWP. As the oncoming FWP begins to forward flow, speed and flow for the running FWP will decrease (if in automatic). It is important to anticipate this decrease to prevent overshooting with the oncoming pump. Speed for the running FWP should be allowed to stabilize between adjustments. As speed and flow of the oncoming FWP approach that of the running FWP, it may be necessary to REDUCE oncoming FWP speed to maintain it at or below that of the running FWP. Once the recirc valve for the oncoming FWP is fully closed, the procedure will place its controller in automatic and prepare the oncoming FWP for automatic speed control.

4.2.12 An isotopic analysis for Iodine is required between 2 and 6 hours following a power change ≥15% within one hour.

4.2.13 If the Turbine Generator will be purged following shutdown, sufficient argon (three racks consisting of 16 bottles each) should be available for purge.

[C] 4.2.14 When activities which can directly affect core reactivity are performed (e.g., Control Rod positioning), conservative actions are needed and strict compliance with procedures must occur.

4.2.15 Attachment 14, Steam Dump Operation for Load Reject Testing provides guidance to allow use of the Steam Dumps to mitigate the affects of a Turbine Runback which may be performed to provide data to tune the Siemens Digital Control System or for Turbine Cooldown.

4.2.16 Attachment 16, If Turbine operation at 1800 rpm will be extended for maintenance and testing, to reduce the consequences of extended Steam Dump operation, Reactor Power may be reduced to a level that will maintain Turbine speed and minimize Steam Dump operation. This could return the plant to MODE 2. When the Turbine is ready to be synchronized to the Grid, power will be raised back to MODE 1. All requirements for MODE 1 operation should be maintained during MODE 2 operation to allow a timely return to MODE 1. Attachment 16 gives guidance to maintain MODE 2 and ensure a timely transition back to MODE 1.

4.2.17 Due to the location of the Temperature Probes on the MSR Tubesheets, the Tubesheet temps on the MSR Display may have a difference of more than 15°F. Therefore, the MSR Tubesheet Temperatures on the EXP #2 MSR Temperatures Display may be used to determine deltaT.

4.2.18 The Low Pressure Turbine installed during 1RF10 provides more extraction steam drain flow to the Heater Drain Tanks than the Heater Drain Pumps can forward flow. The inability of the Heater Drain Pumps to maintain Heater Drain Tank level will be indicated by the Heater Drain Pump discharge valve being full open or the Heater Drain Tank alternate drain valve opening. The Condensate Pump recirculation valve may be placed in manual and opened to redirect a portion of the Condensate Pump flow back to the condenser. This will reduce the pressure at the discharge of the Heater Drain Pumps and increase Heater Drain Pump flow. Feedwater Pump suction pressure should be closely monitored while throttling the Condensate Pump recirculation valve.

4.2.19 The Condensate Pump Recirc Controller has a toggle switch that serves to enable/disable the Trip to Auto feature. With the Switch in the "TRIP-TO-AUTO ENABLE" position the controller's Manual pushbutton will be illuminated and the Operator may adjust the valve as necessary. The controller will trip to Auto on a low flow condition ≤ 6000 gpm. When the controller trips to Auto the valve will go full open and the valve will stay at full open even when flow goes above the reset setpoint. When the valve trips to Auto the Auto pushbutton will illuminate. The Auto pushbutton is for indication only. After 5 seconds and Condensate flow is > 6000 gpm the Manual pushbutton may be depressed to restore Manual control. Manual control is indicated with the Auto pushbutton dark and the Manual pushbutton lit. Normal operation of 1-FK-2239 will be manual pushbutton lit with the toggle switch in "TRIP-TO-AUTO ENABLE", the Auto pushbutton will be dark. When the toggle switch is in the " TRIP-TO-AUTO DISABLE", the controller will function like any other controller in Manual with no automatic low flow pump protection. Anytime a Condensate Pump is operating, the toggle switch should be in "TRIP-TO-AUTO ENABLE".

4.2.20 Previous design of 1-FV-2239 was for the valve to open on a low flow condition ONLY when 1-FK-2239 was in AUTO. With the new LP Turbines, it may be desired to operate with 1-FV-2239 throttled open. This will reduce Condensate System pressure and allow more Heater Drain flow to the suction of the MFPs. To provide low flow protection for the Condensate Pumps with 1-FK-2239 throttled open at High Power levels, the toggle switch on 1-FK-2239 will be in "TRIP-TO-AUTO ENABLE". This will allow the controller to trip to auto on a low flow and provide Condensate Pump protection. A situation where the TRIP-TO-AUTO feature is desired would be when 1-FK-2239 is throttled to 30% open and a Rx Trip is initiated, the controller trips to Auto on a low flow and provides pump protection. There are also conditions in which this feature would not be desired. In those situations the toggle switch can be placed in the "TRIP-TO-AUTO DISABLE".

4.2.21 Due to increased secondary flow rates associated with 1RF13, extraction steam drain flow to the Heater Drain Tanks may be more than the Heater Drain Pumps can forward flow. The inability of the Heater Drain Pumps to maintain Heater Drain Tank level will be indicated by the Heater Drain Pump discharge valve being full open or the Heater Drain Tank alternate drain valve opening. The Condensate Pump recirculation valve may be placed in manual and opened to redirect a portion of the Condensate Pump flow back to the condenser. This will reduce the pressure at the discharge of the Heater Drain Pumps and increase Heater Drain Pump flow. Feedwater Pump suction pressure should be closely monitored while throttling the Condensate Pump recirculation valve.

4.2.22 A revision keyswitch for each channel of the turbine trip system is installed to allow maintenance tasks during turbine-generator outages while the turbine is at stand still or on turning gear. The keyswitch overrides any protection circuit trip signals. The actuation of the key is annunciate on the Turbine Digital Alarm Summary Display (Asd). By actuating the revision keyswitches all protection circuits are blocked. This should not be done in Modes 1, 2, and 3, see TRM 13.3.33.

- Overspeed protection system 1 will be reset and test frequency 2 (< max) is applied to simulate normal running speed (not tripped).
- A release signal is sent to the startup program (AGS1020) allowing stop and control valve operation.
- The manual turbine trip from main control board is blocked to prevent accidental actuation due to personnel safety reasons.
- The local manual trip remains operational allowing the turbine to be tripped locally if necessary.
- The trip block test also remains operational.

4.2.23 Attachment 18 of this procedure provides instructions for the acquisition of test data necessary to validate the existing certified vendor pump performance curves for the Unit 1 Heater Drain Pumps at approximately 30%, 45%, 85% and 100% RTP. Validation of pump performance at each of these plateaus is not required, but is recommended to ensure pump performance meets minimum design requirements. (Ref. FDA-2006-003080-54 and EVAL-2008-003559-07-00)

- NEO will be required to obtain Heater Drain Pump discharge pressures locally at each plateau tested.
  - 1-PI-2605, HEATER DRAIN SYS HEATER DRAIN PUMP 1-02 DISCHARGE PRESSURE INDICATOR (TB - CNDS/HTR DRN PMP PLATFORM AREA)
  - 1-PI-2607, HEATER DRAIN SYS HEATER DRAIN PUMP 1-01 DISCHARGE PRESSURE INDICATOR (TB - CNDS/HTR DRN PMP PLATFORM AREA)
- Heater Drain Pump suction pressures and flows will be obtained using Plant Computer data points.
  - CMPTR PT U1_P5624A, HDR PMP SUCT PRESS
  - CMPTR PT U1_F9105A, HTR DRN TNK PMP 01 FLOW
  - CMPTR PT U1_F9106A, HTR DRN TNK PMP 02 FLOW
- Reactor Thermal Power will be obtained using using Plant Computer data point.
  - CMPTR PT U1_U3469, RX TOTAL THERMAL (LEFM) C30M
- Attachment 19 of this procedure serves as the data sheet to record data required by Attachment 18.

4.2.24 Attachment 20 provides the instructions for performing post-work testing and recording the test results in support of FDA-2006-003080-58-01, which has installed an automated 0.2 MW turbine load increase and load decrease Sub Loop Controller buttons. Testing will be initiated from Section 5.4 after reaching the 45% power plateau with stable turbine load conditions at that power and prior to increase to 50% power.

- Attachment 21 of this procedure serves as the data sheet to record data required by Attachment 20.

4.2.25 The following conditions apply if a positive Moderator Temperature Coefficient (MTC) exists:

- A positive MTC means that an RCS temperature INCREASE adds POSITIVE reactivity, AND an RCS temperature DECREASE adds NEGATIVE reactivity.

- A transient that causes a reduction of RCS temperature will cause a resulting decrease in core reactivity. The reduction in core reactivity will compound the RCS temperature reduction, which could result in a rapid or large reduction in RCS pressure and Pressurizer level.

- The primary plant should lead the secondary plant during Main Turbine load changes. Additional attention should be given to maintaining RCS temperature at or slightly above Tref (Tavg maintained higher than Tref) during power increases, as long as MTC is significantly positive.

- As power increases and RCS Boron Concentration decreases, MTC will decrease, eventually becoming negative by 100% RTP (as required by TS 3.1.3)

- The Turbine load rate value established to support the ramp rate should consider the RCS temperature band expectations so that adjustments to Turbine loading may be made prior to RCS Tavg being reduced below Tref.

4.2.26 For power changes greater than 5%, a reactivity plan should be developed using one of the sources below.

- IF time and resources support generation of a BEACON projection (for a pre-planned power maneuver), THEN contact Core Performance Engineering for support, and utilize the approved results as the reactivity plan.

- IF the power change closely matches one of the down-power scenarios available in the Reactivity Briefing Sheets (printed from CHORE), THEN utilize the appropriate reactivity plan (interpolation between values on the Boration Matrix is allowed).

- IF the above two options are not available or do not fit the current scenario, THEN perform a NDR based reactivity calculation per Attachment 3 or equivalent CHORE output.

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5.0 INSTRUCTIONS

5.1 **Warmup and Synchronization of the Turbine Generator**

CAUTION:
- The Main Turbine HP Stop Valves should not be opened during MSR prewarming. This will result in cross connecting the Main Steam and Auxiliary Steam headers.
- Time spent with the Main Turbine at 1800 RPM AND NOT synchronized to the grid should be minimized to prevent possible turbine damage. IF testing will be performed with the Main Turbine at 1800 RPM AND NOT loaded (e.g. Main Turbine Overspeed Test, Speed/Load Controller Tuning, etc.), briefing of these evolutions should be completed prior to rolling the Turbine to 1800 RPM and personnel should be readily available to perform the required test(s).

NOTE: Attachment 11 may be used to shutdown the reactor and re-enter MODE 3 when the Unit is operating in MODE 2 conditions.

5.1.1 Ensure the prerequisites of Section 2.0 are met.

Initials ____ Date 1/4/13

5.1.2 Prepare the LP Turbine and Control Fluid pumps for startup.

A. Ensure the EHC Pumps have been rotated within the last week in accordance with OWI-409.

Initials ____ Date 1/4/13

B. LP Turbine Monitoring System temperatures are being monitored and trended on the Plant Computer (Group Displays LPTDIFF, LPT1CASE and LPT2CASE).

Initials ____ Date 1/4/13

NOTE: The following steps are to preclude potential yoke damage as documented in CR-2012-003525 and CR-2012-004128.

B1. Ensure the following valves are in AUTO:

- ☑ 1-LK-2709, MSR A SEP DRN TK ALT LVL CTRL
- ☑ 1-LK-2713, MSR B SEP DRN TK ALT LVL CTRL

B2. Place the following valves in MANUAL and CLOSED.

- ☑ 1-LK-2712, MSR B SEP DRN TK NORM LVL CTRL
- ☑ 1-LK-2708, MSR A SEP DRN TK NORM LVL CTRL

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CAUTION:
- The preferred methods to maintain Reactor power and temperature prior to synchronization are use of Steam Dumps and SG Blowdown Flow. Steam Dump operation and Main Steam Line Drain flow affect LP Turbine casing ΔT, which should be monitored prior to synchronization.
- If LP Turbine casing ΔT approaches limits prior to synchronization, a reduction in Steam Dump operation may be required, and Main Steam Line drain flow should also be limited.
- The preferred method, to reduce Steam Dump Operation and Main Steam Line drain flow, is maintaining maximum SG Blowdown flow.

NOTE:
- The LP Turbine Monitoring System thermocouples are installed at 50% of the support arm wall thickness. Operator initiated actions to reduce temperature will not be seen immediately. Vendor representatives may modify the following limits based on temperature trends during startup and operational performance.

5.1.2 C. Monitor the LP Turbine Monitoring System temperatures until the generator is synchronized:

1) IF differential temperature approaches 50°F, THEN perform the following actions to reduce temperature:

- ☐ Reduce steam dump operation.
- ☐ Reduce Main Steam line drain flow to the condenser.
- ☐ Ensure SG Blowdown flow is maximized.
- ☐ Synchronize the generator as soon as possible.

CAUTION: Exhaust hood spray valves should NOT be used as a method of differential temperature control when Turbine speed is less than rated speed (1800 rpm).

- ☒ WHEN Turbine speed is approximately 1800 rpm, THEN cycle exhaust hood spray valves 1-HS-6556, EXH HOOD SPR VLV and 1-HS-6555, EXH HOOD SPR BYP VLV as necessary to control differential temperature.

& / 4/3/13
Initials Date

5.1.2 C. 2) IF differential temperature ≥60°F, THEN perform the following:

☐ • Restore differential temperature <60°F within 15 minutes.

OR

☐ • Within the following 15 minutes, synchronize the generator

OR

☐ • Close the turbine stop and control valves.

_______/_______
Initials Date

NOTE: Drain valves are opened to drain moisture from the turbine during startup. The drains may be cycled as required to prevent excessive cooldown while startup is in progress.

5.1.3 OPEN the Turbine Drain Valves (1-CB-10).

☑ • 1-HS-2418, HP CTRL VLV 3/4 AFT SEAT DRN VLV

☑ • 1-HS-2419, TURB SIDE XOVER DRN VLV

☑ • 1-HS-2420, MSR SIDE XOVER DRN VLV

Turbine Drain Valves open

&_______/ 4/3/13
Initials Date

5.1.4 Ensure OPT-410A has been completed within the previous 31 days. (TS SR 3.3.1.15.16a and 3.3.1.15.16b).

&_______/ 4/3/13
Initials Date

5.1.5 Ensure Moisture Separator Reheater prewarming is completed per SOP-301A.

&_______/ 4/3/13
Initials Date

[C] 5.1.6 IF Reactor power will be increased by ≥15% within a one hour period, THEN notify Chemistry and Radiation Protection. (TS SR 3.4.16.2, ODCM 4.11.2.1.1.2, 4.11.2.1.1.3)

_______/_______
Initials Date

5.1.7 Prior to increasing Reactor power above 10%, perform Flow Control and Isolation Valve Position verification per OPT-206A to ensure each AFW flow control valve and isolation valve is fully open (TS SR 3.7.5.1).

_______/_______
Initials Date

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CAUTION: If 5A/6A or 5B/6B heater string(s) isolate (closure of 1-HV-2611A/B or 2612A/B) during subsequent steps, the affected heater shall only be realigned per Step 5.4.32. The Main Feedwater Pumps could trip if the heater string is not filled and vented prior to restoring condensate flow through the heaters

NOTE: Opening 1-HV-2611/12 to bypass 5 and 6 heaters will reduce secondary side transients by minimizing the effects of heater 5 and 6 isolation due to level oscillations commonly experienced in the heaters during Unit startup.

5.1.8 OPEN 1-HS-2611/12, FW HTR 5A & 6A/5B & 6B BYP VLV.

Initials ______ Date 4/3/13

5.1.9 Verify the following annunciators are OFF:

- ☐ 1-ALB-9B, 3.9, EHC FLUID TEMP HI
- ☐ 1-ALB-9B, 5.6, TURB L/O TEMP HI

Annunciators are OFF

Initials ______ Date 4/3/13

5.1.10 Verify lube oil temperature is >95°F on the TURB BRG TEMP RCDR 1 (1-SB10T010.G01 recorder point 12 on 1-CB-10).

Initials ______ Date 4/3/13

5.1.11 OPEN 1-HS-2417, HP CTRL VLV 1●4 BEF SEAT DRN VLV (1-CB-10).

Initials ______ Date 4/3/13

5.1.12 WHEN required by Chemistry, THEN terminate main condenser sparging by closing 1-HS-2218, CNDSR HOTWELL AUX STM SPLY VLV (1-CB-09).

Initials ______ Date 4/3/13

5.1.13 Monitor the individual Auxiliary Feedwater discharge lines to each SG for indication of an excessive temperature increase during power escalation.

- 1-TI-2471A SG 1 MDAFW TEMP
- 1-TI-2471B SG 1 TDAFW TEMP
- 1-TI-2472A SG 2 MDAFW TEMP
- 1-TI-2472B SG 2 TDAFW TEMP
- 1-TI-2473A SG 3 MDAFW TEMP
- 1-TI-2473B SG 3 TDAFW TEMP
- 1-TI-2474A SG 4 MDAFW TEMP
- 1-TI-2474B SG 4 TDAFW TEMP

Monitoring AFW discharge lines

&8 / 4/3/13
Initials Date

IF temperature increases, THEN initiate ABN-305 prior to exceeding 175°F:

/
Initials Date

5.1.14 Perform the following Pre-Turbine roll checks:

Turbine Display

A. Verify the Relative Expansion and Casing Differential Temperatures show no unexpected or sudden increases.

&8 / 4/3/13
Initials Date

B. Verify the Relative and Differential Expansion and Casing Differential Temperature are less than allowable limits by verifying the following:

- ☐ On the Turbine Display, DIFF and REL EXPANSIONs are Green.
- ☐ 1-ALB-9B, 5.3, HP TURB CSG ΔT HI is not in Alarm.

&8 / 4/3/13
Initials Date

TSE Margin Display

C. Verify Upper TSE Margin is available:

- ☐ Upper Admission Bar Graph Green
- ☐ TSE Influence ON

&8 / 4/3/13
Initials Date

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5.1.14 **Main Control Board**

D. Ensure 1-TK-3091, EHC FLUID TEMP CTRL is set at 7.58 AND in AUTO.

[initials] / 4/3/13
Initials Date

E. Ensure 1-TK-3094, TURB L/O TEMP CTRL is set at 6.08 AND in AUTO.

[initials] / 4/3/13
Initials Date

F. Ensure the following controllers on the "Gen Temp/Leak Water" Display are in AUTO:

- ☑ In the "Primary Water TCV" Section Primary Water TEMP Controller (1-TV-3097) (Red)
- ☑ In the "Hydrogen TCV" Section Hydrogen TEMP Controller (1-TV-3118) (Red)

[initials] / 4/3/13
Initials Date

G. IF the LP casing (rotor) temperature on recorder 1-SB10T010.G01 point 11 (1-CB-10) <68°F prior to rolling the turbine, THEN maintain the turbine on the turning gear until temperature is >68°F. Refer to the Prewarming Curve for LP Discs in TDM-401A.

_____ / _____
Initials Date

H. Ensure the Turbine controls are ready for Start-up by performing the following:

"TG Control" Display

☑ 1) In the "Load Control" Section, ensure the Load Control Subloop Controller is in Off (Green).

☑ 2) In the "Load Control" Section, ensure the Load Target Setpoint Controller is set at 30 MW.

☑ 3) In the "Load Control" Section, ensure Load Rate Setpoint Controller is set at 100 MW/MIN.

☑ 4) In the "Speed Control" Section, ensure the Turbine is in Speed Control by verifying "Speed" Bar is Red.

[initials] / 4/3/13
Initials Date

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5.1.15 Perform the following to ensure the Turbine is reset:

A. IF the Turbine is Tripped ("Turbine Trip" Bar red), on the TG Control Display, THEN reset as follows:

"TG Overview" Display

1) Ensure the main turbine HP stop valves are closed.

- ☑ HPT STOP VLV 1 (SV1)
- ☑ HPT STOP VLV 2 (SV2)
- ☑ HPT STOP VLV 3 (SV3)
- ☑ HPT STOP VLV 4 (SV4)

Initials / Date: [initials] / 4/3/13

On the "TG Control" Display in the "Start-up" Section

2) Latch the Turbine as follows:

☑ a) Click the Turbine Latch Subgroup Controller to bring up the "Osd"

☑ b) Click "0/1" then Execute to turn on the Controller.

NOTE: The Subgroup Controller should start to blink when the following step is complete. It will continue to blink until the Stop Valves are open.

☑ c) In the "Osd" click "1" then Execute to start the Latching of the Turbine.

Initials / Date: [initials] / 4/3/13

B. On the TG Control Display, verify the turbine trip is reset ("Turbine Trip" Bar white).

Initials / Date: [initials] / 4/3/13

5.1.15 C. Verify the following parameters:

Main Control Board

- ☑ 1-PI-6559, TURB L/O PRESS - >25 psig.
- ☑ 1-PI-6561, EHC FLUID PRESS - Minimum 114 psig.
- ☑ 1-PI-6566, HP EHC FLUID PRESS -Approximately 455 psig.

TG Overview Display

- ☑ HPT CTRL VLV 1 POSN - 0%
- ☑ HPT CTRL VLV 2 POSN - 0%
- ☑ HPT CTRL VLV 3 POSN - 0%
- ☑ HPT CTRL VLV 4 POSN - 0%
- ☑ HPT STOP VLV 1 - CLOSED
- ☑ HPT STOP VLV 2 - CLOSED
- ☑ HPT STOP VLV 3 - CLOSED
- ☑ HPT STOP VLV 4- CLOSED
- ☑ LPT 1 LP CTRL VLV 1 POSN - 0%
- ☑ LPT 1 LP CTRL VLV 2 POSN - 0%
- ☑ LPT 2 LP CTRL VLV 1 POSN - 0%
- ☑ LPT 2 LP CTRL VLV 2 POSN - 0%
- ☑ LPT 1 LP STOP VLV 1 - CLOSED
- ☑ LPT 1 LP STOP VLV 2 - CLOSED
- ☑ LPT 2 LP STOP VLV 1 - CLOSED
- ☑ LPT 2 LP STOP VLV 2 - CLOSED

& 4/3/13
Initials Date

NOTE:

- During operation at BOL with a zero or small negative moderator temperature coefficient, very little reactivity feedback will result from changes in temperature. During a startup significant temperature transients can occur with relatively little change to power. This could result in large transients in Pressurizer level and RCS pressure. Care should be taken to ensure changes in steam flow are done gradually to prevent transients in the RCS.

- Steam dumps in automatic should be used to raise power. Steam drains and blowdown are not the preferred method as Operator action is required to change the steam flow. Using Steam Dumps in automatic can reduce the transients in the primary systems since the automatic control will reduce steam dump flow as the turbine speed/load is increased.

- Nuclear Instrumentation may be conservatively calibrated following an extended outage period. Other indication of thermal power, such as calorimetric data, steam dump demand, etc., should also be monitored during the power increase. N-16 should be monitored as an indication of power along with NIS and Calorimetric power. N-16 may be the most accurate indicator of power during a transient since it is temperature compensated. During transient conditions, the highest indication of Reactor power (N-16, NIS, or Calorimetric) should always be maintained within limits.

- If 1-ALB-6D, 1.14 IR HI FLUX ROD STOP C-1 is received prior to 1-PCIP, 1.6 RX $\geq$10% PWR P-10, Core Performance Engineering and I&C should be notified to evaluate.

5.1.16 Perform the following steps to increase Reactor power to approximately 6% - 8% to provide additional steam flow capability:

A. IF desired, THEN ensure the FW BYP CTRL controllers are in AUTO.

_______/_______
Initials Date

B. Prior to increasing Reactor power above 5%, ensure Attachment 1 has been completed and reviewed by the Shift Manager.

_______/_______
Initials Date

C. As Reactor power increases, verify the Steam Dump system continues to maintain steam pressure at approximately 1092 psig.

_______/_______
Initials Date

5.1.16 **D. <u>WHEN</u> Reactor power is >5%, <u>THEN</u> log the time MODE 1 is entered:**

_______/_______/_______
Initials Date Time

E. Perform OPT-102A for MODE 1 surveillances now <u>AND</u> continue shiftly, as required.

_______/_______
Initials Date

F. Slowly increase Reactor power to approximately 6% - 8%.

_______/_______
Initials Date

<u>NOTE</u>: Update of MAXIMO MODE Status need not be completed prior to continuing this IPO, however programs triggered by MAXIMO may not be accurate until current MODE in MAXIMO is updated.

G. Ensure MAXIMO indicates Unit 1 is in MODE 1.

_______/_______
Initials Date

<u>CAUTION</u>: The following step should be performed just prior to rolling the Main Turbine. Should the turbine roll be delayed, MSR temperatures should be evaluated to determine if prewarming should be re-initiated prior to rolling the Main Turbine.

5.1.17 <u>WHEN</u> the turbine will be rolled, <u>THEN</u> perform the following steps to secure Moisture Separator Reheater preheating:

A. On the “MSR” Display, check the temperature difference between MSR 1A (MSRL) and 1B (MSRR) tubesheets ≤25°F.

_______/_______
Initials Date

B. <u>IF</u> the temperature difference is >25°F, <u>THEN</u> on the “MSR” Display in the MSR Setpoint Section, adjust <u>each</u> MSR HTG STM CTRL in Manual as necessary to achieve a tubesheet temperature difference ≤25°F for at least 10 minutes.

_______/_______
Initials Date

5.1.17 C. WHEN the temperature difference is ≤25°F for at least 10 minutes, THEN perform the following:

> NOTE: The Reheater Drain Tank levels and MSR tube sheet temperatures should be closely monitored during subsequent steps. Leakage past the MSR temperature control valves or the Reheater Drain Tank level control valves will affect MSR tube sheet temperatures. The level control valves may be adjusted as necessary to maintain level and MSR temperature.

"MSR" Display

☐ 1) In the "MSR Prewarm" Section, ensure the Subgroup Controller is OFF (green/grey).

☐ 2) In the "MSR Setpoint" Section, ensure "Target" Setpoint Controller in MANUAL (Green).

☐ 3) In the "MSR Setpoint" Section, ensure BOTH MSR Heating Steam Controllers
in MANUAL (Green) and set for 0%.

☐ 4) Ensure both "MSR 1-A Demand" and "MSR 1-B Demand" at 0%.

5) Ensure the following Temperature Valves go closed:

- ☐ 1-TV-6580A, MSR A HTG STM CTRL VLV
- ☐ 1-TV-6580B, MSR A HTG STM CTRL VLV
- ☐ 1-TV-6580C, MSR A HTG STM CTRL VLV
- ☐ 1-TV-6581A, MSR B HTG STM CTRL VLV
- ☐ 1-TV-6581B, MSR B HTG STM CTRL VLV
- ☐ 1-TV-6581C, MSR B HTG STM CTRL VLV

6) CLOSE the Auxiliary Steam Supply Valves to each MSR:

- ☐ 1MS-0451, AUX STM SPLY TO MSR 1-A ISOL VLV
- ☐ 1MS-0454, AUX STM SPLY TO MSR 1-B ISOL VLV

5.1.17.C 7) On the MSR Display, ensure all MSR Heating Steam Equalization Valves <u>CLOSED</u>

- ☐ • 1-HV-6583-1, MSL 1-02 TO MSR 1-A HTG STM EQUAL VLV
- ☐ • 1-HV-6583-2 MSL 1-03 TO MSR 1-A HTG STM EQUAL VLV
- ☐ • 1-HV-6583-3 MSL 1-01 TO MSR 1-B HTG STM EQUAL VLV
- ☐ • 1-HV-6583-4 MSL 1-04 TO MSR 1-B HTG STM EQUAL VLV

MSR Preheating is Secured. ________/________ Initials Date

> <u>NOTE</u>: If at any time the HP Stop valves fail to open during the latching program, they may be opened manually per SOP-401A Section 5.3.3, Opening HP Stop Valves manually.

5.1.18 Perform the following steps to open the high pressure and low pressure stop valves:

☐ A. CLOSE 1-HS-2417, HP CTRL VLV 1●4 BEF SEAT DRN VLV (1-CB-10). ________/________ Initials Date

☐ B. On the “TG Control” Display in the “Start-Up” Section, turn on the “Open Stop Valves” Subloop Controller. ________/________ Initials Date

C. On the TG Overview Display, verify HP and LP Stop Valves are OPEN:

- ☐ • LPT 1 LP STOP VLV 1
- ☐ • LPT 2 LP STOP VLV 1
- ☐ • LPT 1 LP STOP VLV 2
- ☐ • LPT 2 LP STOP VLV 2
- ☐ • HPT STOP VLV 1 (SV1)
- ☐ • HPT STOP VLV 3 (SV3)
- ☐ • HPT STOP VLV 2 (SV2)
- ☐ • HPT STOP VLV 4 (SV4)

________/________ Initials Date

☐ D. OPEN 1-HS-2417, HP CTRL VLV 1.4 BEF SEAT DRN VLV (1-CB-10). ________/________ Initials Date

NOTE: Steam Dumps should be used when practical to maintain power. Increasing Reactor power to provide additional steam flow capability should not be performed until just prior to synchronization. Operation of the SG Atmospherics should NOT routinely be used to compensate for Steam Dump operation.

5.1.19 Perform the following steps to increase Main Turbine speed to 500 RPM:

A. IF temperature difference between MSR 1A (MSRL) and 1B (MSRR) tubesheets is >25°F, THEN perform the following:

On the "TG Control" Display in the “Start-up” Section

1) Un-Latch the Turbine as follows:

☐ a) Click the Turbine Latch Subgroup Controller to bring up the “Osd”

☐ b) Click “0/1" then Execute to turn on the Controller.

NOTE: The Subgroup Controller should start to blink when the following step is complete. When the turbine is Un-latched the Subgroup Controller will stop blinking.

☐ 2) In the “Osd” click “0" then Execute to start the Un-Latching of the Turbine.

☐ 3) On the TG Control Display, verify the turbine is tripped (“Turbine Trip” Bar red) AND Latch Bar is Green.

☐ 4) Refer to ALM-4000A, Digital Alarms, as necessary.

☐ 5) Return to Step 5.1.17.

_______/_______
Initials Date

B. Maintain Reactor power at approximately 6% - 8% and Tavg approximately 557°F, while rolling the Main Turbine to 1800 rpm.

_______/_______
Initials Date

C. Dispatch a Plant Equipment Operator to locally inspect the Main Turbine during roll up for any unusual noises, rubbing, etc.

_______/_______
Initials Date

NOTE: The Main Turbine will begin rolling at a preset rate as soon as the “Speed Target” setpoint is above actual Turbine Speed.

D. On the “TG Control” Display in the “Speed Control” Section, roll the Main Turbine to approximately 500 RPM by raising the“Speed Target” Controller to 500 RPM.

_______/_______
Initials Date

5.1.19 E. On the “Lube Oil” Display, verify “Turning Gear Valve # 1" closes at a Main Turbine speed of approximately 260 RPM.

_______/_______
Initials Date

F. Verify no unexpected or sudden increase in vibration is indicated:

- ☐ Turbine Display or Turbine Vibration Display
- ☐ Generator Display or Generator Vibration Display
- ☐ Alarm Summary Display (Asd)

_______/_______
Initials Date

NOTE:

- Thermal stress of the turbine shaft is calculated based on the differential temperature between the shaft surface and the internal shaft core temperature. Since the shaft is rotating, the use of an embedded thermocouple is impossible; therefore, a thermocouple measures the steam temperature entering the HP casing and this temperature is the shaft surface temperature. The shaft core temperature is then calculated from the inlet steam temperature by the TSE system.
- From these temperatures, the TSE system computes the upper and lower permissible temperature (Turbine) and Turbine Load Margins on the “TSE Margin” Display.
- The TSE, within the digital turbine control system, is constantly measuring temperatures at critical sections of the turbine and will limit the ramp up/ramp down as deemed necessary by internal stress calculations performed by TSE. If TSE determines that the allowable temperature margin is being approached or exceeded, alarm annunciation will occur and the ramp up/ ramp down will be limited. The following alarms may be received:

  TSE Lower Temp Margin <0
  TSE Lower Temp Margin <20
  TSE Upper Temp Margin <0
  TSE Upper Temp Margin <60
  TSE Lower Margin HP Shaft <0
  TSE Lower Margin HP Shaft <60
  TSE Upper Margin HP Shaft <0
  TSE Upper Margin HP Shaft <60

- While TSE Influence is off, any INCREASE in Turbine load is limited to 5 MW/min |
- While TSE Influence is off, with a TSE fault present, the following limits apply: |
  - Turbine speed should be held at warm-up speed (500 RPM) for a minimum of 20 minutes, prior to commencing ramp to 1800 RPM |
  - Following initial synchronization, turbine load increases should be limited to a load rate of 2.27 MW/min while $\leq$ 400 MWe, THEN limited to 5 MW/min while greater than 400 MWe |

G. On the “TSE Margin” Display, IF the Simulated Shaft Temperature is less than 120°F, THEN wait at least 20 minutes before increasing speed to 1800 rpm.

_______/_______
Initials Date

NOTE:
- The "Admission Temperature" Section on the "TSE Margin" Display shows the #1 Stop Valve which has a duplex thermocouple mounted in the valve that measures inner wall temperature (100%/steam side) and midwall temperature (50%).
- From these temperatures, the TSE calculates the permissible upper and lower temperature margins for the valves (Admission). To ensure the turbine startup rate does not exceed the thermal stress limits on the valves, the upper margin shall limit the speed controller's ramp rate.
- The TSE Margin Display has 2 Bar Graphs which have a positive and a negative temperature scale that represents Upper and Lower TSE Margins.

5.1.19 H. Determine the upper TSE margin temperature limitations by monitoring the "TSE Margin" Display:

- IF the Admission Upper Margin is increasing or stable, THEN proceed to Next Step.

  ________/________
  Initials Date

- IF the Admission Upper Margin is decreasing, THEN hold the Main Turbine Speed at 500 RPM until the Admission Upper Margin is increasing AND then proceed to Next Step.

  ________/________
  Initials Date

- IF the Admission Upper Margin is approaching 0°F, THEN reduce Main Turbine speed as necessary until the Admission Upper Margin is increasing. WHEN the Admission Upper Margin is increasing, THEN increase Main Turbine speed to 500 RPM AND proceed to Next Step.

  ________/________
  Initials Date

5.1.20 IF an Overspeed Trip test is required (Prerequisite 2.20), THEN perform the test per Attachment 4.

________/________
Initials Date

NOTE: 1-ALB-10A, 2.11, GEN CORE MONITOR ALARM may illuminate during Main Turbine speed increase to 1800 RPM. The annunciator should clear after the Generator Core Monitors are placed in service by the subsequent steps.

5.1.21 Perform the following steps to increase Main Turbine speed to 1800 RPM:

A. Verify no abnormal indications on the following Displays :

- Turbine Display
- Generator Display

________/________
Initials Date

> NOTE: The TSE Margin Display has 2 Bar Graphs. Each of the 2 Bar Graphs has a positive and a negative temperature scale which represent Upper and Lower TSE Margins. At this point the upper bar graphs should be green and above 60°F.

5.1.21 B. Verify upper TSE Margin is above 60°F and Upper Admission Bar is green on the “TSE Margin” Display.

_______/_______
Initials Date

> NOTE:
> - Hold Setpoint Function on the “TG” Display may be used at anytime during the Turbine Roll-up if problems occur.
> - Initiating the Hold Setpoint Function will automatically reduce (ramp down) the turbine speed to 500 rpm. The turbine then remains at warm-up speed until the Operator resumes startup.

> CAUTION: If the Upper TSE Margin stops the Main Turbine rollup prior to attaining at least 1765 RPM, Main Turbine speed should immediately be reduced to approximately 500 RPM to allow the Main Turbine to continue soaking.

C. In the “Speed Control” Section, roll the Main Turbine to 1800 RPM by raising the “Speed Target” Controller to 1800 RPM.

_______/_______
Initials Date

D. Verify Lube Oil Temperature is maintained at approximately 113°F as indicated on the TURB BRG TEMP RCDR 1 recorder (1-SB10T010.G01 recorder point 12 on 1-CB-10) while Main Turbine speed is increased.

_______/_______
Initials Date

E. Perform the following:

- Verify 1-HS-6579, TURB SHAFT LIFT OIL PMP automatically stops at a Main Turbine speed of approximately 540 RPM.
- Place 1-HS-6579 in AUTO AFTER STOP

_______/_______
Initials Date

F. <u>WHEN</u> turbine speed is approximately 1400 rpm, <u>THEN</u> ensure the EXCITER AIR DRIER and EXCITER HEATER in OFF at the Unit 1 GENERATOR AUXILIARIES CABINET JC91 (TB 778, U1 GAC).

_______/_______
Initials Date

G. Verify 1-PI-6558, TURB L/O PMP DISCH PRESS is between 155 and 175 psig.

_______/_______
Initials Date

H. <u>WHEN</u> Main Turbine speed increases above 1765 RPM, <u>THEN</u> stop <u>ALL</u> running Auxiliary Oil Pumps and place in AUTO.

_______/_______
Initials Date

5.1.21 I. Verify no unexpected or sudden increase in vibration is indicated:

- ☐ • Turbine Display or Turbine Vibration Display
- ☐ • Generator Display or Generator Vibration Display
- ☐ • Alarm Summary Display (Asd)

_______/_______
Initials Date

J. Ensure the Generator Primary Water System startup steps which establish operating conditions at 1800 RPM have been completed per SOP-408A.

_______/_______
Initials Date

K. Ensure the Generator Core Monitors are in service per SOP-405A.

_______/_______
Initials Date

L. IF shaft balance data is needed, THEN perform the following:

1) Ensure necessary data has been obtained.

_______/_______
Initials Date

2) IF a Main Turbine shutdown is required, THEN Trip Main Turbine AND GO TO Attachment 4, Step 18.

_______/_______
Initials Date

3) IF the Main Turbine does NOT have to be shutdown, THEN proceed to the next step.

_______/_______
Initials Date

NOTE:
- 1-ALB-10A, 2.11, GEN CORE MONITOR ALARM may illuminate during Main Turbine speed increase to 1800 RPM. The annunciator should clear after the Generator Core Monitors are placed in service by the subsequent steps.
- Main Transformer cooling fans are placed in the required position prior to synchronizing the Main Generator to the grid (Step 5.1.27 C.). Pumps and fans are maintained off when transformers are not in service to prevent potential static electrification.

5.1.22 Align Unit 1 Main and Auxiliary Transformers for Startup as follows:

A. Perform the Preparing Unit 1 Main and Auxiliary Transformers for Unit Startup Section of SOP-601A.

_______/_______
Initials Date

5.1.23 DELETED

NOTE:
- During operation at BOL with a zero or small negative moderator temperature coefficient, very little reactivity feedback will result from changes in temperature. During a startup significant temperature transients can occur with relatively little change to power. This could result in large transients in Pressurizer level and RCS pressure. Care should be taken to ensure changes in steam flow are done gradually to prevent transients in the RCS.
- Steam dumps in automatic should be used to raise power. Steam drains and blowdown are not the preferred method as Operator action is required to change the steam flow. Using Steam Dumps in automatic can reduce the transients in the primary systems since the automatic control will reduce steam dump flow as the turbine speed/load is increased.
- Nuclear Instrumentation may be conservatively calibrated following an extended outage period. Other indication of thermal power, such as calorimetric data, steam dump demand, etc., should also be monitored during the power increase. N-16 should be monitored as an indication of power along with NIS and Calorimetric power. N-16 may be the most accurate indicator of power during a transient since it is temperature compensated. During transient conditions, the highest indication of Reactor power (N-16, NIS, or Calorimetric) should always be maintained within limits.

5.1.24 SLOWLY increase Reactor power to approximately 10% (6% - 10%) to provide additional steam flow capability.

_____/_____
Initials Date

CAUTION: U1 Generator should not remain connected to the Switchyard (8002 closed) >1 hour without closing a generator output breaker. The 1 hour limitation should prevent over-heating of the metering transformer windings.

5.1.25 Perform the following steps to prepare Unit 1 Generator for synchronization:

A. Perform Switching and Tagging Order per STA-617 using form STA-617-1 to connect the Main Generator.

_____/_____
Initials Date

NOTE: The following step enables input to 86-1/1G, 86-2/1G, deenergizes TEST SWITCH NOT RESET light inside 1-JD04.

B. Place the “Rotor Ground Protection Relay” Safety Switch -S5 (TVR Room, inside 1-JD04) in the “Operating” position.

_____/_____
Initials Date

5.1.25 C. Contact Meter and Relay to ensure the TVR is ready for Generator Start-up.

_______ / _______
Initials Date

D. Following completion of Step A, perform Switching and Tagging per STA-617 using form STA-617-21.

_______ / _______
Initials Date

NOTE: SOP-408A, Section 5.1 SHALL be completed prior to loading the generator.

5.1.26 Perform the following steps to prepare the Main Generator for synchronization:

NOTE: The TSE Margin Display has 2 Bar Graphs. Each of the 2 Bar Graphs has a positive and a negative temperature scale which represent Upper and Lower TSE Margins. At this point the upper bar graphs should be green and above 60°F.

A. On the “TSE Margin” Display, verify Upper TSE Margin is >0°F and stable or increasing.

_______ / _______
Initials Date

B. Perform the following steps to place the generator voltage regulator in service:

☐ 1) In the “Voltage Control” Section, ensure the ON/OFF Subloop Controller is in OFF (Green).

☐ 2) In the “Voltage Control” Section, ensure the Auto/Man Subloop Controller in Auto (Red).

☐ 3) In the “Voltage Control” Section, verify the Voltage Target Setpoint Controller is at approx. 22 KV.

NOTE: The next step will excite the Main Generator and raise voltage to Approx.22 KV AND energize the Main and Unit Auxiliary transformers.

5.1.26.B

☐ 4) Ensure personnel are clear of the Main Generator, and Main and Unit Auxiliary Transformers.

☐ 5) In the "Voltage Control" Section, place the ON/OFF Subloop Controller in ON (Red).

☐ 6) On the "TG" Display, verify Main Generator Voltage builds to Approx. 22 KV.

☐ 7) In the "Voltage Control" Section, verify the Exciter Current Target is tracking with actual Exciter Current.

The Generator Voltage Regulator is in service ________/________
Initials Date

C. Prepare the Turbine to go to Load Control upon synchronization:

☐ • In the "Load Control" Section, ensure the "Load Control" Subloop Controller in ON (Red).

☐ • In the "Load Control" Section, ensure the Load Target Setpoint Controller is set at 30 MW.

☐ • In the "Load Control" Section, ensure Load Rate Setpoint Controller is set at 100 MW/MIN. ________/________
Initials Date

5.1.27 Perform the following steps to synchronize the main generator and initiate loading:

NOTE:
- Long periods of low power levels can cause turbine blade fatigue and excessive vibration.
- Approximately 10% Reactor power on Steam Dumps corresponds to approximately 70 MWe with steam dumps closed.
- Adjustment of TPCW flows to Hydrogen Coolers shortly after Sync may be necessary, experience has shown Hydrogen temperatures may reach near trip values.

A. Notify QSE Generation Controller of approximate time for main generator synchronization. ________/________
Initials Date

5.1.27 B. Locally monitor 1-SS15T546, GEN PRIMARY WATER SYS LEAKAGE WTR CLR 1-544 OUT TEMP INDICATOR AND throttle 1-SS15S558, GEN PRI WTR SYS LEAKAGE WTR CLR 1-544 TPCW OUT VLV as necessary to maintain approximately 104°F (40°C) on 1-SS15T546.

_______ / _______
Initials Date

C. Ensure the Main Transformer Cooling switches are in the required position locally:

1MT1

- ☐ 43F-1 (Cooler Group #1, Cooler 1 and 2) switch in MAN
- ☐ 43F-2, (Cooler Group #2, Cooler 3 and 4) switch in AUTO
- ☐ 43F-3, (Cooler Group #3, Cooler 5) switch in AUTO
- ☐ Reset and check “Failure Alarm Coolers Group” alarm clear

1MT2

- ☐ 43F-1 (Cooler Group #1, Cooler 1 and 2) switch in MAN
- ☐ 43F-2, (Cooler Group #2, Cooler 3 and 4) switch in AUTO
- ☐ 43F-3, (Cooler Group #3, Cooler 5) switch in AUTO
- ☐ Reset and check “Failure Alarm Coolers Group” alarm clear

Switches are aligned

_______ / _______
Initials Date

D. Verify the following controllers on the “Gen Temp/Leak Water” Display are in AUTO:

- ☐ In the “Primary Water TCV” Section Primary Water TEMP Controller (1-TV-3097) (Red)
- ☐ In the “Hydrogen TCV” Section Hydrogen TEMP Controller (1-TV-3118) (Red)

Controllers are in Automatic.

_______ / _______
Initials Date

5.1.27 E. Monitor the GEN GROSS MW on the “TG” Display during the initial turbine synchronization and loading.

_______/_______
Initials Date

F. Turn the GEN BKR SYNCHROSCOPE for either generator output breaker 8000 or 8010 ON (SS-E3 or SS-W3).

_______/_______
Initials Date

G. In the “Voltage Control” Section, adjust Generator INCOMING VOLT (V-IN) to be 2V (one division) higher than RUNNING VOLT (V-RUN) using the Voltage Target Setpoint Controller

_______/_______
Initials Date

H. In the “Speed Control” Section, adjust main generator speed using the Speed Target Setpoint Controller to obtain a steady 2 - 4 RPM synchroscope rotation in the FAST direction.

_______/_______
Initials Date

CAUTION:
- During BOL picking up a large load on initial synchronization could induce large temperature transients in the RCS resulting in Pressurizer level and RCS pressure swings. Raising Reactor power using Steam Dumps in Automatic, then loading the Main Generator will allow the RCS to lead the secondary and provide a more controlled increase in power.
- Closing the Generator Output breaker will shift the Turbine Generator to Load Control and will ramp load to approx. 30 MW.

I. Just before the GEN BKR SYNCHROSCOPE pointer reaches the 12 o'clock position, CLOSE the selected output breaker and record time:

- Breaker CLOSED.
- TIME:____________

_______/_______
Initials Date

J. Verify load rises to 30 MW at approximately 100 MW/min after output breaker closed.

_______/_______
Initials Date

NOTE: Raising or Lowering Reactive Load (MVAR) on the Main Generator will affect reactive Load (MVAR) on the opposite Unit.

K. If required, In the “Voltage Control” Section, adjust reactive load by raising the Voltage Target Setpoint Controller until a positive increase in MEGAVARS (out) on “TG” Display is observed.

_______/_______
Initials Date

5.1.27 L. Coordinate with the opposite unit (if online) and SLOWLY adjust reactive load to balance MEGAVARS loading to maintain the desired 345 KV voltage by raising or lowering the Voltage Target Setpoint Controller in the "Voltage Control" Section. ________/________ Initials Date

M. If desired to raise or lower Turbine load to stabilize Rx Power, perform the following:

1) Set the Load Rate Setpoint Controller to the desired Load Rate. ________/________ Initials Date

2) Set the Load Target Setpoint Controller to the desired Load. ________/________ Initials Date

N. Turn the GEN BKR SYNCHROSCOPE OFF. ________/________ Initials Date

O. Turn the GEN BKR SYNCHROSCOPE for the remaining output breaker ON. ________/________ Initials Date

P. Verify the pointer locks in at the 12 o'clock position. ________/________ Initials Date

Q. CLOSE the remaining open output breaker. ________/________ Initials Date

R. Turn the GEN BKR SYNCHROSCOPE OFF. ________/________ Initials Date

> CAUTION: The following steps will verify Main Generator Protection is available. The Computer points specified AND the SER alarm summary must be verified. Failure to verify these points as listed could result in operation without Generator protection.

S. To ensure Generator Protection is available AND the Load Reject relay is not picked up, obtain an alarm summary from the SER and verify SER Alarm 98, GEN. OFF THE LINE-LOAD REJECTION PROTECTION, is not present in the current alarm summary. ________/________ Initials Date

NOTE: The following Plant Computer points indicate the status of the Generator output breakers and air switch inputs to Generator Protection circuitry.

5.1.27 T. Verify the following Plant Computer points indicate CLOSED:

- ☐ • Y0335D, GEN BRKR 8000 (Plant Computer) is CLOSED
- ☐ • Y0336D, GEN BRKR 8010 (Plant Computer) is CLOSED

_______/_______
Initials Date

5.1.28 Notify QSE Generation Controller by updating GAPS for the change in “Unit Status” to “On-Line and Not Released (NR)” to show the time of main generator synchronization.

_______/_______
Initials Date

5.1.29 On the“TSE Margin” Display, verify TSE allowance is >0 MW as indicated by the “Turbine Load Margin” (Upper)

_______/_______
Initials Date

5.1.30 On the Turbine Display, verify the Relative Expansions and Casing Differential Temperatures show no unexpected or sudden increases as indicated.

_______/_______
Initials Date

5.1.31 Verify the Relative and Differential Expansion and Casing Differential Temperature are less than allowable limits by verifying the following:

- ☐ • Turbine Display, DIFF and REL EXPANSIONs are Green.
- ☐ • 1-ALB-9B, 5.3, HP TURB CSG ΔT HI is not in Alarm.

_______/_______
Initials Date

5.1.32 Verify no unexpected or sudden increase in vibration is indicated:

- ☐ • Turbine Display or Turbine Vibration Display
- ☐ • Generator Display or Generator Vibration Display
- ☐ • Alarm Summary Display (Asd)

No unexpected or sudden increase

_______/_______
Initials Date

5.1.33 Perform the following to align Extraction Steam to the heaters:

A. IF Extraction Steam Isolation valves to FW Heater 3A and 3B are caution tagged due to the drain valves being closed, THEN ensure caution tags are removed:

- ☐ • 1-HS-2031, FW HTR 3A ES SPLY VLV
- ☐ • 1-HS-2032, FW HTR 3B ES SPLY VLV

_______/_______
Initials Date

B. IF valves are closed, THEN slowly OPEN FW Heater 3A and 3B drain valves:

- ☐ • 1HD-0049, HTR DRN SYS FW HTR 1-3A OUT TO HTR DRN TK 1-3-2 ISOL VLV
- ☐ • 1HD-0114, HTR DRN SYS FW HTR 1-3B OUT TO HTR DRN TK 1-3-2 ISOL VLV

_______/_______
Initials Date

NOTE:
- The preferred method for establishing Extraction Steam is to align the low pressure feedwater heaters first and sequentially align the higher pressure feedwater heaters.
- Extraction Steam pressure may not be sufficient to allow alignment of all feedwater heaters at this time. Heaters should be aligned as Extraction Steam pressure increases which will allow the HI-HI level conditions to clear.
- Placing the Extraction Steam isolation valve handswitches in OPEN will clear the Turbine Trip and Feedwater Heater HI-HI level interlocks on the Feedwater Heater and Reheater Drain Tank normal drain valves. This will allow the normal drain valves to open in response to increasing level.

5.1.33 C. OPEN the Extraction Steam Isolation valves to the heaters:

- ☐ 1-HS-2033, FW HTR 4A ES SPLY VLV
- ☐ 1-HS-2034, FW HTR 4B ES SPLY VLV
- ☐ 1-HS-2031, FW HTR 3A ES SPLY VLV
- ☐ 1-HS-2032, FW HTR 3B ES SPLY VLV
- ☐ 1-HS-2029, FW HTR 2A ES SPLY VLV
- ☐ 1-HS-2030, FW HTR 2B ES SPLY VLV
- ☐ 1-HS-2027, FW HTR 1A ES SPLY VLV
- ☐ 1-HS-2028, FW HTR 1B ES SPLY VLV

_______ / _______
Initials Date

NOTE: It may be necessary to repeat Steps 5.1.34 A through G if Reactor power is reduced below 10% on 3/4 Power Range channels.

5.1.34 WHEN Reactor power is above 10% (2/4 PR channels), THEN perform the following:

A. Verify 1-PCIP, 1.6, RX ≥10% PWR P-10 is ON.

_______ / _______
Initials Date

B. Depress both Intermediate Range Manual Block pushbuttons:

- ☐ 1/1-N-38A, IR RX TRIP BLK
- ☐ 1/1-N-38B, IR RX TRIP BLK

_______ / _______
Initials Date

5.1.34 C. Verify the following:

- ☐ ● 1-PCIP, 1.2, IR TRN A RX TRIP BLK is ON.
- ☐ ● 1-PCIP, 2.2, IR TRN B RX TRIP BLK is ON.

_______/_______
Initials Date

D. Depress both Power Range Manual Block pushbuttons:

- ☐ ● 1/1-N-47A, PR RX TRIP BLK
- ☐ ● 1/1-N-47B, PR RX TRIP BLK

_______/_______
Initials Date

E. Verify the following:

- ☐ ● 1-PCIP, 3.2, PR TRN A LO SETPT RX TRIP BLK is ON.
- ☐ ● 1-PCIP, 4.2, PR TRN B LO SETPT RX TRIP BLK is ON.

_______/_______
Initials Date

F. Verify 1-ALB-6D, 1.1, SR HI VOLT FAIL is OFF.

_______/_______
Initials Date

G. Verify the following Trip Status Light bistables are ON:

- ☐ ● 1-TSLB9, 1.8, RX$\geq$10% PWR NC-41M
- ☐ ● 1-TSLB9, 2.8, RX$\geq$10% PWR NC-42M
- ☐ ● 1-TSLB9, 3.8, RX$\geq$10% PWR NC-43M
- ☐ ● 1-TSLB9, 4.8, RX$\geq$10% PWR NC-44M

_______/_______
Initials Date

H. Place <u>BOTH</u> HIGH FLUX AT SHUTDOWN block switches on the NIS Source Range Drawers in the NORMAL.

_______/_______
Initials Date

I. Verify 1-ALB-6D, 3.1, SR SHTDN FLUX ALM BLK is CLEAR.

_______/_______
Initials Date

5.1.35 <u>WHEN</u> the following are as indicated:

- 1-PCIP, 1.6, RX $\geq$10% PWR P-10 is ON

  <u>OR</u>
- 1-PCIP, 4.6, TURB $\leq$10% PWR P-13 is OFF,

<u>THEN</u> ensure 1-PCIP, 3.5, RX & TURB $\leq$10% PWR P-7 is OFF.

_______/_______
Initials Date

5.1.36 Place the Main Feedwater Pump Westinghouse speed control in service as follows:

NOTE:
- The FWP DISCH HDR PRESS - MS HDR PRESS ΔP should be maintained, as necessary, to allow controlled feeding of the SGs. Higher ΔPs (near 80 psig) at low power may cause inadvertent feeding of the SGs due to leakage through the FCVs.
- Plant Computer point U5002A, FW - MS HEADER DP provides indication of differential pressure between the FW Pump discharge header and the Main Steam header. Plant Computer point U5003A, DELTA PROGRAM - ACTUAL DP provides indication of the difference between the programmed differential pressure and actual differential pressure.

A. Ensure Feedwater Pump turbine speed controllers are set per TDM-501A.

- ☐ • 1-SK-509B FWPT A AUTO SPD CTRL
- ☐ • 1-SK-509C FWPT B AUTO SPD CTRL

_______/_______
Initials Date

B. Place BOTH Main Feedwater Pump Auto Speed Controllers in AUTO:

- ☐ • 1-SK-509B FWPT A AUTO SPD CTRL
- ☐ • 1-SK-509C FWPT B AUTO SPD CTRL

_______/_______
Initials Date

C. Using the DFS display on the Plant Computer, slowly adjust 1-SK-509A, FWPT MASTER SPD CTRL to match the FWP FW REF value to the SPD CMD value for the selected FWP.

_______/_______
Initials Date

D. Verify applicable FWPT speed deviation indication (CB-08) is approximately zero.

- ☐ • 1-SDI-2111D FWPT A SPD DEV
- ☐ • 1-SDI-2112D FWPT B SPD DEV

_______/_______
Initials Date

E. Depress the AUTO pushbutton for the selected MFP.

- ☐ • 1-HS-2111B, FWPT A SPD CTRL MODE SELECT
- ☐ • 1-HS-2112B, FWPT B SPD CTRL MODE SELECT

_______/_______
Initials Date

5.1.36 F. Adjust Feedwater Pump speed with 1-SK-509A, FWPT MASTER SPD CTRL in MANUAL to maintain 1-PI-508, FWP DISCH HDR PRESS approximately 80 psig greater than 1-PI-507, MS HDR PRESS (Plant Computer point U5002A, FW - MS HEADER DP).

_______/_______
Initials Date

G. Verify FWP SUCT FLOW AND FWP SUCT PRESS remain within normal bands.

_______/_______
Initials Date

H. OPEN the FWIBV upstream manual isolation valves:

- ☐ 1FW-0209, SG 1-01 FW ISOL BYP VLV UPSTRM ISOL VLV
- ☐ 1FW-0211, SG 1-02 FW ISOL BYP VLV UPSTRM ISOL VLV
- ☐ 1FW-0213, SG 1-03 FW ISOL BYP VLV UPSTRM ISOL VLV
- ☐ 1FW-0207, SG 1-04 FW ISOL BYP VLV UPSTRM ISOL VLV

Isolation valves open

_______/_______
Initials Date

NOTE:
- SG levels should be continuously monitored while transferring control to the Feedwater Control Valves.
- Manipulation of the SG FW BYP CTRL valves and SG FW FLO CTRL valves should be performed on one feedline at a time.
- The SG FW FLO CTRL valves may be placed in manual as desired during startup.

5.1.37 Perform the following steps to place the SG FW FLO CTRL Valves in Automatic:

	1	2	3	4
A. Ensure all SG FW FLO CTRL Valves are in MANUAL.	☐	☐	☐	☐
B. Place the selected SG FW BYP CTRL Valve in MANUAL.	☐	☐	☐	☐
C. Slowly open the selected SG FW FLO CTRL valve until a feed flow increase is observed, THEN place in AUTO.	☐	☐	☐	☐
D. Slowly CLOSE the selected SG FW BYP CTRL Valve in MANUAL.	☐	☐	☐	☐
E. Repeat Steps 5.1.37 B thru D until all SG FW BYP CTRL Valves are CLOSED.	☐	☐	☐	☐

FCVs in Automatic ________/________
Initials Date

5.1.38 IF TPCW was opened OR Main Generator hydrogen Coolers need to be vented, THEN vent the Main Generator Hydrogen Coolers to ensure air is removed.

	OPEN	CLOSED
• 1TW-0159, MAIN GEN H2 CLR 1-505 TPCW VNT VLV	☐	☐
• 1TW-0115, MAIN GEN H2 CLR 1-501 TPCW VNT VLV	☐	☐
• 1TW-0117, MAIN GEN H2 CLR 1-508 TPCW VNT VLV	☐	☐
• 1TW-0120, MAIN GEN H2 CLR 1-504 TPCW VNT VLV	☐	☐
• 1TW-0122, MAIN GEN H2 CLR 1-503 TPCW VNT VLV	☐	☐
• 1TW-0125, MAIN GEN H2 CLR 1-507 TPCW VNT VLV	☐	☐
• 1TW-0127, MAIN GEN H2 CLR 1-502 TPCW VNT VLV	☐	☐
• 1TW-0130, MAIN GEN H2 CLR 1-506 TPCW VNT VLV	☐	☐

Venting complete ________/________
Initials Date

COMMENTS: ______________________________

____

____

____

____

____

Attachment 17
PAGE 1 OF 6

MODE 1 BUBBLE CHART

Instructions:

- The bubble chart includes steps of Sections 5.1 to 5.6 in the IPO.
- It is divided into five sections.

  Section 5.1 is diagramed throughout with pentagons.

  Section 5.2 is diagramed throughout with parallelograms.

  Section 5.3 is diagramed throughout with diamonds.

  Section 5.4 is diagramed throughout with hexagons.

  Section 5.6 is diagramed throughout with squares.

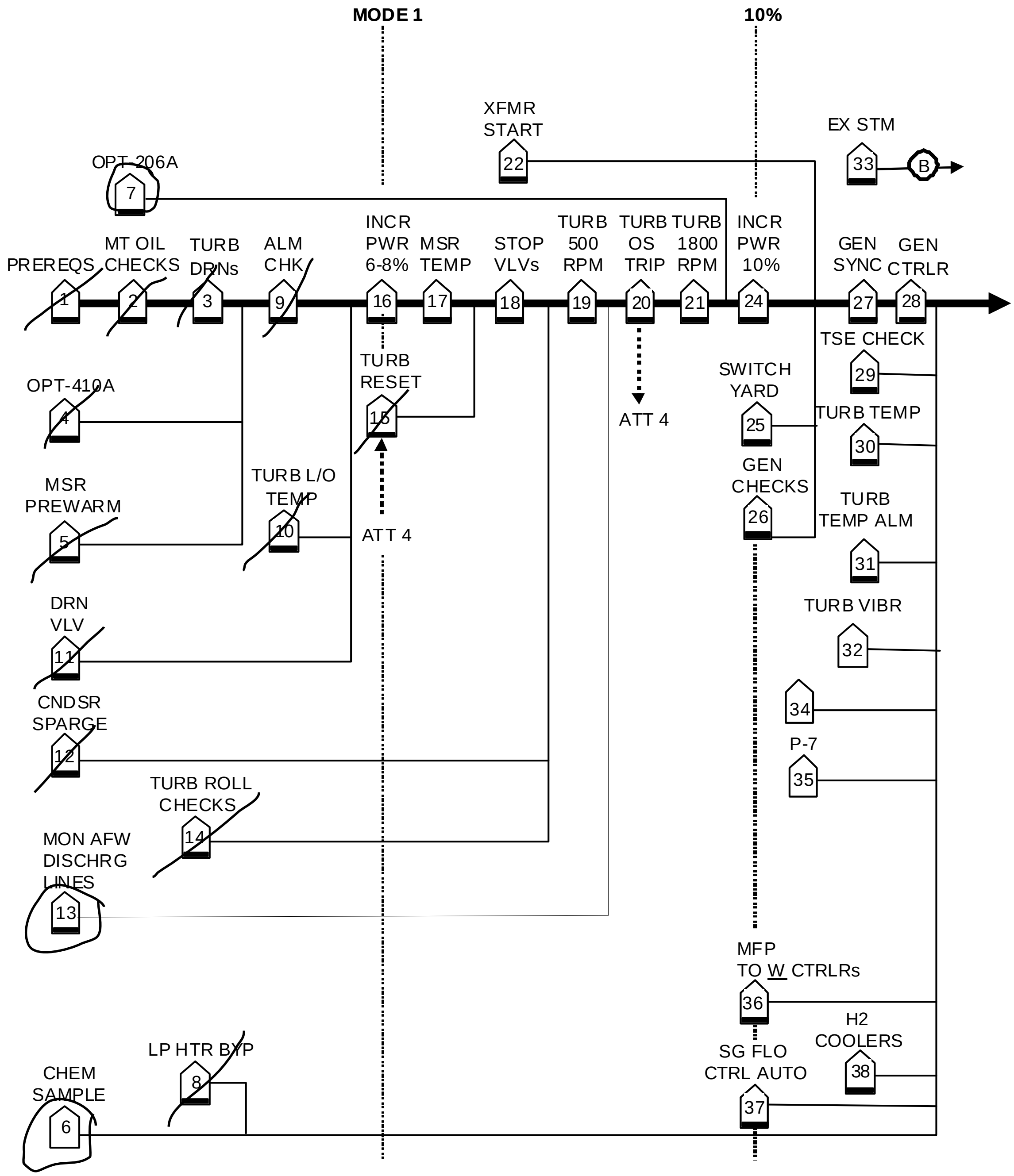
  Circled letters indicate transition to the next page.
- All steps found in parallel can be performed at the same time.
- Solid lines designate preferred method.
- Dark center line designates main procedure flowpath.
- A systematic step-by-step review and implementation of the procedure instructions (steps, notes and cautions) is required to implement this IPO. The chart provides guidance as to what sequence the IPO may be performed when in MODE 1 operation.
- IF this chart is used, THEN the IPO must still be signed off in its entirety.

CPNPP INTEGRATED PLANT OPERATING PROCEDURES MANUAL	UNIT 1	PROCEDURE NO. IPO-003A
POWER OPERATIONS	REVISION NO. 28 **CONTINUOUS USE**	PAGE 191 OF 195

Attachment 17
PAGE 2 OF 6

MODE 1 BUBBLE CHART

SECTION 5.1 Warmup And Synchronization of the Turbine Generator



PARTIALLY COLORED DIAGRAM REFERS TO SECONDARY ACTIONS

UNIT SUPERVISOR RELIEF CHECKLIST

UNIT: 1

PART I TO BE PREPARED BY THE OFF-GOING UNIT SUPERVISOR.

1.0 SHIFT ACTIVITIES:

1.1 Activities Completed This Shift: Reactor and Main Feedwater Pump startup.

1.2 Activities In-Progress: IPO-003A, Section 5.1, Warmup and Synchronization of Turbine Generator.

1.3 Planned Activities:
Recirculate RWST with CTP 1-01 in accordance with SOP-204A, Section 5.1.3.
Raise reactor power to 6% to 8% in accordance with IPO-003A, Section 5.1, starting at Step 5.1.16.

2.0 PLANT AND EQUIPMENT STATUS:

2.1 Technical Specification Related Equipment Summary
All MODE 1 LCOs are met in accordance with OPT-102A, Operations Shiftly Routine Tests.
IPO-003A, Attachment 1, Checklist Signoff Required Prior to Entry into MODE 1, was completed last shift.

UNIT SUPERVISOR RELIEF CHECKLIST

2.2 Non-Technical Specification Equipment Summary:
None

3.0 General Information: None

4.0 END OF SHIFT REVIEW:
LOGS – RO/BOP X LOGS-NEO X CLOSED eLCOARs ARCHIVED X
OPTS COMPLETED X DAILY ACTIVITIES LIST X LCOARs REVIEWED X
COMP ACTIONS REVIEWED X

PART II TO BE COMPLETED BY THE ON-COMING UNIT SUPERVISOR.

1.0 CRITICAL PARAMETERS:
MODE: 2 REACTOR POWER: 3% Mwe: 0
RCS TAVE: 557 °F CONTROL ROD POSITION 109 ON BANK D
C_b: 1659 ppm RCS PRESS: 2235 psig

2.0 STATUS REVIEW:

	X	UNIT LOGS
[C]	X	* * LCOAR AND SYSTEMS IMPORTANT TO SAFETY STATUS
	X	UNIT DIFFERENCES (If last watch was on opposite unit)
	X	SHIFT ORDERS
	X	BOARD WALKDOWN
	X	* POD
[C]	X	CONDITIONAL SURVEILLANCE STATUS BOARD

PROTECTED TRAIN [X] Train "A" [ ] Train "B"

* May be completed after turnover.
* * Each US's (U1 & U2) status review is to include the U1 & Common LCOAR & SIS Logs for Common equipment.

Facility: CPNPP 1 and 2								Date of Exam: 04/01/13						Operating Test No.: NRC			
APPLICANT	EVENT TYPE	SCENARIOS															
		CPNPP #1			CPNPP #2			CPNPP #3			CPNPP #4			TOTAL	MINIMUM(*)		
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
SRO-U1	RX							-			-			**0**	**1**	**1**	**0**
	NOR							-			3			**1**	**1**	**1**	**1**
	I/C							1,2,3			2,4			**5**	**4**	**4**	**2**
	MAJ							4,6			6,9			**4**	**2**	**2**	**1**
	TS							1,3			4,5			**4**	**0**	**2**	**2**
SRO-U2	RX							-			-			**0**	**1**	**1**	**0**
	NOR							-			3			**1**	**1**	**1**	**1**
	I/C							1,2,3			2,4			**5**	**4**	**4**	**2**
	MAJ							4,6			6,9			**4**	**2**	**2**	**1**
	TS							1,3			4,5			**4**	**0**	**2**	**2**
SRO-U3	RX							-			-			**0**	**1**	**1**	**0**
	NOR							-			3			**1**	**1**	**1**	**1**
	I/C							1,2,3			2,4			**5**	**4**	**4**	**2**
	MAJ							4,6			6,9			**4**	**2**	**2**	**1**
	TS							1,3			4,5			**4**	**0**	**2**	**2**
SRO-U4	RX									-	-			**0**	**1**	**1**	**0**
	NOR									-	3			**1**	**1**	**1**	**1**
	I/C									1,3,5,7,8	2,4			**7**	**4**	**4**	**2**
	MAJ									4,6	6,9			**4**	**2**	**2**	**1**
	TS									-	4,5			**2**	**0**	**2**	**2**
SRO-I1	RX							-				3		**1**	**1**	**1**	**0**
	NOR							-				-		**0**	**1**	**1**	**1**
	I/C							1,2,3				2,7		**5**	**4**	**4**	**2**
	MAJ							4,6				6,9		**4**	**2**	**2**	**1**
	TS							1,3				-		**2**	**0**	**2**	**2**

Facility: CPNPP 1 and 2 Date of Exam: 04/01/13 Operating Test No.: NRC

APPLICANT	EVENT TYPE	SCENARIOS															
		CPNPP #1			CPNPP #2			CPNPP #3			CPNPP #4			TOTAL	MINIMUM(*)		
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
RO-1	RX								-				-	**0**	**1**	**1**	**0**
	NOR								-				1,3	**2**	**1**	**1**	**1**
	I/C								2,3				2,4,8	**5**	**4**	**4**	**2**
	MAJ								4,6				6,9	**4**	**2**	**2**	**1**
	TS								-				-	**0**	**0**	**2**	**2**
RO-2	RX									-		3		**1**	**1**	**1**	**0**
	NOR									-		-		**0**	**1**	**1**	**1**
	I/C									1,3,5, 7,8		2,7		**7**	**4**	**4**	**2**
	MAJ									4,6		6,9		**4**	**2**	**2**	**1**
	TS									-		-		**0**	**0**	**2**	**2**
RO-3	RX								-				-	**0**	**1**	**1**	**0**
	NOR								-				1,3	**2**	**1**	**1**	**1**
	I/C								2,3				2,4,8	**5**	**4**	**4**	**2**
	MAJ								4,6				6,9	**4**	**2**	**2**	**1**
	TS								-				-	**0**	**0**	**2**	**2**
RO-4	RX									-		3		**1**	**1**	**1**	**0**
	NOR									-		-		**0**	**1**	**1**	**1**
	I/C									1,3,5, 7,8		2,7		**7**	**4**	**4**	**2**
	MAJ									4,6		6,9		**4**	**2**	**2**	**1**
	TS									-		-		**0**	**0**	**2**	**2**
RO-5	RX								-				-	**0**	**1**	**1**	**0**
	NOR								-				1,3	**2**	**1**	**1**	**1**
	I/C								2,3				2,4,8	**5**	**4**	**4**	**2**
	MAJ								4,6				6,9	**4**	**2**	**2**	**1**
	TS								-				-	**0**	**0**	**2**	**2**
RO-6	RX									-		3		**1**	**1**	**1**	**0**
	NOR									-		-		**0**	**1**	**1**	**1**
	I/C									1,3,5, 7,8		2,7		**7**	**4**	**4**	**2**
	MAJ									4,6		6,9		**4**	**2**	**2**	**1**
	TS									-		-		**0**	**0**	**2**	**2**
RO-7	RX								-				-	**0**	**1**	**1**	**0**
	NOR								-				1,3	**2**	**1**	**1**	**1**
	I/C								2,3				2,4,8	**5**	**4**	**4**	**2**
	MAJ								4,6				6,9	**4**	**2**	**2**	**1**
	TS								-				-	**0**	**0**	**2**	**2**

Instructions:	
1.	Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
2.	Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.
3.	Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

Facility: CPNPP	Date of Examination: 04/01/13	Operating Test No. NRC 2, 3, 4										
	Applicants											
Competencies	SROU-1				SROU-2				SROU-3			
	SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4
Interpret/Diagnose Events and Conditions	-	-	1,2,3, 4,6	2,4, 6,9	-	-	1,2,3, 4,6	2,4, 6,9	-	-	1,2,3, 4,6	2,4, 6,9
Comply With and Use Procedures (1)	-	-	1,2,3, 4,6	2,3,4, 5,6,9	-	-	1,2,3, 4,6	2,3,4, 5,6,9	-	-	1,2,3, 4,6	2,3,4, 5,6,9
Operate Control Boards (2)	-	-	N/A	N/A	-	-	N/A	N/A	-	-	N/A	N/A
Communicate and Interact	-	-	ALL	ALL	-	-	ALL	ALL	-	-	ALL	ALL
Demonstrate Supervisory Ability (3)	-	-	ALL	ALL	-	-	ALL	ALL	-	-	ALL	ALL
Comply With and Use Tech. Specs. (3)	-	-	1,3	4,5	-	-	1,3	4,5	-	-	1,3	4,5

Notes:

(1) Includes Technical Specification compliance for an RO.

(2) Optional for an SRO-U.

(3) Only applicable to SROs.

Facility: CPNPP	Date of Examination: 04/01/13			Operating Test No. NRC 2, 3, 4								
	Applicants											
Competencies	SROU-4				SROI-1							
	SCENARIO				SCENARIO							
	1	2	3	4	1	2	3	4				
Interpret/Diag-nose Events and Conditions	-	-	1,3,5, 6,7,8	2,4, 6,9	-	-	1,2,3, 4,6	2,6, 7,9				
Comply With and Use Procedures (1)	-	-	1,3,4,5 ,6,7,8	2,3,4, 5,6,9	-	-	1,2,3, 4,6	2,3,6, 7,9				
Operate Control Boards (2)	-	-	1,3,4,5 ,6,7,8	N/A	-	-	N/A	2,3,6, 7,9				
Communicate and Interact	-	-	1,3,4,5 ,6,7,8	ALL	-	-	ALL	2,3,6, 7,9				
Demonstrate Supervisory Ability (3)	-	-	N/A	ALL	-	-	ALL	N/A				
Comply With and Use Tech. Specs. (3)	-	-	N/A	4,5	-	-	1,3	N/A				

Notes:

(4) Includes Technical Specification compliance for an RO.

(5) Optional for an SRO-U.

(6) Only applicable to SROs.

Facility: CPNPP Date of Examination: 04/01/13 Operating Test No. NRC 2, 3, 4												
	Applicants											
Competencies	RO-1				RO-2				RO-3			
	SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4
Interpret/Diagnose Events and Conditions	-	-	2,3,4,6	2,4,6, 8,9	-	-	1,3,5, 6,7,8	2,6, 7,9	-	-	2,3,4,6	2,4,6, 8,9
Comply With and Use Procedures (1)	-	-	2,3,4,6	1,2,3, 4,6,8,9	-	-	1,3,4,5, 6,7,8	2,3,6, 7,9	-	-	2,3,4,6	1,2,3, 4,6,8,9
Operate Control Boards (2)	-	-	2,3,4,6	1,2,3, 4,6,8,9	-	-	1,3,4,5, 6,7,8	2,3,6, 7,9	-	-	2,3,4,6	1,2,3, 4,6,8,9
Communicate and Interact	-	-	1,2,3, 4,6	1,2,3, 4,6,8,9	-	-	1,3,4,5, 6,7,8	2,3,6, 7,9	-	-	1,2,3, 4,6	1,2,3, 4,6,8,9
Demonstrate Supervisory Ability (3)	-	-	N/A	N/A	-	-	N/A	N/A	-	-	N/A	N/A
Comply With and Use Tech. Specs. (3)	-	-	N/A	N/A	-	-	N/A	N/A	-	-	N/A	N/A

Notes:

(1) Includes Technical Specification compliance for an RO.

(2) Optional for an SRO-U.

(3) Only applicable to SROs.

Facility: CPNPP Date of Examination: 04/01/13 Operating Test No. NRC 2, 3, 4

	Applicants											
Competencies	RO-4				RO-5				RO-6			
	SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4
Interpret/Diagnose Events and Conditions	-	-	1,3,5, 6,7,8	2,6, 7,9	-	-	2,3,4,6	2,4,6, 8,9	-	-	1,3,5, 6,7,8	2,6, 7,9
Comply With and Use Procedures (1)	-	-	1,3,4,5 ,6,7,8	2,3,6 , 7,9	-	-	2,3,4,6	1,2,3, 4,6,8,9	-	-	1,3,4,5, 6,7,8	2,3,6, 7,9
Operate Control Boards (2)	-	-	1,3,4,5 ,6,7,8	2,3,6, 7,9	-	-	2,3,4,6	1,2,3, 4,6,8,9	-	-	1,3,4,5, 6,7,8	2,3,6, 7,9
Communicate and Interact	-	-	1,3,4,5 ,6,7,8	2,3,6, 7,9	-	-	1,2,3, 4,6	1,2,3, 4,6,8,9	-	-	1,3,4,5, 6,7,8	2,3,6, 7,9
Demonstrate Supervisory Ability (3)	-	-	N/A	N/A	-	-	N/A	N/A	-	-	N/A	N/A
Comply With and Use Tech. Specs. (3)	-	-	N/A	N/A	-	-	N/A	N/A	-	-	N/A	N/A

Notes:

(1) Includes Technical Specification compliance for an RO.
(2) Optional for an SRO-U.
(3) Only applicable to SROs.

Facility: CPNPP	Date of Examination: 04/01/13			Operating Test No. NRC 2, 3, 4								
	Applicants											
Competencies	RO-7											
	SCENARIO											
	1	2	3	4								
Interpret/Diag-nose Events and Conditions	-	-	2,3,4,6	2,4,6, 8,9								
Comply With and Use Procedures (1)	-	-	2,3,4,6	1,2,3, 4,6,8,9								
Operate Control Boards (2)	-	-	2,3,4,6	1,2,3, 4,6,8,9								
Communicate and Interact	-	-	1,2,3, 4,6	1,2,3, 4,6,8,9								
Demonstrate Supervisory Ability (3)	-	-	N/A	N/A								
Comply With and Use Tech. Specs. (3)	-	-	N/A	N/A								

Notes:

(1) Includes Technical Specification compliance for an RO.

(2) Optional for an SRO-U.

(3) Only applicable to SROs.

The OP test was modified for the as-given conditions as follows:

1. The Simulator JPM S-3 task standard and a critical step was modified because basis documents gave no reason for the 3 minute basis to wait prior to isolation of RCP seal leak-off while the 5 minute basis was and is valid for the given equipment concern of a RCP seal leak (LOCA). The As-given JPM is directly behind this cover sheet at the end of the op test file.

2. The Admin JPM RA2 for the RO applicants was modified because the guidance in the procedure did not specify to enter a 1 hr cool down rate into the block for only 30 minutes worth of data so some applicants only calculated the 30 minute cool down rate, which was deemed to be acceptable. The As-given JPM is directly behind this cover sheet at the end of the op test file.

3. Scenario 4 was modified because the licensee created a false standard in the D-2 form that the applicant should not exceed 5 steps in a rod pull for start-up and this is not correct. There was no limit on the number of steps and several applicants used a 7 step pull but the procedure guidance for this limit of 5 steps does not apply during start-up. The As-given Scenario is directly behind this cover sheet at the end of the op test file.

CPNPP ABNORMAL CONDITIONS PROCEDURES MANUAL	UNIT 1	PROCEDURE NO. ABN-905A
LOSS OF CONTROL ROOM HABITABILITY	REVISION NO. 9	PAGE 46 OF 74

ATTACHMENT 7
PAGE 1 OF 2

RCS PRESSURE/TEMPERATURE VERIFICATION

Time		0900	0930					
PRZR PRESS	1-PI-455B	2085	1785					
Tsat from Steam Table (2)	→	643±3	621±3					
PRZR LVL	1-LI-459B	49%	46%					
NEUT FLUX SR	1-NI-50A-3	450	400					
RCS LOOP (4)	CL1	545	540					
1 & 2 TEMP	CL2	545	540					
1-TR-410F	HL1	550	545					
	HL2	550	545					
Calculated Subcooling °F	→	93±5	76±5					
SG 1 PRESS (2)	1-PI-514B	1010	960					
Tsat from Steam Table (2)	→	547±3	541±3					
SG 1 LVL (WR) (1)	1-LI-501A	79	78					
SG 2 LVL (WR) (1)	1-LI-502A	77	79					
SG 2 PRESS (2)	1-PI-524B	1020	970					
Tsat from Steam Table (2)	→	549±3	543±3					
RCS LOOP (4)	CL3	550	550					
3 & 4 TEMP	CL4	550	550					
1-TR-430F	HL3	555	555					
	HL4	555	555					
SG 3 PRESS (2)	1-PI-534B	1020	960					
Tsat from Steam Table (2)	→	549±3	541±3					
SG 3 LVL (WR) (1)	1-LI-503A	78	78					
SG 4 LVL (WR) (1)	1-LI-504A	76	76					
SG 4 PRESS (2)	1-PI-544B	1010	970					
Tsat from ST	→	547±3	543±3					
COOLDOWN RATE	(3) →	N/A	16±3 *					

(1) SG Level (WR) Cold Cal of approximately 74% corresponds to an AFW Pump Low Level Auto Start signal.

(2) Steam pressure converted to Tsat/Tcold is the best indication of temperature and temperature changes.

(3) Cooldown rate should be calculated based on most conservative SG Press reading. Calculate cooldown using Tsat values and steam tables, with SG Press reading that has dropped the largest amount from last reading.

(4) RCS indicated temperature response will be slow due to slow response time of strap on RTDs.

NOTE: When completed, this attachment shall be dispositioned by attaching it to the SMART Form generated as a result of this abnormal condition.

* Based on procedure weakness accept 8^{o}F+3^{o}F or 16^{o}F+3^{o}F.

Facility: CPNPP JPM # NRC S-3 Task # RO1118 K/A # 015.AA1.22 4.0 / 4.2 SF-4P

Title: Respond to a Reactor Coolant Pump Seal Failure

Examinee (Print): ______________________________

Testing Method:

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

- Unit 1 is operating at 100% power with all controls in AUTOMATIC.

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

- RESPOND to any Primary Side alarms.

THIS IS A TIME CRITICAL JPM

Task Standard: Utilizing ABN-101, evaluated RCP seal leakoff flow condition, tripped the Reactor and affected RCP, and isolated affected RCP seal water leakoff flow within 5 minutes.

Required Materials: ABN-101, Reactor Coolant Pump Trip/Malfunction, Rev. 10-6.

ALM-0051A, 1-ALB-5A, Window 1.2 – ANY RCP SEAL 1 LKOFF FLO HI, Rev. 5-4.

OWI-214, Control of Time Critical Actions, Rev. 1.

Validation Time: 10 minutes Completion Time: ________ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): ______________________________ Date: ______________

SIMULATOR SETUP

BOOTH OPERATOR:

INITIALIZE to IC-18 and LOAD scenario file "LC-21 NRC JPM S3" or PERFORM the following:

- **When directed, INSERT malfunction CV27C, RCP 1-03 Seal #1 failure at 36%.**

EXAMINER:

When referenced, PROVIDE the examinee with a copy of:

- **ABN-101, Reactor Coolant Pump Trip/Malfunction.**

√ - Check Mark Denotes Critical Step

START TIME:	

Booth Operator:	**When directed, EXECUTE malfunction CV27C at 36%.**
Perform Step: 1	EVALUATE alarms and SELECT appropriate Alarm Procedure.
Standard:	ACKNOWLEDGED alarm 1-ALB-5A, Window 1.2 – ANY RCP SEAL 1 LKOFF FLO HI and REFERRED to ABN-101, Reactor Coolant Pump Trip/Malfunction.
Examiner Note:	**When referenced, PROVIDE copy of ABN-101.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps are from ABN-101, Section 4.0.**

NOTE:
- Step 1 is a continuous action step.
- The No. 1 Seal Leakoff Valve should not be closed before taking pump handswitch to stop.

Perform Step: 2 4.3.1	Determine appropriate action step.
Standard:	OBSERVED 1-FR-0155, RCP 3 SEAL LKOFF FLO (NR) at 1.0 gpm and 1-FR-0159, RCP 3 SEAL LKOFF FLO (WR) at > 8 gpm.
Comment:	**SAT ☐ UNSAT ☐**

Note:
- Total #1 Seal Flow = #1 Leakoff plus #2 Leakoff indications
- For immediate shutdown required, a manual plant trip must precede RCP Shutdown.
- #2 seal leakoff is read locally in containment. If containment entry is not practicable it is acceptable to assume a #2 seal leakoff of 1 gpm if the "ANY SEAL 2 LEAKOFF FLO HI", u-ALB-5A, window 3.2 is DARK.
- Attachment 1 lists computer points for temperature monitoring.

#1 Seal Leakoff Flow	OR	Total #1 Seal Flow	AND	Pump Bearing/Seal Inlet Temperature	THEN	RCP Shutdown Step
>6.0 gpm		>6.0 gpm		Increasing		Immediate Step 2
>6.0 gpm		>6.0 gpm and <8.0 gpm		Stable		Orderly Step 3
		>8.0 gpm		NA		Immediate Step 2
<0.8 gpm		<0.8 gpm		Stable		Orderly Step 3
<0.8 gpm		<0.8 gpm		Increasing		Immediate Step 2

Perform Step: 3 4.3.1	Determine appropriate action step.
Standard:	DETERMINED Total #1 Seal Leak Off Flow greater than 8.0 gpm and IMMEDIATELY PERFORMED Step 2 of ABN-101.
Comment:	**SAT** ☐ **UNSAT** ☐

Perform Step: 4√ 4.3.2.a	Trip the Reactor and GO TO EOP-0.0A/B while other operators continue this procedure.
Standard:	PLACED 1/1-RTC, RX TRIP BKR Switch **or** 1/1-RT, RX TRIP Switch in TRIP position and VERIFIED the following: • Reactor Trip Breakers - at least one OPEN. • Neutron flux - DECREASING. • All Control Rod position rod bottom lights - ON.
Comment:	**SAT** ☐ **UNSAT** ☐

Examiner Note:	**The following steps are from EOP-0.0A.**
Perform Step: 4.a 1	Verify Reactor Trip:
Standard:	VERIFIED the following: • Reactor Trip Breakers - at least one OPEN. • Neutron flux - DECREASING. • All Control Rod position rod bottom lights - ON.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4.b 2	Verify Turbine Trip:
Standard:	VERIFIED the following: • All HP Turbine Stop Valves – CLOSED.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4.c 3	Verify Power to AC Safeguards Busses:
Standard:	VERIFIED the following: • Both AC Safeguards Buses – ENERGIZED.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4.d 4	Check SI Status:
Standard:	VERIFIED the following: • DETERMINED SI is not actuated.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps are from ABN-101, Section 4.0.**
Perform Step: 5√ 4.3.2.b	STOP affected RCP(s).
Standard:	PERFORMED the following: • PLACED 1/1-PCPX3, RCP 3 to STOP (**critical**). • OBSERVED green STOP light LIT (**NOT critical**). • OBSERVED 1-II-RCP 3, RCP MOT CURRENT at zero (0) amps (**NOT critical**). • OBSERVED 1-FI-434/435/436 RC LOOP 3 FLO CHAN I/II/III to zero (0) flow (**NOT critical**).
Comment:	**SAT ☐ UNSAT ☐**

CRITICAL START TIME:	

Examiner Note:	**OWI-214, Attachment 8.A, TCA-1.13 is the reference for this Time Critical task.**
Perform Step: 6√ 4.3.2.c	Within 5 minutes after RCP stopped, CLOSE No. 1 Seal Leakoff Valve for affected RCP(s).
Standard:	PERFORMED the following: • PLACED 1/1-8141C, RCP 3 SEAL 1 LKOFF VLV to CLOSE within 5 minutes after the RCP is stopped **(critical).** • OBSERVED green CLOSE light LIT (**NOT critical**).
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

CRITICAL STOP TIME:	

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

- **Unit 1 is operating at 100% power with all controls in AUTOMATIC.**

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

- **RESPOND to any Primary Side alarms.**

THIS IS A TIME CRITICAL JPM

Facility: CPNPP 1 & 2 Scenario No.: 4 Op Test No.: April 2013 NRC

Examiners: ____________ Operators: ____________

Initial Conditions: ~3% power BOL - RCS Boron is 1659 ppm by Chemistry sample. Steam Dump System in service for Reactor Coolant System Temperature Control.

Turnover: Recirculate the Refueling Water Storage Tank prior to MODE 1 entry then raise Reactor Power from 3% to 8% in preparation for Turbine Startup.

Critical Tasks:

- Manually Trip Reactor Due to Reactor Protection System Failure Prior to Exiting EOP-0.0A, Reactor Trip or Safety Injection. (Event 7)
- Trip Reactor Coolant Pumps within 10 minutes upon a Loss of Subcooling per EOP-1.0A, Loss of Reactor or Secondary Coolant, Foldout Page. (Event 9)

Event No.	Malf. No.	Event Type*	Event Description
1 +10 min		N (BOP)	Recirculate the Refueling Water Storage Tank with Containment Spray Pump 1-01.
2 +20 min	RX12	C (RO/BOP)	Main Steam Header Pressure (PT-507) Fails High on 360 second ramp.
3 +40 min		R (RO) N (BOP, SRO)	Raise Power to 6% to 8% in Preparation for Synchronizing Main Generator to Electrical Grid.
4 +50 min	RX04A	I (BOP, SRO) TS (SRO)	Steam Generator (1-01) Level Channel (LT-551) Fails Low.
5 +55 min	CS02A	TS (SRO)	Containment Spray Pump (1-01) Trip.
6 +60 min	RP14B	M (RO, BOP, SRO)	Spurious Train B Safety Injection Actuation Signal.
7 +60 min	RP01	C (RO)	Automatic Reactor Trip Failure. Reactor Protection System Failure requires Manual Reactor Trip.
8 +60 min	RP09B	C (BOP)	Train B Containment Isolation Phase A Automatic Actuation Failure.
9 +80 min	RC08C1	M (RO, BOP, SRO)	Small Break Loss of Coolant Accident Inside Containment When Safety Injection Pump 1-02 is Secured in EOS-1.1A.

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

Actual	Target Quantitative Attributes
7	Total malfunctions (5-8)
3	Malfunctions after EOP entry (1-2)
2	Abnormal events (2-4)
2	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 SUMMARY NRC 4

The crew will assume the watch with power at approximately 3% per IPO-003A, Power Operations. Prior to raising power, the crew will recirculate the Refueling Water Storage Tank (RWST) using Containment Spray Pump 1-01 per SOP-204A, Containment Spray System, Section 5.1.3, Recirculation through the Recirculation Header.

The next event is a high failure of Main Steam Header Pressure Transmitter (PT-507) on a 360 second ramp. The crew enters ABN-709, Steam Header Pressure Instrument Malfunction, Section 3.0, and places the Steam Dump System in MANUAL to regain control of Reactor Coolant System (RCS) temperature. The controller will remain in MANUAL for the duration of the scenario.

When RCS temperature control is restored, the crew will continue with IPO-003A, Section 5.1, Warmup and Synchronization of the Turbine Generator, Step 5.1.16, and perform a power ascension using the Rod Control and Steam Dump Systems.

The next event is a Steam Generator Level Transmitter failure. Actions are per ABN-710, Steam Generator Level Instrumentation Malfunction. The BOP will be required to take manual control of the Feedwater Bypass Control Valve and then select an alternate controlling channel to return the Feedwater System to automatic control. The SRO will refer to Technical Specifications.

When conditions are stable, Containment Spray Pump 1-01 will trip. Actions are per ALM-0022A, 1-ALB-2B, Window 1.3 – ANY CSP OVRLD TRIP. The SRO will refer to Technical Specifications.

When Technical Specifications have been referenced, a spurious Train B Safety Injection Signal will actuate. The crew will determine that the Reactor did not automatically trip and initiate a Reactor Trip and Safety Injection and enter EOP-0.0A, Reactor Trip or Safety Injection. This scenario is complicated by Train B Containment Isolation Phase A Automatic actuation failure.

The crew will exit EOP-0.0A at Step 15 and enter EOS-1.1A, Safety Injection Termination. While in EOS-1.1A, Safeguards Signals are reset, the Charging flow path is realigned, and Safety Injection (SI) Pumps are stopped. When SI Pump 1-02 is stopped, a Small Break Loss of Coolant Accident will initiate. At this point, the crew will follow guidance on the EOS-1.1A Foldout Page that requires a transition to EOP-1.0A, Loss of Reactor or Secondary Coolant.

The scenario is terminated when it is determined in EOP-1.0A that Pressurizer pressure continues to slowly lower, and a transition to EOS-1.2 A, Post LOCA Cooldown and Depressurization, is required.

Risk Significance:

• Failure of risk important system prior to trip:	Containment Spray Pump Trip
• Risk significant core damage sequence:	Automatic Reactor Trip Failure
	Small Break Loss of Coolant Accident
• Risk significant operator actions:	Manually Trip Reactor
	Manually Initiate Safety Injection
	Initiate Train B Containment Isolation

BOOTH OPERATOR INSTRUCTIONS for SIMULATOR SETUP

Initialize to IC-10 and LC21 NRC Scenario 4.

EVENT	TYPE	MALF #	DESCRIPTION	DEMAND VALUE	INITIATING PARAMETER
SETUP		RP01	Automatic Reactor Trip Failure	FAIL	K0
		RP09B	Train B Containment Isolation Phase A Failure	FAIL	K0
1		-	Recirculate the RWST	-	N/A
2		RX12	Main Steam Header Pressure (PT-507) Failure	1500 psig	K2 (360 sec. ramp)
3		-	Raise power to 6% to 8%	-	N/A
4		RX04A	SG (1-01) Level Channel (LT-551) Failure	0%	K4
5		CS02A	Containment Spray Pump (1-01) Trip	TRIP	K5
6		RP14B	Spurious Train B Safety Injection Actuation	-	K6
7		RP01	Automatic Reactor Trip Failure	FAIL	K0
8		RP09B	Train B Containment Isolation Phase A Failure	FAIL	K0
9		RC08C1	Small Break LOCA in EOS-1.1A.	3"	SIP 1-02 Stopped
9	DISIAPSI2 Value = 1 IMF RC08C1 f:1				

Booth Operator: **INITIALIZE to IC-10 and LC21 NRC Scenario 4.**
ENSURE all Simulator Annunciator Alarms are ACTIVE.
ENSURE all Control Board Tags are removed.
ENSURE Operator Aid Tags reflect current boron conditions.
ENSURE Control Rods are in MANUAL with Control Rod Bank C @ 224 steps and Bank D @ 109 steps.
ENSURE Rod Bank Update (RBU) is performed.
REMOVE N-16 detectors from POLL on PC-11.
ENSURE 1-HS-2484 & 1-HS-2485, Condensate Storage Tank Isolation Valves are OPEN.
SET Plant Computer screen for MODE 2.
ENSURE Reactivity Briefing Sheet printout provided with Turnover.
PLACE Plant Computer, right hand RO and US Computer screens for MODE 2.
PLACE Group Display LPTDIFF on the BOP Desktop Computer.
ENSURE all PRZR Heaters energized.
ENSURE procedures in progress are on SRO desk:
- **COPY of IPO-003A, Power Operations, Section 5.1, Warmup and Synchronization of the Turbine Generator, INITIALED to Step 5.1.15.**
- **COPY of IPO-003A, Power Operations, Attachment 17, MODE 1 Bubble Chart.**
- **COPY of SOP-204A, Containment Spray System, Section 5.1.3, Recirculation Through the Recirculation Header, INITIALED to Step 5.1.3.A.**

Significant 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 – CNDNSR AVAIL STM DUMP 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 WTHDRWL BLK C-5
PCIP-2.5 – SR RX TRIP BLK PERM P-6
PCIP-3.4 – TURB LOAD REJ STM DMP ARMED C-7
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
6D-1.1 – SR HI VOLT FAIL
7B-4.8 – FWP A/B RECIRC VLV NOT CLOSED
8A-1.3 – FWPT B TRIP
8A-1.10 – 1 OF 4 TURB STOP VLV CLOSE
Numerous 9A Feedwater alarms

Operating Test : NRC	Scenario # 4	Event # 1	Page 5 of 32
Event Description: Recirculate Refueling Water Storage Tank With Containment Spray Pump			

Time	Position	Applicant's Actions or Behavior
Booth Operator: ENSURE Simulator in RUN when crew is ready to assume the watch.		
Examiner Note: The Refueling Water Storage Tank is recirculated using a Containment Spray Pump per SOP-204A, Containment Spray System.		
+1 min	US	DIRECT performance of SOP-204A, Containment Spray System, Section 5.1.3, Recirculation Through the Recirculation Header.
NOTE: IF the containment spray system is being started for performance of OPT-205A, THEN the following valves will be positioned as directed by the performance of the operability test. • 1CT-0150, U1 CS CHEM EDUCT TST HDR ISOL VLV • 1CT-0137, CS PMP 1-01/1-03 CHEM EDUCT TST LN ISOL VLV • 1CT-0183, CS PMPS 1-02/1-04 CHEM EDUCT TST LN ISOL VLV • 1CT-0075, CS PMP 1-03 EDUCT SUCT ISOL VLV • 1CT-0023, CS PMP 1-04 EDUCT SUCT ISOL VLV • 1CT-0079, CS PMP 1-01 EDUCT SUCT ISOL VLV • 1CT-0027, CS PMP 1-02 EDUCT SUCT VLV		
	BOP	ENSURE the system is in standby per Section 5.1.1. [Step 5.1.3.A]
	BOP	VERIFY Train A Chemical Additive Tank Discharge Valve – CLOSED. [Step 5.1.3.B]
		• 1-HS-4754, CHEM ADD TK DISCH VLV, Train A
	BOP	INITIATE trend of Containment Spray Pump 1-01 parameters on Plant Computer. [Step 5.1.3.C]

Operating Test :	NRC	Scenario #	4	Event #	1	Page	6	of	32
Event Description:	Recirculate Refueling Water Storage Tank With Containment Spray Pump								

Time	Position	Applicant's Actions or Behavior

DESCRIPTION	CSP 1-01	CSP 1-02	CSP 1-03	CSP 1-04
CSP MOT OUTBD BRG TEMP	T9313A	T9318A	T9323A	T9328A
CSP MOT INBD BRG TEMP	T9314A	T9319A	T9324A	T9329A
CSP INBD BRG TEMP	T9315A	T9320A	T9325A	T9330A
CSP OUTBD BRG TEMP	T9316A	T9321A	T9326A	T9331A
CSP STAT WNDG TEMP	T9340A	T9341A	T9342A	T9343A

Time	Position	Applicant's Actions or Behavior
	BOP	VERIFY CS Pump 1-01 Recirculation Valve – OPEN. [Step 5.1.3.D]
		• 1-HS-4772-1, CSP 1 RECIRC VLV
	BOP	START Containment Spray Pump 1-01. [Step 5.1.3.E]
		• PLACE 1-HS-4764, CSP 1 in START position.

NOTE: The Containment Spray system is designed to operate with system temperature up to 300°F. When the system temperature exceeds 150°F; however, CCW flow must be aligned to the pump seal coolers to maintain integrity of the mechanical seals. In all cases, CCW flow must be available to both the Containment Spray Heat Exchanger and the mechanical seal cooler to declare the system operable per TS 3.6.6.

Time	Position	Applicant's Actions or Behavior
+10 min	BOP	IF CCW flow is NOT available, STOP Containment Spray Pump 1-01 when system temperature reaches 150°F. [Step 5.1.3.F]

When Containment Spray Pump flow and pressure are verified, or at Lead Examiner discretion, PROCEED to Event 2.

Operating Test :	NRC	Scenario #	4	Event #	2	Page	7	of	32
Event Description:	Main Steam Header Pressure Failure								

Time	Position	Applicant's Actions or Behavior
Booth Operator: **When directed, EXECUTE Event 2 (Key 2).** **- RX12, Steam Header Pressure Transmitter (PT-507) fails high on 360 second ramp.**		
Indications Available: **6D-1.10 – AVE T_{AVE} - T_{REF} DEV** **6D-3.10 – 1 OF 4 T_{AVE} LO-LO (WHEN $T_{AVE} \leq 553°F$)** **PCIP-3.6 – RCS TAVE LO-LO P-12 (WHEN $T_{AVE} < 553°F$, Steam Dump Valves will close)** **Steam Dump Valves opening then closing (IF $T_{AVE} < 553°F$)** **Reactor Coolant System temperature lowering** **1-PI-507 – MS HDR PRESS indication fails high**		
+30 secs	RO/BOP	RESPOND to Annunciator Alarm Procedures.
	RO/BOP	REPORT Reactor Coolant System temperature lowering, Steam Dump Valves opening, and PT-507, Steam Header Pressure Channel failure.
	US	DIRECT implementation of ABN-709, Steam Line Pressure, Steam Header Pressure, Turbine 1st Stage Pressure, and Feed Header Pressure Instrument Malfunction, Section 3.0.
	RO/BOP	CHECK 1-PI-507, MS HDR PRESS indicating HIGHER than Main Steam Line Pressure. [Step 3.3.1]
NOTE: Computer point P5446A, FW STM FLOW SETPOINT may aid the operator.		
	RO/BOP	MANUALLY CONTROL Feedwater Pumps. [Step 3.3.2]
		• PLACE 1-SK-509A, FWPT MASTER SPD CTRL in MANUAL. [Step 3.3.2.a]
	RO/BOP	MONITOR Steam Generator Levels: [Step 3.3.3]
		• VERIFY SG levels – STABLE AT OR TRENDING TO NORMAL PROGRAM. [Step 3.3.3.a]
		• Manually CONTROL Auxiliary Feedwater flow as necessary to maintain levels. [Step 3.3.3.b.2) RNO]

Time	Position	Applicant's Actions or Behavior
	US	DETERMINE Required Operational Mode of Steam Dumps: [Step 3.3.4]
	RO/BOP	• CHECK 43/1-SD, STM DMP MODE SELECT Switch in – T_{AVE}. [Step 3.3.4.a]
	RO/BOP	• VERIFY T_{AVE} and steam pressure – STABLE. [Step 3.3.4.b]
	RO/BOP	• If T_{AVE} and steam pressure less than normal for conditions then PLACE both STM DMP INTLK SELECT switches in OFF – RESET. [Step 3.3.4.b.1).a RNO]
		• 43/1-SDA in OFF – RESET.
		• 43/1-SDB in OFF – RESET.
	RO/BOP	• PLACE 1-PK-507, STM DMP PRESS CTRL in MANUAL and 0% DEMAND. [Step 3.3.4.b.1).b RNO]
	RO/BOP	• PLACE both STM DMP INTLK SELECT switches in ON. [Step 3.3.4.b.1).c RNO]
		• 43/1-SDA in ON.
		• 43/1-SDB in ON.
	RO/BOP	• PLACE 43/1-SD, STM DMP MODE SELECT Switch in RESET then in STM PRESS position. [Step 3.3.4.b.1).d RNO]
	RO/BOP	• Manually CONTROL 1-PK-507, STM DMP PRESS CTRL as necessary for conditions. [Step 3.3.4.b.2) RNO]
<u>Examiner Note</u>: 1-PK-507, STM DMP PRESS CTRL, will remain in MANUAL for the duration of the scenario.		
	US	MANUALLY CONTROL 1-SK-509A, FWPT MASTER SPD CTRL to MAINTAIN differential pressure. [Step 3.3.5]
	US	INITIATE a Condition Report per STA-421. [Step 3.3.6]
+10 min	US	INITIATE repairs per STA-606. [Step 3.3.7]
When plant conditions are stable, or at Lead Evaluator's discretion, PROCEED to Event 3.		

Operating Test :	NRC	Scenario #	4	Event #	3	Page	9	of 32
Event Description:	Raise Reactor Power							

Time	Position	Applicant's Actions or Behavior
		Booth Operator: MONITOR Simulator parameters while the crew transitions to IPO-003A.
		Examiner Note: The following steps are from IPO-003A, Power Operations, Section 5.1, Warmup and Synchronization of the Turbine Generator, Step 5.1.16.

NOTE:

- During operation at BOL with a zero or small negative moderator temperature coefficient, very little reactivity feedback will result from changes in temperature. During a startup significant temperature transients can occur with relatively little change to power. This could result in large transients in Pressurizer level and RCS pressure. Care should be taken to ensure changes in steam flow are done gradually to prevent transients in the RCS.
- Steam dumps in automatic should be used to raise power. Steam drains and blowdown are not the preferred method as Operator action is required to change the steam flow. Using Steam Dumps in automatic can reduce the transients in the primary systems since the automatic control will reduce steam dump flow as the turbine speed/load is increased.
- Nuclear Instrumentation may be conservatively calibrated following an extended outage period. Other indication of thermal power, such as calorimetric data, steam dump demand, etc., should also be monitored during the power increase. N-16 should be monitored as an indication of power along with NIS and Calorimetric power. N-16 may be the most accurate indicator of power during a transient since it is temperature compensated. During transient conditions, the highest indication of Reactor power (N-16, NIS, or Calorimetric) should always be maintained within limits.
- If 1-ALB-6D, 1.14 IR HI FLUX ROD STOP C-1 is received prior to 1-PCIP, 1.6 RX $\geq$10% PWR P-10, Core Performance Engineering and I&C should be notified to evaluate.

Time	Position	Applicant's Actions or Behavior
	BOP	If desired, ENSURE Feedwater Bypass Control Valve Controllers in AUTO. [Step 5.1.16.A]
	US	VERIFY Attachment 1 was COMPLETED & REVIEWED by the Shift Manager per the Turnover Sheet prior to exceeding 5% power. [Step 5.1.16.B]
	BOP	As Reactor power rises, manually ADJUST Steam Dump System to maintain Main Steam pressure at approximately 1092 psig. [Step 5.1.16.C]

Operating Test : NRC	Scenario # 4	Event # 3	Page 10 of 32
Event Description: Raise Reactor Power			

Time	Position	Applicant's Actions or Behavior
	US	Direct WITHDRAWAL of Control Rods to raise power.
	RO	WITHDRAW Control Rods while monitoring Reactor power level.
	RO	VERIFY Power Range Channels respond appropriately as power level rises.
<u>Examiner Note</u>: Crew will likely use N-16 power indication from Plant Computer System.		
	US	When reactor power is greater than 5%, LOG entry into MODE 1. [Step 5.1.16.D]
	US	PERFORM OPT-102A for MODE 1 Surveillances. [Step 5.1.16.E]
<u>Floor Cue</u>: If requested, REPORT OPT-102A, Operations Shiftly Routine Tests was completed last shift.		
+15 min	RO	Slowly RAISE Reactor power to between 6% and 8%. [Step 5.1.16.F]
When power level is stabilized at 6% to 8%, or at Lead Examiner discretion, PROCEED to Event 4.		

Operating Test :	NRC	Scenario #	4	Event #	4	Page	11	of	32
Event Description:	Steam Generator Level Transmitter Failure								

Time	Position	Applicant's Actions or Behavior
Booth Operator: When directed, EXECUTE Event 4 (Key 4). **- RX04A, Steam Generator 1-01 Level Transmitter (LT-551) fails low.**		
Indications Available: **8A-1.6 – SG 1 LVL LO** **8A-1.8 – SG 1 STM & FW FLO MISMATCH (power level dependent)** **8A-1.12 – SG 1 LVL DEV (power level dependent)** **8A-1.14 – SG 1 1 OF 4 LVL LO-LO** **1-LI-551, SG 1 LVL (NR) CHAN I indication failed low**		
+30 sec	BOP	RESPOND to Annunciator Alarm Procedures.
	BOP	RECOGNIZE Steam Generator 1-01 Level Transmitter (LT-551) failed low.
Examiner Note: Steam Generator level channel failing LOW will cause the Feedwater Control Bypass Valve to OPEN. Unit 1 SG High Level Turbine Trip occurs at 84%.		
	US	DIRECT performance of ABN-710, Steam Generator Level Instrumentation Malfunction, Section 2.0.
	BOP	RECOGNIZE Steam Generator 1-01 Level Transmitter (LT-551) controlling level channel failed LOW. [Step 2.3.1]
	BOP	PLACE 1-LK-550, SG 1 BYP CTRL in MANUAL and CONTROL Steam Generator 1-01 at programmed level. [Step 2.3.2]
	BOP	VERIFY instruments on common instrument line indicate NORMAL. [Step 2.3.3]
		• VERIFY Loop 1 Instrument LT-501 responding normally per Attachment 1.

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.

Operating Test :	NRC	Scenario #	4	Event #	4	Page	12	of	32
Event Description:	Steam Generator Level Transmitter Failure								

Time	Position	Applicant's Actions or Behavior
	BOP	DETERMINE all HI-HI level bistable windows on Trip Status Light Box (TSLB-3) for Steam Generator 1-01 are DARK. [Step 2.3.4]
		• OBSERVE TSLB-3, Window 2.2 – SG 1 LVL HI-HI LB-519A is DARK.
		• OBSERVE TSLB-3, Window 3.2 – SG 1 LVL HI-HI LB-518A is DARK.
		• OBSERVE TSLB-3, Window 4.2 – SG 1 LVL HI-HI LB-517A 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.

Time	Position	Applicant's Actions or Behavior
	BOP	VERIFY automatic SG level control available: [Step 2.3.5]
		• OBSERVE alternate level control channel 1-LI-519A indication NORMAL. [Step 2.3.5.a]
		• DETERMINE automatic level control desired by Unit Supervisor. [Step 2.3.5.b]
	BOP	PLACE 1-LS-519C, Steam Generator 1 Level Channel Select to LY-519 position. [Step 2.3.6]
	BOP	VERIFY affected SG conditions for auto level control: [Step 2.3.7]
		• OBSERVE Feedwater and Steam Flows – MATCHED.
		• OBSERVE Steam Generator Level – STABLE AT PROGRAM.

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.

Time	Position	Applicant's Actions or Behavior
	BOP	PLACE 1-LK-550, SG 1 BYP CTRL in AUTO and MONITOR operation. [Step 2.3.8]

Operating Test : NRC	Scenario # 4	Event # 4	Page 13 of 32
Event Description: Steam Generator Level Transmitter Failure			

Time	Position	Applicant's Actions or Behavior
<u>Examiner Note</u>: The next two (2) steps are performed after I&C troubleshooting is completed.		
		WITHIN 72 hours, CONTACT I&C to PLACE bistable test switches for Level Channel I in CLOSE per Attachments 2 and 3. [Step 2.3.9]
		VERIFY appropriate alarms and Trip Status Lights LIT per Attachment 3 and NOTE in the Unit Log. [Step 2.3.10]
		• OBSERVE TSLB-5, Window 1.4 – SG 1 LVL LO-LO LB-551B is LIT.
+10 min	US	EVALUATE Technical Specifications. [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 (Channel 1 LO-LO). • ACTION E.1 - Place channel in trip within 72 hours, <u>OR</u> • ACTION E.2 - Be in MODE 3 within 78 hours.
		• LCO 3.3.2.D, ESFAS Instrumentation. (Function 6.c, Steam Generator Water Level Low-Low)
		• CONDITION D - One channel inoperable. • ACTION D.1 - Place channel in trip within 72 hours, <u>OR</u> • ACTION D.2.1 - Be in MODE 3 within 78 hours, <u>AND</u> • ACTION D.2.2 - Be in MODE 4 within 84 hours.

Operating Test :	NRC	Scenario #	4	Event #	4	Page	14	of	32
Event Description:	Steam Generator Level Transmitter Failure								

Time	Position	Applicant's Actions or Behavior
		• LCO 3.3.2.I, ESFAS Instrumentation. (Function 5.b, SG Water Level High-High P-14)
		• CONDITION I - One channel inoperable (Channel 1 HI-HI). • 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]
+10 min	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 5.		

Operating Test :	NRC	Scenario #	4	Event #	5	Page	15	of	32
Event Description:	Containment Spray Pump Trip								

Time	Position	Applicant's Actions or Behavior
Booth Operator: When directed, EXECUTE Event 5 (Key 5). - CS02A, Containment Spray Pump 1-01 trip.		
Indications Available: **2B-1.3 – ANY CSP OVRLOAD / TRIP** **Containment Spray Pump 1-01 amber MISMATCH and white TRIP lights lit**		
+30 sec	BOP	RESPOND to Annunciator Alarm Procedures.
	BOP	RECOGNIZE 1-HS-4764, CSP 1, Containment Spray Pump 1-01 amber MISMATCH and white TRIP lights LIT.
	US	DIRECT performance of ALM-0022A, 1-ALB-2B, Window 1.3 – ANY CSP OVRLD TRIP.
CAUTION: Do not place pump handswitch in STOP if pump has tripped (white TRIP light). This will reset 86M relay (white TRIP light) and may result in an automatic restart.		
	BOP	DETERMINE Containment Spray Pump 1-01 affected pump. [Step 1]
Booth Operator: **When asked about status of Containment Spray Pump, REPORT that the motor casing is hot.**		
	BOP	DISPATCH a PEO to check for signs of damage. [Step 2]
Booth Operator: **When asked about status of Containment Spray (CS) Pump breaker, REPORT that the 50/51 overcurrent relays on Phases B & C are tripped. CSP 1-01 Breaker (1EA1/8/BKR) indicates an overload condition exists.**		
	BOP	DISPATCH a PEO to 1APCS1, CONTAINMENT SPRAY PUMP 1-01 MOTOR BREAKER (1EA1/8/BKR). [Step 3]
	BOP	VERIFY 1-HS-4776/4777, CS HX 1/2 OUT VLV is CLOSED. [Step 4]

Operating Test :	NRC	Scenario #	4	Event #	5	Page	16	of	32
Event Description:	Containment Spray Pump Trip								

Time	Position	Applicant's Actions or Behavior
	US	EVALUATE Technical Specifications. [Step 5]
		• LCO 3.6.6.A, Containment Spray System.
		• CONDITION A - One containment spray inoperable. • ACTION A.1 - Restore containment spray training to OPERABLE status within 72 hours. • CONDITION B - Required Action and associated Completion Time of Condition A not met. • ACTION B.1 - Be in MODE 3 within 6 hours, AND • ACTION B.2 - Be in MODE 5 within 84 hours.
Examiner Note: **Both Train A Containment Spray (CS) Pumps may be taken to PULLOUT to avoid having the OPERABLE Train A CS Pump 1-03 experience a runout condition in the event a Containment H-3 signal is received.**		
	US	SUBMIT a Condition Report per STA-421. [Step 2.3.6]
+10 min	US	INITIATE a work request per STA-606. [Step 2.3.6]
When Technical Specifications are addressed, or at Lead Examiner discretion, PROCEED to Events 6, 7, 8, and 9.		

Operating Test :	NRC	Scenario #	4	Event #	6, 7, 8, & 9	Page	17	of	32
Event Description:	Spurious Train B Safety Injection Actuation Signal / Automatic Reactor Trip Failure / Train B Containment Isolation Phase A Automatic Actuation Failure / Small Break Loss of Coolant Accident								

Time	Position	Applicant's Actions or Behavior
Booth Operator: When directed, EXECUTE Events 6, 7, 8, and 9 (Key 6). **- RP14B, Spurious Train B Safety Injection Actuation Signal.** **- RP01, Automatic Reactor Trip failure.** **- RP09B, Train B Containment Isolation Phase A automatic actuation failure.** **- RC08C1, Small Break Loss of Coolant Accident inside Containment when Safety Injection Pump 1-02 is secured in EOS-1.1A, SI Termination.**		
Indications Available: **Multiple Spurious Train B Safety Injection System Alarms**		
+30 sec	RO/BOP	RECOGNIZE Train B Safety Injection Actuation.
	RO/BOP	DETERMINE Reactor Trip required but NOT tripped.
CRITICAL TASK STATEMENT		**Manually Trip Reactor Due to Reactor Protection System Failure Prior to Exiting EOP-0.0A, Reactor Trip or Safety Injection.**
CRITICAL TASK	RO	Manually INITIATE a Reactor Trip.
	RO	• PLACE 1/1-RTC, RX TRIP Switch in TRIP at CB-07.
	BOP	• PLACE 1/1-RT, RX TRIP Switch in TRIP at CB-10.
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]
		• VERIFY all Control Rod Position Rod Bottom Lights – ON. [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]

Operating Test : NRC	Scenario # 4	Event # 6, 7, 8, & 9	Page 18 of 32
Event Description:	Spurious Train B Safety Injection Actuation Signal / Automatic Reactor Trip Failure / Train B Containment Isolation Phase A Automatic Actuation Failure / Small Break Loss of Coolant Accident		

Time	Position	Applicant's Actions or Behavior
		• VERIFY both AC Safeguards Buses – ENERGIZED. [Step 3.b]
Examiner Note: **Safety Injection must be manually actuated to place both Trains in service.**		
	RO	CHECK SI status: [Step 4]
		• CHECK if SI is actuated. [Step 4.a]
		• VERIFY Both Trains SI Actuated: [Step 4.b]
		• SI Actuated blue status light – ON and FLASHING. [Step 4.b]
		• PLACE 1/1-SIA2, SI MAN ACT Switch to ACT position at CB-07 and DETERMINE SI has actuated on both Trains. [Step 4.b RNO]
Examiner Note: **EOP-0.0A, Attachment 2 steps performed by the BOP are at the end of the scenario.**		
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]
	RO	VERIFY AFW Alignment: [Step 6]
		• VERIFY both MDAFW Pumps – RUNNING. [Step 6.a]
		• If necessary, START TDAFW Pump. [Step 6.b]
		• VERIFY AFW total flow – GREATER THAN 460 GPM. [Step 6.c]
		• VERIFY AFW valve alignment - PROPER ALIGNMENT. [Step 6.d]

Time	Position	Applicant's Actions or Behavior
	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 Train B Containment Spray Pumps – RUNNING. [Step 7.c]
	RO	CHECK if Main Steam lines should be ISOLATED: [Step 8]
		• VERIFY Containment pressure – GREATER THAN 6.0 PSIG OR Main Steam Line pressure less than 610 PSIG. [Step 8.a]
		• GO to Step 9. [Step 8.a RNO]
	RO	CHECK RCS Temperature: [Step 9]
		• VERIFY RCS Average Temperature – STABLE AT OR TRENDING TO 557°F. [Step 9]
	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]
	RO	CHECK If RCPs Should Be Stopped: [Step 11]
		• VERIFY RCS subcooling – LESS THAN 25°F (55°F FOR ADVERSE CONTAINMENT). [Step 11.a]
		• GO to Step 12. [Step 11.a RNO]

Operating Test :	NRC	Scenario #	4	Event #	6, 7, 8, & 9	Page	20	of	32

Event Description: Spurious Train B Safety Injection Actuation Signal / Automatic Reactor Trip Failure / Train B Containment Isolation Phase A Automatic Actuation Failure / Small Break Loss of Coolant Accident

Time	Position	Applicant's Actions or Behavior
	US/RO	CHECK if any SG is Faulted: [Step 12]
		• VERIFY any Steam Generator pressure – DECREASING IN AN UNCONTROLLED MANNER. [Step 12.a]
		• VERIFY any Steam Generator pressure – COMPLETELY DEPRESSURIZED. [Step 12.a]
		• GO to Step 12. [Step 12.a RNO]
	RO/BOP	CHECK if Steam Generator Tubes Are NOT Ruptured: [Step 13]
		• VERIFY Condenser Off Gas radiation – NORMAL.
		• VERIFY Main Steam Line radiation – NORMAL.
		• VERIFY SG Blowdown Sample Radiation Monitor – NORMAL.
		• VERIFY levels in all Steam Generators – NORMAL.
	RO/BOP	CHECK if RCS is Intact: [Step 14]
		• VERIFY Containment pressure – LESS THAN 1.3 PSIG. [Step 14]
		• VERIFY Containment recirculation sump levels – NORMAL. [Step 14]
		• VERIFY Containment radiation levels – NORMAL. [Step 14]
	US/RO	CHECK if ECCS Flow to Should Be Reduced: [Step 15]
		• VERIFY Secondary heat sink: [Step 15.a]
		• DETERMINE Total AFW Flow to intact SGs > 460 GPM.
		• DETERMINE Narrow Range Level in all SGs > 50%.
		• DETERMINE RCS subcooling – GREATER THAN 25°F (55°F FOR ADVERSE CONTAINMENT). [Step 15.b]
		• VERIFY RCS pressure – STABLE <u>OR</u> INCREASING. [Step 15.c]
		• VERIFY PRZR level - GREATER THAN 13% (34% FOR ADVERSE CONTAINMENT). [Step 15.d]
		• GO to EOS-1.1A, Safety Injection Termination, Step 1. [Step 15.e]

<u>Examiner Note</u>: EOS-1.1A, Safety Injection Termination steps begin here.

Operating Test :	NRC	Scenario #	4	Event #	6, 7, 8, & 9	Page	21	of	32
Event Description:	Spurious Train B Safety Injection Actuation Signal / Automatic Reactor Trip Failure / Train B Containment Isolation Phase A Automatic Actuation Failure / Small Break Loss of Coolant Accident								

Time	Position	Applicant's Actions or Behavior
Examiner Note: **The following six (6) steps are performed per EOS-1.1A, Attachment 1.D.**		
CAUTION: If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment.		
	BOP	[1.D] PLACE both Diesel EMER START/STOP handswitches in START. [Step 1]
Examiner Note: **When Safety Injection is properly RESET, Annunciator 1-ALB-2B, Window 2.8, SFGD SEQR TRN A/B AUTO TEST TRBL, will RESET.**		
	BOP	[1.D] RESET SI. [Step 2]
		• DEPRESS 1/1-SIRA, TRAIN A SI RESET pushbutton.
		• DEPRESS 1/1-SIRB, TRAIN A SI RESET pushbutton.
	BOP	[1.D] RESET SI Sequencers. [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.
	BOP	[1.D] RESET Containment Isolation Phase A and B. [Step 4]
		• 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.

Operating Test :	NRC	Scenario #	4	Event #	6, 7, 8, & 9	Page	22	of 32
Event Description:	Spurious Train B Safety Injection Actuation Signal / Automatic Reactor Trip Failure / Train B Containment Isolation Phase A Automatic Actuation Failure / Small Break Loss of Coolant Accident							

Time	Position	Applicant's Actions or Behavior
	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)]
		• OPEN 1-HS-3487, Containment Instrument Air Isolation Valve. [Step 6.a.2)]
		• ESTABLISH Nitrogen: [Step 6.b]
		• VERIFY 1-HC-3943, ACCUM 1●4 VENT CTRL Valve – CLOSED. [Step 6.b.1)]
		• OPEN 1/1-8880, SI/PORV ACCUM N_2 ISOL VLV. [Step 6.b.2)]
	RO	STOP all but one CCP and PLACE in Standby. [Step 7]
	US/RO	CHECK RCS Pressure – STABLE OR INCREASING. [Step 8]
<u>Examiner Note</u>: The following two (2) steps are performed per EOS-1.1A, Attachment 1.J.		
	RO	[1.J] ISOLATE CCP Injection Line Flow Path: [Step 9]
		• VERIFY CCP – SUCTION ALIGNED TO RWST. [Step 9.a]
		• ALIGN CCP Miniflow Valves: [Step 9.b]
		• OPEN 1/1-8110 and 1/1-8111, CCP Miniflow Valves. [Step 9.b.1)]
		• CLOSE 1/1-8511A and 1/1-8511B, CCP Alternate Miniflow Isolation Valves. [Step 9.b.2)]
		• PLACE Charging Flow Control Valve in MANUAL and 35% demand. [Step 9.c]
		• CLOSE 1/1-8801A and 1/1-8801B, CCP Injection Line Isolation Valves. [Step 9.d]

Operating Test :	NRC	Scenario #	4	Event #	6, 7, 8, & 9	Page	23	of	32
Event Description:	Spurious Train B Safety Injection Actuation Signal / Automatic Reactor Trip Failure / Train B Containment Isolation Phase A Automatic Actuation Failure / Small Break Loss of Coolant Accident								

Time	Position	Applicant's Actions or Behavior
+20 min	RO	[1.J] ESTABLISH Charging Flow Path: [Step 10]
		• OPEN 1/1-8105 and 1/1-8106, Charging Line Isolation Valves. [Step 10.a]
		• ADJUST Charging Flow Control Valve to establish Charging flow. [Step 10.b]
		• ADJUST RCP seal flow to maintain between 6 GPM and 13 GPM. [Step 10.c]
	RO	CONTROL Charging Flow to maintain PRZR Level. [Step 11]
Examiner Note:		**When Safety Injection Pump 1-02 is stopped, a Small Break Loss of Coolant Accident will occur. EOS-1.1A, Foldout Page criteria requires entry into EOP-1.0A, Loss of Reactor or Secondary Coolant, if RCS subcooling or Pressurizer level cannot be maintained.**
	RO	CHECK IF SI Pumps Should Be Stopped: [Step 12]
		• CHECK RCS pressure: [Step 12.a]
		• Pressure – STABLE OR INCREASING. [Step 12.a]
		• Pressure – GREATER THAN 1700 PSIG. [Step 12.a]
		• STOP SI pumps and PLACE in standby. [Step 12.b]
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.

Operating Test :	NRC	Scenario #	4	Event #	6, 7, 8, & 9	Page	24	of	32
Event Description:	Spurious Train B Safety Injection Actuation Signal / Automatic Reactor Trip Failure / Train B Containment Isolation Phase A Automatic Actuation Failure / Small Break Loss of Coolant Accident								

Time	Position	Applicant's Actions or Behavior

<u>Examiner Note</u>:		**When EOP-1.0A is entered, RCS subcooling has not lowered to the point where the RCPs must be tripped, however, this is a Continuous Action Step and must eventually be performed.**
CRITICAL TASK STATEMENT		**Trip Reactor Coolant Pumps within 10 minutes upon a Loss of Subcooling per EOP-1.0A, Loss of Reactor or Secondary Coolant, Foldout Page.**
CRITICAL TASK	RO	CHECK If RCPs Should Be Stopped: [Step 1].
		• VERIFY RCS subcooling – LESS THAN 25°F. [Step 1.a]
		• VERIFY ECCS Pumps (CCP or SI) – AT LEAST ONE RUNNING. [Step 1.b]
		• STOP all RCPs. [Step 1.c]
	RO/BOP	CHECK if Any Steam Generator Is Faulted: [Step 2]
		• VERIFY any Steam Generator pressure – DECREASING IN AN UNCONTROLLED MANNER. [Step 2.a]
		• VERIFY any Steam Generator pressure – COMPLETELY DEPRESSURIZED. [Step 2.a]
		• GO to Step 3. [Step 2.a RNO]
	US	CHECK Intact Steam Generator Levels: [Step 3]
		• VERIFY 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]
	US	CHECK Secondary Radiation NORMAL: [Step 4]
		• VERIFY Condenser off gas radiation – NORMAL. [Step 4]
		• VERIFY Main Steam Line radiation – NORMAL. [Step 4]
		• VERIFY SG Blowdown Sample Radiation Monitor – NORMAL. [Step 4]
		• VERIFY levels in all Steam Generators – NORMAL. [Step 4]

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Time	Position	Applicant's Actions or Behavior
		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.
	US	CHECK PRZR PORVs and Block Valves: [Step 5]
		• VERIFY power Block Valves – AVAILABLE. [Step 5.a]
		• VERIFY PORVs – CLOSED. [Step 5.b]
		• VERIFY Block Valves – AT LEAST ONE OPEN. [Step 5.c]

Time	Position	Applicant's Actions or Behavior
	US/RO	CHECK if ECCS Flow Should Be Reduced: [Step 6]
		• VERIFY Secondary heat sink conditions – SATISFIED. [Step 6.a]
		• VERIFY RCS subcooling – GREATER THAN 25°F (55°F FOR ADVERSE CONTAINMENT). [Step 6.b]
		• GO to Step 7 and OBSERVE CAUTIONS Prior to Step 7. [Step 6.b RNO]
		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]

Operating Test :	NRC	Scenario #	4	Event #	6, 7, 8, & 9	Page	26	of	32
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Time	Position	Applicant's Actions or Behavior
		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]
	RO/BOP	• VERIFY RCS pressure – GREATER THAN 325 PSIG (425 PSIG FOR ADVERSE CONTAINMENT). [Step 8.a]
		• VERIFY RCS pressure – STABLE OR INCREASING
		• VERIFY RHR Pumps – RUNNING AND ALIGNED TO RWST. [Step 8.b]
		• STOP RHR Pumps and PLACE in Standby. [Step 8.c]
		• RESET RHR Auto Switchover. [Step 8.d]
	US	CHECK RCS and SG Pressures: [Step 9]
	RO/BOP	• VERIFY RCS pressure – STABLE OR DECREASING. [Step 9]
	RO/BOP	• VERIFY SG pressures in all SGs – STABLE OR INCREASING. [Step 9]
	US	CHECK If Diesel Generators Should Be Stopped: [Step 10]
	RO/BOP	• VERIFY AC Safeguards Buses – ENERGIZED BY OFFSITE POWER. [Step 10.a]
	RO/BOP	• PLACE 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]
	RO	• VERIFY Cold Leg Recirculation capability: [Step 11.a]
		• VERIFY Train A RHR Pump – AVAILABLE. [Step 11.a.1)]

Operating Test :	NRC	Scenario #	4	Event #	6, 7, 8, & 9	Page	27	of	32
Event Description:	Spurious Train B Safety Injection Actuation Signal / Automatic Reactor Trip Failure / Train B Containment Isolation Phase A Automatic Actuation Failure / Small Break Loss of Coolant Accident								

Time	Position	Applicant's Actions or Behavior
		• VERIFY CCW to Train A RHR Pump – AVAILABLE. [Step 11.a.1)]
		• VERIFY 1/1-8811A, CNTMT SMP TO RHRP 1 SUCT ISOL VLV AVAILABLE. [Step 11.a.1)]
		• VERIFY Train B RHR Pump – AVAILABLE. [Step 11.a.1)]
		• VERIFY CCW to Train B RHR Pump – AVAILABLE. [Step 11.a.1)]
		• VERIFY 1/1-8811B, CNTMT SMP TO RHRP 2 SUCT ISOL VLV – AVAILABLE. [Step 11.a.1)]
		• VERIFY 1/1-8804A, RHRP 1 TO CCP SUCT VLV – AVAILABLE. [Step 11.a.2)]
		• VERIFY 1/1-8804B, RHRP 2 TO SIP SUCT VLV – AVAILABLE. [Step 11.a.2)]
	RO/BOP	• CHECK Auxiliary Building and Safeguards Building radiation – NORMAL: [Step 11.b]
		• CHECK PC-11 monitors – NORMAL (Grid 4). [Step 11.b]
	US	• NOTIFY Chemistry to obtain RCS samples to assist in determining extent of the accident. [Step 11.c]
	US	• CONTACT Plant Staff to EVALUATE plant equipment. [Step 11.d]
	US	CHECK if RCS Cooldown and Depressurization Is Required: [Step 12]
	RO/BOP	• VERIFY RCS pressure – GREATER THAN 325 PSIG (425 PSIG FOR ADVERSE CONTAINMENT). [Step 12.a]
	RO/BOP	• GO to EOS-1.2 A, Post LOCA Cooldown and Depressurization, Step 1. [Step 12.b]
When transition to EOS-1.2 A, Post LOCA Cooldown and Depressurization is reached, terminate the scenario.		

Operating Test :	NRC	Scenario #	4	Event #	6, 7, 8, & 9	Page	28	of	32
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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 EDG 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]
		• PLACE 1/1-CIPAA1 CNTMT ISOL – PHASE A / CNTMT VENT ISOL Switch in ACT position. [Step 3 RNO]
	BOP	VERIFY Containment Ventilation Isolation (Train A) – 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 Centrifugal Charging Pumps – RUNNING. [Step 7.a]
		• VERIFY Letdown Relief Valve Isolation: [Step 7.b]
		• Letdown Orifice Isolation Valves – CLOSED. [Step 7.b.1)]
		• Letdown Isolation Valves 1/1-LCV-459 & 1/1-LCV-460 – CLOSED. [Step 7.b.2)]

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Time	Position	Applicant's Actions or Behavior
	BOP	VERIFY ECCS flow: [Step 8]
		• CCP SI flow indicator – CHECK FOR FLOW. [Step 8.a]
		• RCS pressure – LESS THAN 1700 PSIG (1800 PSIG FOR ADVERSE CONTAINMENT). [Step 8.b]
		• GO to Step 9. [Step 8.b RNO]
	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 both 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]
	BOP	INITIATE periodic monitoring of Spent Fuel Cooling. [Step 13]
		• Spent Fuel Pool temperature (T2900A, T2901A).
		• Spent Fuel Pool level (L4800A, L4801A, L4802A, L4803A).

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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.

Time	Position	Applicant's Actions or Behavior
	BOP	VERIFY Components on Table 1 are Properly Aligned. [Step 14]

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

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Time	Position	Applicant's Actions or Behavior

	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
Examiner Note: X-HS-3632 on CV-01 will NOT start due to loss of power.				
	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

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Time	Position	Applicant's Actions or Behavior

<u>Examiner Note</u>: The next four (4) 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

Time	Position	Applicant's Actions or Behavior
	BOP	NOTIFY Unit Supervisor attachment instructions complete <u>AND</u> to IMPLEMENT FRGs as required. [Step 14]

EOP-0.0A, Attachment 2 steps are now complete.