

Final Submittal

(Blue Paper)

FINAL JPMS

1. ADMINISTRATIVE JPMS
2. IN-PLANT JPMS
3. SIMULATOR JPMS (CONTROL ROOM)

CATAWBA

2007-301

FINAL
SIMULATOR JPMs
(CONT ROOM)

CATAWBA
2007-301

**Catawba 2007
Initial License Examination
Job Performance Measure**

JPM A

Simulator

CANDIDATE: _____

EXAMINER: _____

**Catawba 2007
Initial License Examination
Job Performance Measure**

Task: Respond to a Loss of Steam Generator Feedwater with a Failure of the Turbine to Trip following a Reactor Trip

Alternate Path: Yes

Facility JPM #: OP-CN-CF-CA083

K/A Rating(s): APE 054 AK3.01 (4.1 4.4)

SAFETY FUNCTION: 4 (Secondary)

Task Standard: The reactor is tripped and SI is manually actuated following a loss of both operating CFPTs.

Preferred Evaluation Location:

Control Room X In-Plant

Preferred Evaluation Method:

Perform Simulate X

Procedure References:

- AP/1/A/5500/006 (Loss of Steam Generator Feedwater)
- EP/1/A/5000/E-0 (Reactor Trip or Safety Injection)

Validation Time: 5 Minutes

Time Critical: No

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Candidate: _____
NAME

Time Start: _____

Time Finish: _____

Performance Ratings:

SAT _____ UNSAT _____ Question Grade _____ Performance Time: _____

Examiner: _____
NAME SIGNATURE DATE

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COMMENTS

Simulator Set- Up Sheet

Reset to 20% power snap with CF on main nozzles (IC #25).

- Insert MAL-IPX001A AUTO REACTOR TRIP FAILURE TRN A
- Insert MAL IPX001B AUTO REACTOR TRIP FAILURE TRN B
- Insert MAL EHC002 TURBINE TRIP FAILURE; Set = Both
- Insert Mal- ISE002A (Auto SI TRN A Fails to Actuate)
- Insert Mal- ISE002B (Auto SI TRN B Fails to Actuate)
- Insert OVR-FWP012C CFPT1A TRIP RESET TRIP PB; Digital Value = ON; Event Trigger= 2.
- Insert OVR-FWP015C CFPT1B TRIP RESET TRIP PB; Digital Value = ON; Event Trigger= 2.
- Insert MAL-SM006A (Main Steam Isolation Valve A Failure)
- Insert MAL-SM006B (Main Steam Isolation Valve B Failure)
- Insert MAL-EHC010E (All Main Turbine Stop Valves Fail), Malfunction Value = AS IS
- Insert MAL-EHC011E (All Main Turbine Control Valves Fail), Malfunction Value = AS IS
- Insert ANN-AD01-A06 TURB TRIP ON LOSS OF BOTH CFPT, Malfunction Value =2-AS IS
- Insert ANN-AD01-B01 AMSAC TURBINE TRIP, Malfunction Value =2-AS IS.
- Insert ANN-AD01-C06 EXT TRAIN A-B/NON TRAIN TURB TRIP, Malfunction Value =2-AS IS.

IC SELECTED: 151

Read Password: 7539

Write Password: 1307

Simulator Operator Instructions:

When the operator states that he/she is ready initiate Trigger 2.

Tools / Equipment / Procedures Needed:

- None

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIATING CUE:

You are the OATC monitoring plant conditions. A recent power increase has been temporarily placed on hold. Continue to monitor plant conditions.

START TIME: _____

<p><u>AP/06 Step 1:</u> Verify reactor power - LESS THAN 5%.</p> <p><u>STANDARD:</u> Verifies power range indication on MC1 and/or OAC indicates greater than 5% and then goes to RNO.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>AP/06 Step 1 RNO:</u> IF AT ANY TIME all CF supply to S/G(s) lost, THEN perform the following:</p> <p style="padding-left: 40px;">a. Manually trip reactor.</p> <p style="padding-left: 40px;">b. GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection)</p> <p><u>STANDARD:</u> Operator rotates RX TRIP TRN A and B switches on 1MC1 to the trip position.</p> <p style="padding-left: 40px;">Operator begins to perform the immediate actions of EP/E-0 from memory.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>EP/E-0 Step 2:</u> Verify Reactor Trip:</p> <ul style="list-style-type: none">• All rod bottom lights - LIT• All reactor trip and bypass breakers - OPEN• I/R amps - DECREASING. <p><u>STANDARD:</u> Operator verifies the following:</p> <ul style="list-style-type: none">• All rod bottom lights lit on the DRPI panel on 1MC1.• The "GREEN" open light is lit on all reactor tip and bypass breakers on 1MC1• I/R amps decreasing <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p><u>EP/E-0 Step 3: Verify Turbine Trip:</u></p> <ul style="list-style-type: none"> • All turbine stop valves - CLOSED OR • Both of the following: <ul style="list-style-type: none"> • All MSIVs - CLOSED • All MSIV bypass valves - CLOSED. <p><u>STANDARD:</u> Operator determines all turbine stop valves are OPEN by verifying TURB STOP VALVE 1, 2, 3 AND 4 CLOSED CH I, II, III and IV status lights on 1SI-2 are dark.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>EP/E-0 Step 3 RNO:</u> Perform the following:</p> <p>a. Manually trip the turbine.</p> <p><u>STANDARD:</u> Operator depresses the "TRIP" pushbutton on the EHC Control Panel and then verifies: all turbine stop valves are OPEN by verifying TURB STOP VALVE 1, 2, 3 AND 4 CLOSED CH I, II, III and IV status lights on 1SI-2 are DARK.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>EP/E-0 Step 3 RNO:</u> b. IF turbine will not trip, THEN:</p> <ol style="list-style-type: none"> 1) Depress the "MANUAL" pushbutton on the turbine control panel. 2) Rapidly unload turbine by simultaneously depressing the "CONTROL VALVE LOWER" and "FAST RATE" pushbuttons. <p><u>STANDARD:</u> Operator depresses "MANUAL". Operator then depresses "CONTROL VALVE LOWER" and "FAST RATE" pushbuttons. Operator determines the turbine is NOT running back.</p> <p><u>COMMENT:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p><u>EP/E-0 Step 3 RNO:</u> 3) IF turbine will not runback, THEN close:</p> <ul style="list-style-type: none"> • All MSIVs • All MSIV bypass valves. <p><u>STANDARD:</u> Verifies all MSIV bypass valves closed and attempts to close all MSIV. 1A and 1B S/G MSIV will not close. Candidate may attempt to initiate SM Isolation due to rapidly decreasing steam pressure.</p> <p><u>COMMENT:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>EPE-0 Step 4:</u> Verify 1ETA and 1ETB - ENERGIZED.</p> <p><u>STANDARD:</u> Operator verifies that 1ETA and 1ETB are ENERGIZED by verifying equipment on both trains is energized.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>EP/E-0 Step 5:</u> Verify S/I is actuated:</p> <p>a. "SAFETY INJECTION ACTUATED" status light (1SI-13) - LIT.</p> <p><u>STANDARD:</u> Operator verifies that S/I is not actuated by verifying that the "SAFETY INJECTION ACTUATED" status light (1SI-13) - DARK</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p><u>EP/E-0 Step 5 RNO:</u> a. Perform the following:</p> <p>1) Verify conditions requiring S/I:</p> <ul style="list-style-type: none"> • PZR pressure - LESS THAN 1845 PSIG OR • Containment pressure - GREATER THAN 1.2 PSIG. <p>2) IF S/I is required, THEN manually initiate S/I. (Critical)</p> <p><u>STANDARD:</u> Operator uses available control board or OAC indications to verify that PZR pressure is less than 1845 psig and manually initiates Safety Injection.</p> <p><u>COMMENTS:</u></p>	<p>Critical Task</p> <p>___ SAT</p> <p>___ UNSAT</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>EP/E-0 Step 5:</u> Verify S/I is actuated:</p> <p>b. E/S load sequencer actuated status lights (1SI-14) - LIT.</p> <p><u>STANDARD:</u> Operator verifies that the "ES Load Seq Actuated Train A" and "ES Load Seq Actuated Train B" status lights (1SI-14) - LIT</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>This JPM is complete.</p>	

STOP TIME: _____

CANDIDATE CUE SHEET

(To Be Returned To Examiner Upon Completion of Task)

INITIATING CUE:

You are the OATC monitoring plant conditions. A recent power increase has been temporarily placed on hold. Continue to monitor plant conditions.

**Catawba 2007
Initial License Examination
Job Performance Measure**

JPM B

Simulator

CANDIDATE: _____

EXAMINER: _____

**Catawba 2007
Initial License Examination
Job Performance Measure**

Task: Perform Enclosure 6 (Establishing Blowdown From Ruptured S/G(s)) of EP/ES-3.2

Alternate Path: No

Facility JPM #: OP-CN-EP-EP4-002 (Modified)

K/A Rating(s): 038 EA1.18 (4.0/3.9)

SAFETY FUNCTION: 4P

Task Standard: Blowdown established from S/G 1D at less than or equal to 100 GPM

Preferred Evaluation Location:

Preferred Evaluation Method:

Control Room X In-Plant

Perform Simulate X

Procedure References:

EP/1A/5000/ES-3.2 (Post - SGTR Cooldown Using Blowdown)

Validation Time: 12 Minutes

Time Critical: No

Candidate: _____
NAME

Time Start: _____

Time Finish: _____

Performance Ratings:

SAT UNSAT Question Grade Performance Time:

Examiner: _____ / _____
NAME SIGNATURE DATE

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COMMENTS

Simulator Set- Up Sheet

Reset to any 100% power IC.

- NOTE: A BOL core will be easier to get to desired initial conditions.

Insert MAL-SG001D (Steam Generator D Tube Leak), Value = 400 gpm.

Complete actions of E-0 and E-3.

When required, use the following to place and then remove power from the CLA isolation valves:

- LOA-NI0007 (Rackout NI-54A)
- LOA-NI0008 (Rackout NI-65B)
- LOA-NI0009 (Rackout NI-76A)
- LOA-NI0010 (Rackout NI-88B)

Ensure BB tank Level Lo Alarm (D1880) clear.

Freeze simulator and write to a snap.

IC SELECTED 152

Read: 7539

Write: 1307

Simulator Operator Instructions:

Tools / Equipment / Procedures Needed:

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIATING CUE:

EP/1/A/5000/ES-3.2 (Post-SGTR Cooldown Using Blowdown) has been implemented following a tube rupture on S/G 1D. The Control Room Supervisor directs you to establish blowdown from the ruptured S/G using Enclosure 6 of EP/ES-3.2.

START TIME: _____

<p><u>STEP 1:</u> Ensure CA system is reset.</p> <p><u>STANDARD:</u> Yellow "RESET" lights lit for CA SYS VLV CTRL TRN A & B on 1MC-10.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2:</u> Close BB controllers.</p> <ul style="list-style-type: none">• S/G A BLDWN FLOW CTRL• S/G B BLDWN FLOW CTRL• SG C BLDWN FLOW CTRL• S/G D BLDWN FLOW CTRL <p><u>STANDARD:</u> Controllers set at 0% for "S/G A, B, C, & D BLDWN FLOW CTRL" on 1MC-4.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 3:</u> Ensure 1BB-178 OPEN.</p> <p><u>STANDARD:</u> Red "OPEN" light lit for 1BB-178 on 1MC-4. Green "CLSD" light "DARK."</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 4:</u> Ensure 1BB-48 CLOSED.</p> <p><u>STANDARD:</u> Green "CLSD" lights lit for 1BB-48 on 1MC-4. Red "OPEN" light dark.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p>STEP 5: Override 1EMF-33 by depressing "OVERRIDE" on the RAD MON OVERRIDE Pushbutton (1MC-4).</p> <p>STANDARD: Depress white "OVERRIDE" pushbutton on the "RAD MON OVERRIDE" switch on 1MC-4.</p> <p>COMMENTS:</p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 6: Notify Station Management to determine maximum blowdown flowrate.</p> <p>STANDARD: Candidate acknowledges flow limit.</p> <p>EXAMINER CUE: Maximum flowrate is 100 gpm.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 7: Align blowdown from ruptured S/G(s) as follows:</p> <ul style="list-style-type: none"> • S/G 1D: <ul style="list-style-type: none"> a. Verify 1BB-80 (1D S/G Blowdown Penetration Valve Test Isol) (DH-583,EE-FF, 44, Rm 591) - OPEN. <p>STANDARD: Notifies an NLO to check position of 1BB-80.</p> <p>EXAMINER CUE: NLO reports 1BB-80 is open.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 7: b. Open 1BB-8A (S/G 1D Bldwn Cont Isol Insd).</p> <p>STANDARD: Candidate opens 1BB-8A.</p> <p>COMMENTS:</p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 7: c. Open 1BB-147B (S/G 1D Bldwn Cont Isol Byp).</p> <p>STANDARD: Candidate opens 1BB-147B.</p> <p>COMMENTS:</p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 7:</u> d. Do not continue until 5 minutes has elapsed.</p> <p><u>STANDARD:</u> Candidate acknowledges wait period.</p> <p>EXAMINER CUE: 5 minutes has elapsed.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 7:</u> e. Open 1BB-10B (S/G 1D Bldwn Cont Isol Otsd).</p> <p><u>STANDARD:</u> Candidate opens 1BB-10B.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 7:</u> f. Close 1BB-147B (S/G 1D Bldwn Cont Isol Byp).</p> <p><u>STANDARD:</u> Candidate closes 1BB-147B.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 7:</u> g. Slowly open "S/G D BLDWN FLOW CTRL" until flow is indicated.</p> <p><u>STANDARD:</u> Candidate slowly opens only the D S/G BB controller until flow is indicated.</p> <p><u>COMMENTS:</u></p>	<p>Critical Step</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 7:</u> h. Do not continue until 10 minutes has elapsed.</p> <p><u>STANDARD:</u> Candidate acknowledges wait period.</p> <p>EXAMINER CUE: 10 minutes has elapsed.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p>STEP 7: i. Verify blowdown system - PREVIOUSLY ALIGNED FOR COLD WATER INJECTION.</p> <p>STANDARD: Determines required actions.</p> <p>EXAMINER CUE: No, cold water injection mode not previously aligned.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 7i RNO: WHEN "S/G BLOWDOWN TANKLEVEL LO" alarm (OAC point D1880) (28% level on local gauge) clears, THEN restart the BB pump.</p> <p>STANDARD: Locates OAC point D1880 and determines S/G BLOWDOWN TANK LEVEL LO" is not in alarm and restarts BB pump.</p> <p>EXAMINER NOTE: If performed in the plant control room, after applicant locates the OAC point, give the following cue:</p> <p>EXAMINER CUE: S/G Blowdown Tank Level Lo alarm is clear.</p> <p>COMMENTS:</p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 7: j. Throttle "S/G D BLDWN FLOW CTRL" to maintain flowrate as required from Step 6.</p> <p>STANDARD: Open "S/G D BLDWN FLOW CTRL" to maintain less than or equal to 100 gpm</p> <p>COMMENTS:</p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p>SETP 8: IF required, THEN shift Blowdown operating modes. REFER TO OP/1/A/6250/008 (Steam Generator Blowdown).</p> <p>EXAMINER CUE: Shift of operating modes is not required.</p>	
<p>This JPM is complete.</p>	

STOP TIME: _____

CANDIDATE CUE SHEET

(To Be Returned To Examiner Upon Completion of Task)

INITIATING CUE:

EP/1/A/5000/ES-3.2 (Post-SGTR Cooldown Using Blowdown) has been implemented following a tube rupture on S/G 1D. The Control Room Supervisor directs you to establish blowdown from the ruptured S/G using Enclosure 6 of EP/ES-3.2.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

- ___ 1. **Ensure CA System valve control - RESET.**
- ___ 2. **Close the following controllers:**
 - ___ • "S/G A BLDWN FLOW CTRL"
 - ___ • "S/G B BLDWN FLOW CTRL"
 - ___ • "S/G C BLDWN FLOW CTRL"
 - ___ • "S/G D BLDWN FLOW CTRL".
- ___ 3. **Ensure 1BB-178 (BB Demin To Cond Drn Hdr Isol) - OPEN.**
- ___ 4. **Ensure 1BB-48 (BB Pumps Disch To TB Smp) - CLOSED.**
- ___ 5. **Override 1EMF-33 by depressing "OVERRIDE" on the "RAD MON OVERRIDE" pushbutton (1MC-4).**
- ___ 6. **Notify station management to determine maximum blowdown flowrate from ruptured S/G(s).**
- ___ 7. **Align blowdown from ruptured S/G(s) as follows:**
 - S/G 1A:
 - ___ a. Verify 1BB-81 (1A S/G Blowdown Penetration Valve Test Isol) (DH-583, EE-FF, 44, Rm 591) - OPEN.
 - ___ a. Open 1BB-81 (1A S/G Blowdown Penetration Valve Test Isol).
 - ___ b. Open 1BB-56A (S/G 1A Bldwn Cont Isol Insd).
 - ___ c. Open 1BB-148B (S/G 1A Bldwn Cont Isol Byp).
 - ___ d. Do not continue until 5 minutes has elapsed.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

7. (Continued)

- ___ e. Open 1BB-57B (S/G 1A Bldwn Cont Isol Otsd).
- ___ f. Close 1BB-148B (S/G 1A Bldwn Cont Isol Byp).
- ___ g. Slowly open "S/G A BLDWN FLOW CTRL" until flow is indicated.
- ___ h. Do not continue until 10 minutes has elapsed.
- ___ i. Verify blowdown system - PREVIOUSLY ALIGNED FOR COLD WATER INJECTION.
- ___ j. Throttle "S/G A BLDWN FLOW CTRL" to maintain flowrate as required from Step 6.
- ___ i. **WHEN** "S/G BLOWDOWN TANK LEVEL LO" alarm (OAC point D1880) (28% level on local gauge) clears, **THEN** restart the BB pump.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

7. (Continued)

• S/G 1B:

- | | |
|---|---|
| <p>___ a. Verify 1BB-83 (1B S/G Blowdown Penetration Valve Test Isol) (DH-580, FF-53, Rm 572) - OPEN.</p> <p>___ b. Open 1BB-19A (S/G 1B Bldwn Cont Isol Insd).</p> <p>___ c. Open 1BB-150B (S/G 1B Bldwn Cont Isol Byp).</p> <p>___ d. Do not continue until 5 minutes has elapsed.</p> <p>___ e. Open 1BB-21B (S/G 1B Bldwn Cont Isol Otsd).</p> <p>___ f. Close 1BB-150B (S/G 1B Bldwn Cont Isol Byp).</p> <p>___ g. Slowly open "S/G B BLDWN FLOW CTRL" until flow is indicated.</p> <p>___ h. Do not continue until 10 minutes has elapsed.</p> <p>___ i. Verify blowdown system - PREVIOUSLY ALIGNED FOR COLD WATER INJECTION.</p> <p>___ j. Throttle "S/G B BLDWN FLOW CTRL" to maintain flowrate as required from Step 6.</p> | <p>___ a. Open 1BB-83 (1B S/G Blowdown Penetration Valve Test Isol).</p> <p>___ i. WHEN "S/G BLOWDOWN TANK LEVEL LO" alarm (OAC point D1880) (28% level on local gauge) clears, THEN restart the BB pump.</p> |
|---|---|

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

7. (Continued)

• S/G 1C:

- ___ a. Verify 1BB-82 (1C S/G Blowdown Penetration Valve Test Isol) (DH-583, FF-53, Rm 572) - OPEN.
- ___ b. Open 1BB-60A (S/G 1C Bldwn Cont Isol Insd).
- ___ c. Open 1BB-149B (S/G 1C Bldwn Cont Isol Byp).
- ___ d. Do not continue until 5 minutes has elapsed.
- ___ e. Open 1BB-61B (S/G 1C Bldwn Cont Isol Otsd).
- ___ f. Close 1BB-149B (S/G 1C Bldwn Cont Isol Byp).
- ___ g. Slowly open "S/G C BLDWN FLOW CTRL" until flow is indicated.
- ___ h. Do not continue until 10 minutes has elapsed.
- ___ i. Verify blowdown system - PREVIOUSLY ALIGNED FOR COLD WATER INJECTION.
- ___ j. Throttle "S/G C BLDWN FLOW CTRL" to maintain flowrate as required from Step 6.

- ___ a. Open 1BB-82 (1C S/G Blowdown Penetration Valve Test Isol).

- ___ i. **WHEN** "S/G BLOWDOWN TANK LEVEL LO" alarm (OAC point D1880) (28% level on local gauge) clears, **THEN** restart the BB pump.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

7. (Continued)

• S/G 1D:

- ___ a. Verify 1BB-80 (1D S/G Blowdown Penetration Valve Test Isol) (DH-583,EE-FF, 44, Rm 591) - OPEN.
- ___ b. Open 1BB-8A (S/G 1D Bldwn Cont Isol Insd).
- ___ c. Open 1BB-147B (S/G 1D Bldwn Cont Isol Byp).
- ___ d. Do not continue until 5 minutes has elapsed.
- ___ e. Open 1BB-10B (S/G 1D Bldwn Cont Isol Otsd).
- ___ f. Close 1BB-147B (S/G 1D Bldwn Cont Isol Byp).
- ___ g. Slowly open "S/G D BLDWN FLOW CTRL" until flow is indicated.
- ___ h. Do not continue until 10 minutes has elapsed.
- ___ i. Verify blowdown system - PREVIOUSLY ALIGNED FOR COLD WATER INJECTION.
- ___ j. Throttle "S/G D BLDWN FLOW CTRL" to maintain flowrate as required from Step 6.

- ___ a. Open 1BB-80 (1D S/G Blowdown Penetration Valve Test Isol).

- ___ i. **WHEN** "S/G BLOWDOWN TANK LEVEL LO" alarm (OAC point D1880) (28% level on local gauge) clears, **THEN** restart the BB pump.

- ___ 8. **IF** required, **THEN** shift blowdown operating modes. **REFER TO** OP/1/A/6250/008 (Steam Generator Blowdown).

**Catawba 2007
Initial License Examination
Job Performance Measure**

JPM C

Simulator

CANDIDATE: _____

EXAMINER: _____

**Catawba 2007
Initial License Examination
Job Performance Measure**

Task: Restoration of Offsite power to the A Train Essential Bus.

Alternate Path: Yes

Facility JPM #: N/A

K/A Rating(s): 062 A4 Ability to manually operate and/or monitor in the control room A4.01 All breakers (including available switchyard) 3.3 3.1

SAFETY FUNCTION: 6

Task Standard: Offsite power restored to ETA and FTA.

Preferred Evaluation Location:

Control Room X In-Plant

Preferred Evaluation Method:

Perform Simulate X

Procedure References:

- AP/1/A/5500/007 (Loss of Normal Power)

Validation Time: 20 Minutes

Time Critical: No

Candidate: _____

NAME

Time Start: _____

Time Finish: _____

Performance Ratings:

SAT UNSAT Question Grade Performance Time:

Examiner: _____

NAME

SIGNATURE

DATE

COMMENTS

Simulator Set- Up Sheet

1. Select any 100% set.
2. Insert MAL-DG001A (D/G 1A Fails to Start)
3. Ensure B Equipment in service.
4. Open ETA NORM FDR FRM ATC
5. Open FTA B/O NORM FDR FRM ATC
6. Open 4 KV XFMR 1ATC FDR
7. Place 1NV-148 to ~ 45% to prevent a nuisance alarm
8. **REMOVE 1A D/G Load Sequencer Power.**
9. RUN – bat ops/lseta.txt
10. RUN – bat ops/reseteta.txt
11. Insert LOA-EP067 600V LC ELXA BKR ELXA-4B – CLOSED on Trigger 1
12. Insert LOA-EP069 600V LC ELXC BKR ELXC-4B – CLOSED on Trigger 1 with 30 second delay
13. Insert LOA-EP077 600V LC LXI BKR LXI-4B – CLOSED on Trigger 2
14. Complete AP/07 Case II up to step 24.
15. FREEZE and write to snap.

IC SELECTED: 153

Read Password: 7539

Write Password: 1307

Simulator Operator Instructions:

After the examinee has been read the initial conditions and is ready, then go to RUN.

When asked to open breakers, report the breaker is open.

When asked to close 1ELXA and B 4B, activate Trigger 1

When asked to close LXI-4B activate Trigger 2

Tools / Equipment / Procedures Needed:

AP/1/A/5500/007 (Loss of Normal Power)

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIATING CUE:

The Unit 1 Reactor is at 100%. A loss of all power to 1ETA has occurred. TCC has verified that switchyard voltage and grid reliability are adequate to allow 1ETA and related equipment to be reenergized. The CRS directs you to perform AP/1/A/5500/007 (Loss of Normal Power) beginning at step 24 to restore power to A Train essential and blackout loads from Unit 1 offsite power. An NLO is standing by at 5562 to perform local actions.

START TIME: _____

<p><u>STEP 24 NOTE:</u> NOTE: If loss of grid has occurred, then it may take 6-8 hours to restore power to the CNS switchyard.</p> <p><u>STANDARD:</u> Candidate acknowledges note.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 24:</u> Energize the affected bus as follows:</p> <p>a. Verify the following:</p> <ul style="list-style-type: none">• It is desired to restore power to the affected bus from offsite power. <p><u>STANDARD:</u> The candidate determines this is true from initiating cue.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 24 a:</u></p> <ul style="list-style-type: none">• The TCC verifies that adequate switchyard voltage and grid reliability available to re-energize affected 4160v busses. <p><u>STANDARD:</u> The candidate determines this is true from initiating cue.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 24:</u> b. Verify the following:</p> <ul style="list-style-type: none">▪ Offsite power - AVAILABLE <p><u>STANDARD:</u> The candidate determines this is true from initiating cue.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 24b:</u></p> <ul style="list-style-type: none"> At least one of the following PCBs - CLOSED: <ul style="list-style-type: none"> PCB 15 PCB 18. <p><u>STANDARD:</u> Candidate verifies red closed light on PCB 15 CLOSE switch LIT and green open light on PCB 15 TRIP switch DARK.</p> <p>Candidate verifies red closed light on PCB 18 CLOSE switch LIT and green open light on PCB 18 TRIP switch DARK</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 24b:</u> All 6.9KV busses - ENERGIZED.</p> <p><u>STANDARD:</u> Candidate should use available indications to determine 1TA, 1TB, 1TC and 1TD are energized.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 24:</u> c. Verify affected 4160V transformer - ENERGIZED:</p> <ul style="list-style-type: none"> 1ATC <p><u>STANDARD:</u> Candidate will determine from the FROM 7KV SWGR 1TA TRANSF 1ATC KV meter and 4 KV XFMR 1ATC FDR breaker open that 1ATC is DEENERGIZED.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 24 RNO:</u> c. Perform the following:</p> <p>1) IF Unit 1 power available, THEN close the appropriate breaker to energize the affected transformer:</p> <ul style="list-style-type: none"> o "4 KV XFMR 1ATC FDR" <p><u>STANDARD:</u> Candidate should depress the CLOSE P/B on 4 KV XFMR 1ATC FDR and ensure red closed light is LIT and green open light is DARK.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 24 RNOc:</u> IF the affected 4160V transformer is energized, THEN GO TO Step 24.d.</p> <p><u>STANDARD:</u> Candidate will determine from the FROM 7KV SWGR 1TA TRANSF 1ATC KV meter and 4 KV XFMR 1ATC FDR breaker closed that 1ATC is energized</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 24:</u> d. Close the feeder breaker for the affected bus:</p> <ul style="list-style-type: none"> • "ETA NORM FDR FRM ATC" <p><u>STANDARD:</u> Candidate should depress the CLOSE P/B on ETA NORM FDR FRM ATC and ensure red closed light is LIT and green open light is DARK.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 24:</u> e. WHEN the feeder breaker is closed, THEN dispatch operator to ensure the following essential load center breakers for the affected bus are closed:</p> <ul style="list-style-type: none"> • 1ETA: <ul style="list-style-type: none"> ○ 1ELXA-4B (Normal Incoming Breaker Fed From Xfmr 1ETXA)(AB-577, AA-47, Rm 496) ○ 1ELXC-4B (Normal Incoming Breaker Fed From Xfmr 1ETXC)(AB-577, AA-46, Rm 496). <p><u>STANDARD:</u> Candidate calls to have these breakers closed.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 25:</u> Verify B/O busses are energized as follows:</p> <p>a. 1AD-11, K/3 "4KV B/O BUS FTA VOLTAGE LO" - DARK.</p> <p><u>STANDARD:</u> Candidate should determine this alarm is LIT.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 25 RNO:</u> a. Perform the following:</p> <p>NOTE Both ND Hx Bypass valves fail closed on loss of 1LXI (1FTA).</p> <p>1) IF ND Pump 1A is operating in Residual Heat Removal Mode, THEN perform the following:</p> <p><u>STANDARD:</u> Candidate should determine this step is not applicable.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 25 RNO a:</u> 2) IF ND Pump 1B is operating in Residual Heat Removal Mode, THEN perform the following:</p> <p><u>STANDARD:</u> Candidate should determine this step is not applicable</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 25 RNO a 3:</u> Ensure breaker "FTA B/O NORM FDR FRM ATC" - OPEN.</p> <p><u>STANDARD:</u> Candidate should determine the red CLOSE light is DARK and the green OPEN light is LIT for FTA B/O NORM FDR FRM ATC.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 25 RNO a 4:</u> Dispatch operator to open 1LXI-4B (Incoming Breaker Fed From Xfmr 1TXI) (SB-594, U-V, 29-30).</p> <p><u>STANDARD:</u> The Candidate should dispatch an NLO to open 1LXI-4B.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 25 RNO a 5:</u> IF S/I has actuated, THEN ensure "ECCS TRN A" reset.</p> <p><u>STANDARD:</u> Candidate should determine this step is not applicable.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 25 RNO a 6:</u> IF sequencer control power is available, THEN reset "D/G 1A LOAD SEQ RESET".</p> <p><u>STANDARD:</u> Candidate determines sequencer control power has been removed.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p>STEP 25 RNO 7: WHEN notified by dispatched operator that 1LXI-4B is open, THEN perform the following: a) Close breaker "FTA B/O ALT FDR FRM ETA".</p> <p>STANDARD: Candidate should depress the CLOSE P/B on FTA B/O ALT FDR FRM ETA and ensure red closed light is LIT and green open light is DARK</p> <p>EXAMINER CUE: NLO reports 1LXI-4B is open. (Not required if performed on simulator).</p> <p>COMMENTS:</p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 25 RNO 7: b) Close breaker "ETA ALT FDR TO FTA".</p> <p>STANDARD: Candidate should depress the CLOSE P/B on ETA ALT FDR TO FTA and ensure red closed light is LIT and green open light is DARK.</p> <p>COMMENTS:</p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 25 RNO 7: c) Notify dispatched operator to close 1LXI-4B (Incoming Breaker Fed From Xfmr 1TXI) (SB-594, U-V, 29-30).</p> <p>STANDARD: The Candidate should dispatch an NLO to close 1LXI-4B.</p> <p>COMMENTS:</p> <p>EXAMINER CUE: Another operator will complete the procedure.</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>This JPM is complete.</p>	

STOP TIME: _____

CANDIDATE CUE SHEET

(To Be Returned To Examiner Upon Completion of Task)

INITIATING CUE:

The Unit 1 Reactor is at 100%. A loss of all power to 1ETA has occurred. TCC has verified that switchyard voltage and grid reliability are adequate to allow ETA and related equipment to be reenergized. The CRS directs you to perform AP/1/A/5500/007 (Loss of Normal Power) beginning at step 24 to restore power to A Train essential and blackout loads from Unit 1 offsite power. An NLO is standing by at 5562 to perform local actions

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE If loss of grid has occurred, then it may take 6-8 hours to restore power to the CNS switchyard.

24. Energize the affected bus as follows:

a. Verify the following:

- ___ • It is desired to restore power to the affected bus from offsite power.
- ___ • The TCC verifies that adequate switchyard voltage and grid reliability available to re-energize affected 4160v busses.

a. Perform the following:

- 1) **IF** D/G(s) available, **THEN** perform the following:

- a) Dispatch operator to energize affected bus from D/G as follows:

- ___ • **REFER TO** Enclosure 10 (Energizing 1ETA From D/G)

OR

- ___ • **REFER TO** Enclosure 11 (Energizing 1ETB From D/G).

- ___ b) Do not continue in this procedure until affected bus is energized from D/G.

- ___ c) **GO TO** Step 25.

- 2) **IF** offsite power and D/Gs not available, **THEN** perform the following:

- ___ a) **WHEN** offsite power or D/G(s) available, **THEN RETURN TO** Step 24.

- ___ b) Do not continue.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

24. (Continued)

b. Verify the following:

- ☐ • Offsite power - AVAILABLE
- ☐ • At least one of the following PCBs - CLOSED:
 - ☐ • PCB 15
 - ☐ • PCB 18.
- ☐ • All 6.9KV busses - ENERGIZED.

b. Perform one of the following:

- ☐ • **IF** power capable of being restored from Unit 1 offsite power **AND** it is desired to energize the affected bus from offsite power, **THEN GO TO** Enclosure 4 (Restoration Of Offsite Power).

OR

- ☐ • **IF** Unit 2 power is available **AND** it is desired to energize the affected bus from Unit 2, **THEN:**
 - ☐ 1) To energize 1ETA **GO TO** Enclosure 5 (Aligning Alternate Power To 1ETA).
 - ☐ 2) To energize 1ETB **GO TO** Enclosure 6 (Aligning Alternate Power To 1ETB).
 - ☐ 3) **WHEN** Unit 1 offsite power is available, **THEN** perform Step 24.b.
 - ☐ 4) **GO TO** Step 25.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

24. (Continued)

c. Verify affected 4160V
transformer - ENERGIZED:

___ • 1ATC

OR

___ • 1ATD.

c. Perform the following:

1) **IF** Unit 1 power available, **THEN**
close the appropriate breaker to
energize the affected transformer:

___ • "4 KV XFMR 1ATC FDR"

OR

___ • "4 KV XFMR 1ATD FDR".

___ 2) **IF** the affected 4160V transformer is
energized, **THEN GO TO** Step 24.d.

3) **IF** the affected feeder breaker is
open due to a loss of control power,
THEN:

___ a) Close the affected feeder
breaker. **REFER TO** Enclosure
12 (Manual Operation Of
6900V Bus Breakers).

b) Do not continue in this
procedure until one of the
following is satisfied:

___ • The affected feeder breaker is
closed

OR

___ • Dispatched operator reports
that the breaker cannot be
closed.

___ c) **IF** the affected 4160V
transformer is energized, **THEN**
GO TO Step 24.d.

(RNO continued on next page)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

24. (Continued)

d. Close the feeder breaker for the affected bus:

___ • "ETA NORM FDR FRM ATC"

OR

___ • "ETB NORM FDR FRM ATD".

4) **IF** the affected 4160V transformer is still de-energized, **THEN** align alternate power as follows:

___ • **GO TO** Enclosure 5 (Aligning Alternate Power To 1ETA)

OR

___ • **GO TO** Enclosure 6 (Aligning Alternate Power To 1ETB).

___ 5) **GO TO** Step 25.

d. Perform the following:

1) **IF** the affected feeder breaker is open due to a loss of control power, **THEN**:

___ a) Close the affected feeder breaker. **REFER TO** Enclosure 7 (Manual Operation Of 4160V Bus Breakers).

b) Do not continue in this procedure until one of the following is satisfied:

___ • The affected feeder breaker is closed

OR

___ • Dispatched operator reports that the breaker cannot be closed.

___ c) **IF** the affected feeder breaker is closed, **THEN GO TO** Step 24.e.

(RNO continued on next page)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

24. (Continued)

2) Align alternate power to the affected bus as follows:

- • **GO TO** Enclosure 5 (Aligning Alternate Power To 1ETA)

OR

- • **GO TO** Enclosure 6 (Aligning Alternate Power To 1ETB).

— 3) **GO TO** Step 25.

e. **WHEN** the feeder breaker is closed,
THEN dispatch operator to ensure the following essential load center breakers for the affected bus are closed:

- 1ETA:

- • 1ELXA-4B (Normal Incoming Breaker Fed From Xfmr 1ETXA) (AB-577, AA-47, Rm 496)

- • 1ELXC-4B (Normal Incoming Breaker Fed From Xfmr 1ETXC) (AB-577, AA-46, Rm 496).

OR

- 1ETB:

- • 1ELXB-4B (Normal Incoming Breaker Fed From Xfmr 1ETXB) (AB-560, AA-47, Rm 372)

- • 1ELXD-4B (Normal Incoming Breaker Fed From Xfmr 1ETXD) (AB-560, AA-46, Rm 372).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

25. **Verify B/O busses are energized as follows:**

- ___ a. 1AD-11, K/3 "4KV B/O BUS FTA VOLTAGE LO" - DARK.

- a. Perform the following:

NOTE Both ND Hx Bypass valves fail closed on loss of 1LXI (1FTA).

- 1) **IF** ND Pump 1A is operating in Residual Heat Removal Mode, **THEN** perform the following:

- ___ a) Place the "PWR DISCON FOR 1NI173A" in "THROT".
___ b) Throttle 1NI-173A (ND Hdr 1A To Cold Legs C&D) to stabilize NC temperature.

- 2) **IF** ND Pump 1B is operating in Residual Heat Removal Mode, **THEN** perform the following:

- ___ a) Place the "PWR DISCON FOR 1NI178B" in "THROT".
___ b) Throttle 1NI-178B (ND Hdr 1B To Cold Legs A&B) to stabilize NC temperature.

- ___ 3) Ensure breaker "FTA B/O NORM FDR FRM ATC" - OPEN.

- ___ 4) Dispatch operator to open 1LXI-4B (Incoming Breaker Fed From Xfmr 1TXI) (SB-594, U-V, 29-30).

- ___ 5) **IF** S/I has actuated, **THEN** ensure "ECCS TRN A" reset.

- ___ 6) **IF** sequencer control power is available, **THEN** reset "D/G 1A LOAD SEQ RESET".

(RNO continued on next page)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

25. (Continued)

- ___ b. 1AD-11, K/4 "4KV B/O BUS FTB
VOLTAGE LO" - DARK.

- 7) **WHEN** notified by dispatched operator that 1LXI-4B is open, **THEN** perform the following:

- ___ a) Close breaker "FTA B/O ALT FDR FRM ETA".
- ___ b) Close breaker "ETA ALT FDR TO FTA".
- ___ c) Notify dispatched operator to close 1LXI-4B (Incoming Breaker Fed From Xfmr 1TXI) (SB-594, U-V, 29-30).

- b. Perform the following:

- ___ 1) Ensure breaker "FTB B/O NORM FDR FRM ATD" - OPEN.
- ___ 2) Dispatch operator to open 1LXH-4B (Incoming Breaker Fed From Xfmr 1TXH) (SB-594, U-30).
- ___ 3) **IF** S/I has actuated, **THEN** ensure "ECCS TRN B" reset.
- ___ 4) **IF** sequencer control power is available, **THEN** reset "D/G 1B LOAD SEQ RESET".
- 5) **WHEN** notified by dispatched operator that 1LXH-4B is open, **THEN** perform the following:
 - ___ a) Close breaker "FTB B/O ALT FDR FRM ETB".
 - ___ b) Close breaker "ETB ALT FDR TO FTB".
 - ___ c) Notify dispatched operator to close 1LXH-4B (Incoming Breaker Fed From Xfmr 1TXH) (SB-594, U-30).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

26. **Start required loads as follows:**

- a. Ensure the load on the essential bus does not exceed the capacity of the power source as follows:

___ 1) Verify D/G - SUPPLYING POWER TO ESSENTIAL BUSSES.

1) Perform the following:

___ a) While performing the following steps, do not exceed the KW load limit determined by the Transmission Control Center (TCC).

___ b) **GO TO** Step 26.b.

___ 2) While performing the following steps, do not exceed 5750 KW on the operating D/G.

- b. Manually start required loads as follows:

___ • **REFER TO** Enclosure 2 (Blackout Loads).

___ • Dispatch operator to ensure all required in plant loads are energized or on. **REFER TO** Enclosure 3 (Local Blackout Loads).

___ c. Restore spent fuel pool cooling.
REFER TO OP/1/A/6200/005 (Spent Fuel Cooling System).

___ 27. **Realign VC/YC to normal operation.**
REFER TO OP/0/A/6450/011 (Control Room Area Ventilation/Chilled Water System).

CNS
AP/1/A/5500/007

LOSS OF NORMAL POWER
Case II
Loss of All Power to an Essential Train

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ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE There is a five minute time delay for the automatic swapper from YV to RN.

___ 28. **Verify "YV OPERABLE" light - LIT.**

Perform the following:

a. Ensure YV swap to RN as follows:

- ___ • "YV/RN AUTO SWAP RESET" light - DARK
- ___ • "YV ISOLATED" light - LIT
- ___ • "RN OPERABLE" light - LIT
- ___ • "RN ISOLATED" light - DARK.

___ b. **WHEN** YV swap to RN is complete, **THEN** ensure at least two RN pumps in service. **REFER TO** OP/0/A/6400/006C (Nuclear Service Water System).

___ c. **WHEN** offsite power is restored, **THEN** realign YV to normal operation. **REFER TO** OP/1/A/6450/020 (Containment Chilled Water System).

___ 29. **Verify D/G output breaker for the affected bus - CLOSED.**

___ **GO TO** Step 31.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE If loss of grid has occurred, then it may take 6-8 hours to restore power to the CNS switchyard.

30. **Align offsite power to the affected bus as follows:**

a. Verify the following:

- ___ • Offsite power - AVAILABLE
- ___ • At least one of the following PCBs - CLOSED:
 - ___ • PCB 15
 - ___ • PCB 18.
- ___ • All 6.9KV busses - ENERGIZED.

a. Perform one of the following:

- ___ • **IF** power capable of being restored from Unit 1 offsite power **AND** it is desired to energize the affected bus from offsite power, **THEN GO TO** Enclosure 4 (Restoration Of Offsite Power).

OR

- ___ • **IF** Unit 2 power is available **AND** it is desired to energize the affected bus from Unit 2, **THEN:**

- ___ 1) To energize 1ETA **GO TO** Enclosure 5 (Aligning Alternate Power To 1ETA).
- ___ 2) To energize 1ETB **GO TO** Enclosure 6 (Aligning Alternate Power To 1ETB).
- ___ 3) **WHEN** Unit 1 offsite power is available, **THEN** perform Step 30.a.
- ___ 4) **GO TO** Step 31.

OR

- ___ • **IF** normal or alternate power not available to the affected bus, **THEN** perform the following:
 - ___ • **WHEN** normal or alternate power available, **THEN RETURN TO** Step 30.
 - ___ • Do not continue.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

30. (Continued)

b. Verify affected 4160V transformer -
ENERGIZED:

___ • 1ATC

OR

___ • 1ATD.

b. Perform the following:

1) **IF** Unit 1 power available, **THEN**
close the appropriate breaker to
energize the affected transformer:

___ • "4 KV XFMR 1ATC FDR"

OR

___ • "4 KV XFMR 1ATD FDR".

___ 2) **IF** the affected 4160V transformer is
energized, **THEN GO TO** Step 30.c.

3) **IF** the affected feeder breaker is
open due to a loss of control power,
THEN:

___ a) Close the affected feeder
breaker. **REFER TO** Enclosure
12 (Manual Operation Of
6900V Bus Breakers).

b) Do not continue in this
procedure until one of the
following is satisfied:

___ • The affected feeder breaker is
closed

OR

___ • Dispatched operator reports
that the breaker cannot be
closed.

___ c) **IF** the affected 4160V
transformer is energized, **THEN**
GO TO Step 30.c.

(RNO continued on next page)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

30. (Continued)

4) **IF** the affected 4160V transformer is still de-energized, **THEN** align alternate power as follows:

- ___ • **GO TO** Enclosure 5 (Aligning Alternate Power To 1ETA)

OR

- ___ • **GO TO** Enclosure 6 (Aligning Alternate Power To 1ETB).

___ 5) **GO TO** Step 31.

- ___ c. Verify with TCC that adequate switchyard voltage and grid reliability available to place affected 4160v bus on offsite power.

- ___ d. Shutdown affected D/G. **REFER TO** OP/1/A/6350/002 (Diesel Generator Operation).

- e. **IF** the normal incoming breaker for the affected bus cannot be closed, **THEN** align alternate power as follows:

- ___ • **GO TO** Enclosure 5 (Aligning Alternate Power To 1ETA)

OR

- ___ • **GO TO** Enclosure 6 (Aligning Alternate Power To 1ETB).

- ___ c. Do not continue until TCC verifies switchyard voltage and grid reliability stable enough to place affected 4160v bus on offsite power.

31. **Ensure plant systems returned to normal as follows:**

- a. **WHEN** normal power is available, **THEN** return plant electrical systems to normal. **REFER TO:**

- ___ • OP/0/B/6350/007 (250 VDC Auxiliary Power System)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

31. (Continued)

- • OP/0/A/6350/010 (Operation of Station Breakers and Disconnects)
- • OP/0/B/6350/015 (230 KV Switchyard 125 VDC Power System)
- • OP/1/B/6350/009 (125 VDC 240/120 VAC Auxiliary Control Power System)
- • OP/1/A/6350/001 (Normal Power Checklist)
- • OP/1/A/6350/005 (Alternate AC Power Sources)
- • OP/1/A/6350/008 (125 VDC/120 VAC Vital Instrument and Control Power System).

- b. **WHEN** CA is no longer needed to feed S/Gs, **THEN** shutdown the CA System following the automatic start and return CA System to standby readiness. **REFER TO** OP/1/A/6250/002 (Auxiliary Feedwater System).

- c. Restore control power to the affected CA pump breaker as follows:

- 1) Depress and hold the "CA SYS VLV CTRL RESET" pushbutton for the affected CA pump.
- 2) Dispatch operator with a screwdriver to re-install the following control power fuses for the affected CA pump:
 - • AU
 - • AX
 - • AZ.
- 3) **WHEN** control power fuses have been re-installed, **THEN** release the "CA SYS VLV CTRL RESET" pushbutton.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

31. (Continued)

- d. Notify dispatched operator to re-install the following control power fuses for the affected NS pump:

- ___ • AY
- ___ • AX.

- e. Restore power to the affected D/G load sequencer as follows:

- ___ 1) Verify affected essential bus - ENERGIZED.

- 1) Perform the following:

- a) **WHEN** affected essential bus is energized, **THEN** notify dispatched operator to close the affected breaker:

- ___ • 1EDE-F01F (Diesel Generator Load Sequencer Panel 1DGLSA)

OR

- ___ • 1EDF-F01F (Diesel Generator Load Sequencer Panel 1DGLSB).

- ___ b) **GO TO** Step 31.f.

- 2) Notify dispatched operator to close the affected breaker:

- ___ • 1EDE-F01F (Diesel Generator Load Sequencer Panel 1DGLSA)

OR

- ___ • 1EDF-F01F (Diesel Generator Load Sequencer Panel 1DGLSB).

- ___ f. Verify "DRPI B ON EMERG POWER" (1SI-3) - DARK.

- ___ f. **WHEN** power is restored to 1RPB, **THEN** realign DRPI power to normal. **REFER TO** OP/1/B/6350/009 (125 VDC 240/120 VAC Auxiliary Control Power System).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

31. (Continued)

___ g. Verify NF System - IN OPERATION.

h. Verify the following switches in "DISCON":

- ___ • "PWR DISCON FOR 1NI-173A"
- ___ • "PWR DISCON FOR 1NI-178B".

___ i. Ensure Boric Acid Transfer pumps 1A and 1B - RESET.

___ g. Restore proper NF System operation.
REFER TO OP/0/A/6200/008 (Ice Condenser Refrigeration System).

h. **IF** 1NI-173A (ND Hdr 1A To Cold Legs C&D) **OR** 1NI-178B (ND Hdr 1B To Cold Legs A&B) have been throttled, **THEN**:

- **WHEN** the condition requiring the affected valve(s) to be throttled is corrected **AND** the opposite ND train is available for decay heat removal, **THEN** perform the following:

___ 1) Place the opposite ND train in RHR mode. **REFER TO** OP/1/A/6200/004 (Residual Heat Removal System).

___ 2) Do not continue in this procedure until the opposite ND train is operating in RHR mode.

___ 3) Place the affected power disconnect switch in "ENABL".

4) Cycle the affected valve(s) and leave open:

___ • 1NI-173A (ND Hdr 1A To Cold Legs C&D)

___ • 1NI-178B (ND Hdr 1B To Cold Legs A&B).

___ 5) **IF** the unit is in Mode 4, **THEN** return the affected power disconnect switch(es) to "DISCON".

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

31. (Continued)

j. Ensure the following valves - OPEN:

___ • 1IASV5080 (Upper PAL Air Sup C/I)

___ • 1IASV5160 (Lower PAL Air Sup C/I).

___ k. Restart an FW Recirc Pump as needed.
REFER TO OP/1/A/6200/014
(Refueling Water System).

___ l. Return Auxiliary Building Ventilation to
normal. **REFER TO** OP/0/A/6450/003
(Auxiliary Building Ventilation System).

___ m. **IF** the Emergency Seal Oil Pump is
running, **THEN** return the Main Seal Oil
Pump to service. **REFER TO**
OP/1/B/6300/004 (Generator Seal Oil
System).

___ 32. **Determine long term plant status.**
RETURN TO procedure in effect.

END

**Catawba 2007
Initial License Examination
Job Performance Measure**

JPM D

Simulator

CANDIDATE: _____

EXAMINER: _____

**Catawba 2007
Initial License Examination
Job Performance Measure**

Task: Respond to Inadvertent Dilution While Shutdown

Alternate Path: Yes

Facility JPM #: OP-CN-PS-NV-117 (Modified)

K/A Rating(s): 004 A2.10 (3.9 4.2)

SAFETY FUNCTION: 1

Task Standard: Dilution stopped by tripping the reactor, terminating makeup, isolating the inservice demineralizers and aligning NV Pump suction to the FWST.

Preferred Evaluation Location:

Preferred Evaluation Method:

Control Room X In-Plant

Perform Simulate X

Procedure References:

- AP/1/A/5500/013 Case II (Boron Dilution While Shutdown)

Validation Time: 8 Minutes

Time Critical: No

Candidate: _____
NAME

Time Start: _____

Time Finish: _____

Performance Ratings:

SAT _____ UNSAT _____ Question Grade _____ Performance Time: _____

Examiner: _____ / _____
NAME SIGNATURE DATE

=====

COMMENTS

Simulator Set- Up Sheet

Reset to any shutdown IC Set with shutdown banks withdrawn.

Run simulator and acknowledge annunciators.

Place both SDM to "Test" to ensure alarms 1AD-3 E-2 and F-2 are lit.

Ensure both S/R are selected on NR-45.

Place 1NV-238 potentiometer to 0.1, lower VCT level diverting 1NV-172 to the RHT as needed. This will ensure a makeup is in progress with no boron being added.

Ensure that 1NV-172 is returned to the "VCT" position.

Ensure 1NV153A is selected to the "Demin" position.

Ensure that SR audible count rate is on.

Insert Mal-NC001 (Variable RCS Boron Concentration) Value = 600 with a 10 minute ramp.

Ensure that SR audible count rate is on.

FREEZE and save to a snap.

IC selected: 154

Read: 7539

Write: 1307

Simulator Operator Instructions:

Instructor Note: Boron concentration will be decreasing immediately upon going to "RUN".

Ensure that SR audible count rate is on.

Place Simulator in "RUN" when directed by the Examiner.

Tools / Equipment / Procedures Needed:

AP/1/A/5500/013 Case II (Boron Dilution While Shutdown)

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIATING CUE:

The unit is in Mode 3, with the shutdown banks withdrawn. Preparations are being made for turbine warming. You are the Operator at the Controls monitoring plant shutdown. Auto Makeup has been occurring as needed when you notice source range and BDMS counts increasing unexpectedly. The Control Room Supervisor instructs you to take actions to stop the dilution event and begin boration by completing AP/1/A/5500/013 Case II (Boron Dilution while Shutdown).

START TIME: _____

<p><u>STEP 1:</u> Verify boron dilution event – IN PROGRESS.</p> <p><u>STANDARD:</u> Per the initiating cue and plant parameters, the candidate determines boron dilution event is in progress.</p> <p><u>COMMENT:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 2: Verify Reactor Trip:</p> <ul style="list-style-type: none">• All rod bottom lights - LIT• All reactor trip and bypass breakers - OPEN• S/R counts - STABLE OR DECREASING. <p><u>STANDARD:</u> Candidate should determine the reactor is not tripped and continue to the RNO to take actions.</p> <p><u>COMMENT:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2 RNO:</u> Perform the following:</p> <p>a. Manually trip reactor.</p> <p><u>STANDARD:</u> Candidate should OPEN Reactor Trip Breakers to trip the reactor.</p> <p><u>COMMENT:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2 RNO:</u> Perform the following:</p> <p>b. Perform Steps 5 through 8 to stop dilution and initiate boration.</p> <p><u>STANDARD:</u> See note below.</p> <p>EXAMINER NOTE: Candidate may proceed to Step 5 or may first perform the Immediate Actions of E-0 and then proceed to Step 5. Either action is acceptable.</p> <p><u>COMMENT:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 5:</u> Evacuate personnel from reactor building using the following:</p> <ul style="list-style-type: none"> • Containment evacuation alarm • Plant page. <p><u>STANDARD:</u> Initiates a Containment Evacuation Alarm on 1MC-01 and makes a plant page to evacuate all personnel from the Reactor Building.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 6:</u> Stop any dilutions in progress as follows:</p> <p>a. Place "NC MAKEUP CONTROL" switch to "STOP".</p> <p><u>STANDARD:</u> Positions "NC MAKEUP CONTROL" switch on MC-10 to STOP.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 6:</u> Stop any dilutions in progress as follows:</p> <p>b. Place both reactor makeup pumps to "OFF"</p> <p><u>STANDARD:</u> Positions "RX M/U WATER PUMP 1A and 1B" switches on MC-10 to OFF.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 6:</u> Stop any dilutions in progress as follows:</p> <p>c. Isolate the NV demineralizers as follows:</p> <p>1) Place 1NV-153A in the VCT position</p> <p><u>STANDARD:</u> Selects 1NV-153A switch on MC-10 to "VCT"</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 6:</u> Stop any dilutions in progress as follows:</p> <p>c. Isolate the NV demineralizers as follows:</p> <p>2 Ensure the following valves - CLOSED:</p> <ul style="list-style-type: none"> NV-353 & 364 (Mixed Bed 1A) (Critical) NV-368 & 379 (Mixed Bed 1B) <p><u>STANDARD:</u> For the demineralizer in service, depresses the green "CLOSED" pushbutton and verifies the red "OPEN" light is dark and green "CLSD" light is lit.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 7:</u> Ensure proper BDMS operation as follows:</p> <p>a) Verify at least one of the following alarms LIT:</p> <ul style="list-style-type: none"> 1AD-2, E/2 "TRAIN A SHUTDOWN MARGIN ALARM" 1AD-2, F/2 "TRAIN B SHUTDOWN MARGIN ALARM" <p><u>STANDARD:</u> Candidate verifies both alarms lit.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 7:</u> b. Ensure the following valves - OPEN:</p> <ul style="list-style-type: none"> 1NV-252A (NV Pumps Suct From FWST) 1NV-253B (NV Pumps Suct From FWST). <p><u>STANDARD:</u> The Candidate should open both valves given above.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 8:</u> c. Ensure the following valves - CLOSED:</p> <ul style="list-style-type: none"> • 1NV-188A (VCT Otlt Isol) • 1NV-189B (VCT Otlt Isol). <p><u>STANDARD:</u> Candidate should close both valves given above.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 8:</u> d. Ensure one NV pump - ON.</p> <p><u>STANDARD:</u> Verifies one NV pump is already running.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 8:</u> e. Maintain charging flow less than 180 GPM.</p> <p><u>STANDARD:</u> Acknowledges requirement.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 8:</u> f. Adjust charging flow to maximize boration.</p> <p><u>STANDARD:</u> Candidate should fully open 1NV-294.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 8:</u> g. GO TO Step 9.</p> <p><u>STANDARD:</u></p> <p>EXAMINER CUE: Another operator will complete the procedure.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>This JPM is complete.</p>	

STOP TIME: _____

CANDIDATE CUE SHEET

(To Be Returned To Examiner Upon Completion of Task)

INITIATING CUE:

The unit is in Mode 3, with the shutdown banks withdrawn. Preparations are being made for turbine warming. You are the Operator at the Controls monitoring plant shutdown. Auto Makeup has been occurring as needed when you notice source range and BDMS counts increasing unexpectedly. The Control Room Supervisor instructs you to take actions to stop the dilution event and begin boration by completing AP/1/A/5500/013, Case II (Boron Dilution while Shutdown).

Duke Power Company
Catawba Nuclear Station
Boron Dilution

Procedure No.

AP/**1**/A/5500/013

Revision No.

018

Electronic Reference No.

CN005CEH

Continuous Use

PERFORMANCE

***** UNCONTROLLED FOR PRINT *****

(ISSUED) - PDF Format

A. Purpose

- To provide guidance to ensure the proper response in the event of an accidental boron dilution of the NC System while at power or shutdown.

B. Symptoms

Case I. Boron Dilution At Power:

- 1AD-2, A/9 "CONTROL ROD BANK LO LIMIT" - LIT
- 1AD-2, B/9 "CONTROL ROD BANK LO-LO LIMIT" - LIT
- Unanticipated control rod insertion
- Unexplained increase in T-Avg.

Case II. Boron Dilution While Shutdown:

- Unanticipated neutron flux level increase
- 1AD-2, E/2 "TRAIN A SHUTDOWN MARGIN ALARM" - LIT
- 1AD-2, F/2 "TRAIN B SHUTDOWN MARGIN ALARM" - LIT
- 1AD-2, D/3 "S/R HI FLUX LEVEL AT SHUTDOWN" - LIT
- 1AD-2, D/4 "S/R HI FLUX LEVEL AT SHUTDOWN" - LIT.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

C. Operator Actions

___ 1. **Ensure reactor power - MAINTAINED
LESS THAN 100%.**

___ 2. **Verify reactor power - STABLE.**

Perform the following:

- ___ a. Stabilize unit at current power level.
- ___ b. Maintain control rods above insertion limits.
- ___ c. Adjust the following as required to maintain T-Avg within 1°F of T-Ref:
 - ___ • Turbine load
 - ___ • Control rods
 - ___ • Boron concentration.

3. **Stop any dilutions in progress as follows:**

- ___ a. Place "NC MAKEUP CONTROL" switch to "STOP".
- ___ b. Place both reactor makeup water pumps to "OFF".
- ___ c. Isolate the NV demineralizers as follows:
 - ___ 1) Place 1NV-153A (Letdn Hx Otlt 3-Way Vlv) in the "VCT" position.
 - ___ 2) Ensure the following valves - CLOSED:
 - ___ • 1NV-353 & 364 (Mixed Bed Demin 1A Isol)
 - ___ • 1NV-368 & 379 (Mixed Bed Demin 1B Isol).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

4. **Verify boration of NC System required as follows:**

a. Verify one of the following:

- ___ • OAC point C1L4409 (Ctrl Bank Tech Spec Insertion Lmt Reached) - IN ALARM.

OR

- ___ • Control rods below insertion limits. **REFER TO** R.O.D. Book (Section 2.2).

a. Perform the following:

- 1) **IF AT ANY TIME** either of the following occurs, **THEN RETURN TO** Step 4.

- ___ • OAC point C1L4409 (Ctrl Bank Tech Spec Insertion Lmt Reached) alarms.

OR

- ___ • Control rods are below the insertion limits of the R.O.D. Book.

- ___ 2) **GO TO** Step 6.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION Failure to initiate boration within one hour of exceeding rod insertion limits may violate Tech Spec 3.1.6.

- ___ 5. Borate NC system as required, to restore rods above insertion limits. REFER TO OP/1/A/6150/009 (Boron Concentration Control).

Borate NC system from the FWST as required, to restore rods above insertion limits:

- a. Open the following valves:

- ___ • 1NV-252A (NV Pumps Suct From FWST)
- ___ • 1NV-253B (NV Pumps Suct From FWST).

- b. Close the following valves:

- ___ • 1NV-188A (VCT Otlt Isol)
- ___ • 1NV-189B (VCT Otlt Isol).

- c. WHEN desired to stop borated water flow from the FWST, THEN:

- 1) Open the following valves:

- ___ • 1NV-188A (VCT Otlt Isol)
- ___ • 1NV-189B (VCT Otlt Isol).

- 2) Close the following valves:

- ___ • 1NV-252A (NV Pumps Suct From FWST)
- ___ • 1NV-253B (NV Pumps Suct From FWST).

- ___ d. Repeat Step 5 RNO as required, to restore rods above insertion limits.

- ___ 6. Ensure compliance with Tech Spec 3.1.6 (Control Bank Insertion Limits).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

7. **Determine and correct cause of dilution to include the following:**

a. Notify Primary Chemistry to perform the following:

- ___ • Sample the mixed bed demineralizers.
- ___ • Investigate any possible BAT changes as follows:
 - ___ • Level changes
 - ___ • Batching evolutions
 - ___ • Concentration changes.

___ b. Evaluate recent trends in VCT level and boron concentration.

___ 8. **Borate control rods to desired height. REFER TO OP/1/A/6150/009 (Boron Concentration Control).**

9. **Request Chemistry sample the following for boron concentration:**

- ___ • NC H-Legs
- ___ • Pzr.

10. **Determine required notifications:**

- ___ • **REFER TO** RP/0/A/5000/001 (Classification Of Emergency)
- ___ • **REFER TO** RP/0/B/5000/013 (NRC Notification Requirements).

___ 11. **Notify Reactor Group Engineer of occurrence.**

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION To prevent an inadvertent dilution of the NC system, Boron Saturation of the Mixed Bed Demineralizer may be required prior to returning it to service.

- ___ 12. **WHEN** the cause of the dilution has been corrected, **THEN** realign NV System to normal operation. **REFER TO** OP/1/A/6200/001 (Chemical and Volume Control System).
- ___ 13. Determine long term plant status. **RETURN TO** procedure in effect.

END

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

C. Operator Actions

___ 1. **Verify boron dilution event - IN PROGRESS.**

IF entry symptoms were due to any of the following:

- ___ • Failure to reset Source Range High Flux at Shutdown alarm setpoints when required

OR

- ___ • Failure to block Source Range High Flux at Shutdown alarm when required

OR

- ___ • Failure to reset Shutdown Margin Alarm setpoints during heatup

OR

- ___ • Instrument failure

OR

- ___ • Instrument spike.

___ **THEN GO TO Step 13.**

2. **Verify Reactor Trip:**

Perform the following:

- ___ • All rod bottom lights - LIT
- ___ • All reactor trip and bypass breakers - OPEN
- ___ • S/R counts - STABLE OR DECREASING.

- ___ a. Manually trip reactor.
- ___ b. Perform Steps 5 through 8 to stop dilution and initiate boration.
- ___ c. **IF above P-11, THEN GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection).**
- ___ d. **IF below P-11, THEN GO TO AP/1/A/5500/005 (Reactor Trip Or Inadvertent S/I Below P-11).**

___ 3. **Verify core alterations - IN PROGRESS.**

___ **GO TO Step 5.**

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

4. **Notify fuel handling operators to perform the following:**

- ☐ • Place components being handled in a safe position
- ☐ • Suspend core alterations.

5. **Evacuate personnel from reactor building using the following:**

- ☐ • Containment evacuation alarm
- ☐ • Plant page.

6. **Stop any dilutions in progress as follows:**

- ☐ a. Place "NC MAKEUP CONTROL" switch to "STOP".
- ☐ b. Place both reactor makeup water pumps to "OFF".
- ☐ c. Isolate the NV demineralizers as follows:
 - ☐ 1) Place 1NV-153A (Letdn Hx Otlt 3-Way Vlv) in the "VCT" position.
 - ☐ 2) Ensure the following valves - CLOSED:
 - ☐ • 1NV-353 & 364 (Mixed Bed Demin 1A Isol)
 - ☐ • 1NV-368 & 379 (Mixed Bed Demin 1B Isol).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

7. Ensure proper BDMS operation as follows:

- a. Verify at least one of the following alarm(s) - LIT:

___ • 1AD-2, E/2 "TRAIN A SHUTDOWN MARGIN ALARM"

OR

___ • 1AD-2, F/2 "TRAIN B SHUTDOWN MARGIN ALARM".

- b. Ensure the following valves - OPEN:

___ • 1NV-252A (NV Pumps Suct From FWST)

___ • 1NV-253B (NV Pumps Suct From FWST).

- c. Ensure the following valves - CLOSED:

___ • 1NV-188A (VCT Otlt Isol)

___ • 1NV-189B (VCT Otlt Isol).

___ d. Ensure one NV pump - ON.

___ e. Maintain charging flow less than 180 GPM.

___ f. Adjust charging flow to maximize boration.

___ g. **GO TO** Step 9.

8. Initiate boration of the NC System as follows:

___ a. Ensure one NV pump - ON.

- a. Perform the following:

1) **IF AT ANY TIME** any of the following alarms are lit, **THEN** perform Step 7.

___ • 1AD-2, E/2 "TRAIN A SHUTDOWN MARGIN ALARM"

OR

___ • 1AD-2, F/2 "TRAIN B SHUTDOWN MARGIN ALARM".

___ 2) **GO TO** Step 8.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

8. (Continued)

___ b. Ensure at least one boric acid transfer pump - ON.

b. Establish boric acid flow from the FWST as follows:

1) Open the following valves:

___ • 1NV-252A (NV Pumps Suct From FWST)

___ • 1NV-253B (NV Pumps Suct From FWST).

2) Close the following valves:

___ • 1NV-188A (VCT Otlt Isol)

___ • 1NV-189B (VCT Otlt Isol).

___ 3) Maintain charging flow less than 180 GPM.

___ 4) Adjust charging flow to maximize boration.

___ 5) **GO TO** Step 9.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

8. (Continued)

c. Align boration flowpath as follows:

1) Open the following valves:

- ___ • 1NV-238A (B/A Xfer Pmp To Blender Ctrl)
- ___ • 1NV-186A (B/A Blender Otlt To VCT Otlt).

___ 2) Verify boration flow as indicated on 1NVCR5450.

2) Perform the following:

- ___ a) Ensure 1NV-236B (Boric Acid To NV Pumps Suct) - OPEN.
- ___ b) Verify boration flow as indicated on 1NVP5440 (Emer Borate Flow).
- ___ c) Maintain charging flow less than 180 GPM.
- ___ d) Ensure charging flow - GREATER THAN OR EQUAL TO BORATION FLOW.
- ___ e) **IF AT ANY TIME** boration flow path cannot be maintained, **THEN RETURN TO** Step 8.b RNO.
- ___ f) **GO TO** Step 9.

___ d. Maintain charging flow less than 180 GPM.

___ e. Ensure charging flow - GREATER THAN OR EQUAL TO BORATION FLOW.

___ f. **IF AT ANY TIME** letdown flow needs to be increased to allow for higher charging flowrate, **THEN** increase letdown to a maximum of 120 GPM.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE A time delay of up to 3-5 minutes can be expected before indication of negative reactivity insertion is obtained on excore instrumentation.

- ___ 9. **Verify neutron flux level - STABLE OR DECREASING.** ___ **IF boration flow not adequate, THEN increase boration flowrate.**
10. **Ensure compliance with appropriate Tech Specs:**
- ___ • 3.1.1 (Shutdown Margin)
- ___ • 3.9.1 (Refueling - Boron Concentration).
11. **Determine required notifications:**
- ___ • **REFER TO** RP/0/A/5000/001 (Classification Of Emergency)
- ___ • **REFER TO** RP/0/B/5000/013 (NRC Notification Requirements).
12. **Ensure adequate shutdown margin as follows:**
- ___ a. Obtain current NC boron concentration from Primary Chemist.
- ___ b. **WHEN** current NC boron concentration is obtained, **THEN** perform shutdown margin calculation. **REFER TO** OP/0/A/6100/006 (Reactivity Balance Calculation).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

12. (Continued)

- c. **WHEN** adequate shutdown margin is obtained, **THEN** stop NC System boration as follows:

___ 1) Ensure shutdown margin monitor(s)
- RESET.

2) **IF** borating from the FWST, **THEN**:

a) Ensure the following valves -
OPEN:

- ___ • 1NV-188A (VCT Otlt Isol)
___ • 1NV-189B (VCT Otlt Isol)

b) Ensure the following valves -
CLOSED:

- ___ • 1NV-252A (NV Pumps Suct
From FWST)
___ • 1NV-253B (NV Pumps Suct
From FWST).

___ c) Control charging as required for
plant conditions.

3) **IF** borating from the BAT, **THEN**:

a) Close the following valves:

- ___ • 1NV-238A (B/A To Blendr Ctrl
Vlv)
___ • 1NV-186A (B/A Blender Otlt
To VCT Otlt).

___ b) Ensure 1NV-236B (Boric Acid
To NV Pumps Suct) - CLOSED.

___ c) Stop boric acid transfer pump(s).

___ d) Control charging as required for
plant conditions.

___ d. **GO TO** Step 14.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

13. **Realign from inadvertent actuation as follows:**

a. Perform the following:

- ___ • Ensure shutdown margin monitor(s) - RESET
- ___ • Verify 1AD-2, E/2 "TRAIN A SHUTDOWN MARGIN ALARM" - DARK
- ___ • Verify 1AD-2, F/2 "TRAIN B SHUTDOWN MARGIN ALARM" - DARK.

b. Ensure the following valves - OPEN:

- ___ • 1NV-188A (VCT Otlt Isol)
- ___ • 1NV-189B (VCT Otlt Isol).

c. Ensure the following valves - CLOSED:

- ___ • 1NV-252A (NV Pumps Suct From FWST)
- ___ • 1NV-253B (NV Pumps Suct From FWST).

___ d. Control charging as required for plant conditions.

___ e. Stop any NC System heatup in progress.

f. **WHEN** NC System heatup is stopped, **THEN** verify the following:

- ___ • Source Range indication - STABLE OR DECREASING
- ___ • Shutdown Margin Monitors - STABLE OR DECREASING.

___ g. **IF** required, **THEN** notify IAE to reset setpoints for S/R Hi Flux Level at Shutdown alarms.

a. Defeat inoperable BDMS train(s) as follows:

- ___ 1) Place the Boron Dilution Interlock key switch to "DEFEAT" for inoperable BDMS train(s).
- ___ 2) **REFER TO** Tech Spec 3.3.9 (Boron Dilution Mitigation System) and 3.9.2 (Nuclear Instrumentation).

___ f. **RETURN TO** Step 2.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

13. (Continued)

h. Ensure compliance with appropriate
Tech Specs:

- • 3.3.1 (Reactor Trip System
Instrumentation)
- • 3.3.9 (Boron Dilution Mitigation
System)
- • 3.9.2 (Refueling - Instrumentation).

i. Determine required notifications:

- • **REFER TO** RP/0/A/5000/001
(Classification Of Emergency)
- • **REFER TO** RP/0/B/5000/013 (NRC
Notification Requirements).

— 14. **Notify Reactor Group Engineer of
occurrence.**

CAUTION To prevent an inadvertent dilution of the NC system, Boron Saturation of
the Mixed Bed Demineralizer may be required prior to returning it to
service.

— 15. **WHEN the cause of the dilution has been
corrected, THEN realign NV System to
normal operation. REFER TO
OP/1/A/6200/001 (Chemical and Volume
Control System).**

— 16. **Determine long term plant status.
RETURN TO procedure in effect.**

END

**Catawba 2007
Initial License Examination
Job Performance Measure**

JPM E

Simulator

CANDIDATE: _____

EXAMINER: _____

**Catawba 2007
Initial License Examination
Job Performance Measure**

Task: Terminate SI Flow

Alternate Path: Yes

Facility JPM #: OP-CN-ECCS-ISE-048 (Modified)

K/A Rating(s): WE02 EK1.2 (3.4/3.9)

SAFETY FUNCTION: 3

Task Standard: Charging System realigned per procedure using one NV Pump and NV S/I
flow path isolated

Preferred Evaluation Location:

Control Room X In-Plant

Preferred Evaluation Method:

Perform Simulate X

Procedure References:

EP/1/A/5000/E-0 (Reactor Trip or Safety Injection)

Validation Time: 10 Minutes

Time Critical: No

Candidate: _____
NAME

Time Start: _____

Time Finish: _____

Performance Ratings:

SAT _____ UNSAT _____ Question Grade _____ Performance Time: _____

Examiner: _____
NAME SIGNATURE DATE

=====

COMMENTS

Simulator Set- Up Sheet

1. Select any 100% power IC set.
2. Insert MAL-ISE001A (Inadvertent S/I with Trip), Value = 1, Delay = 10, Trigger = 1
3. Insert MAL-ISE001B (Inadvertent S/I with Trip), Value = 1, Delay = 10, Trigger = 1
4. Insert Trigger 1.
5. Perform actions of EP/E-0 through step 26.
6. Close 1NV-203A and 1NV-202B
7. Insert VLV-NV041F (NC-202B CENT CHARG PMP RECIRC Fail To Position) Value = 0
8. Depressurize NC system to LTE 2000 PSIG
9. Acknowledge OAC alarms.
10. Freeze simulator and write to a snap.

IC SELECTED 155

Read Password: 7539

Write Password: 1307

Simulator Operator Instructions:

Booth instructor must be ready to perform the following when required.

Recall VLV-NV041F (NC-202B CENT CHARG PMP RECIRC Fail To Position) and setup to Value 1 (open), 30 second delay and 60 second ramp.

Insert the above malfunction when 1NI-10B is fully closed.

When Candidate has decreased charging flow to ~60 gpm and 1NV-202B is open, call and report 1NV-202B is open.

Tools / Equipment / Procedures Needed:

EP/1/A/5000/E-0 (Reactor Trip or Safety Injection)

READ TO OPERATOR**DIRECTION TO CANDIDATE:**

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIATING CUE:

An inadvertent Safety Injection has occurred during IAE testing. EP/1/A/5000/E-0 has been implemented through step 26. The Control Room Supervisor instructs you to complete step 27 of EP/1/A/5000/E-0, Reactor Trip or Safety Injection.

START TIME: _____

<p><u>STEP 27a:</u> Verify S/I termination criteria as follows:</p> <p>a. NC subcooling based on core exit T/Cs GREATER THAN 0°F</p> <p><u>STANDARD:</u> Verifies "SUBCOOLING" on ICCS monitor(s) is greater than 0°F.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 27b:</u> Verify secondary heat sink as follows:</p> <ul style="list-style-type: none">• N/R level in at least one S/G-GREATER THAN 11% <p>OR</p> <ul style="list-style-type: none">• Total feed flow to S/Gs-GREATER THAN 450 GPM <p><u>STANDARD:</u> Verifies greater than 11% in at least one S/G.</p> <p>OR</p> <p>Verifies total feed flow to S/Gs-GREATER THAN 450 GPM.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 27c:</u> NC pressure-STABLE OR INCREASING</p> <p><u>STANDARD:</u> Verifies NC pressure stable or increasing</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 27d:</u> Pzr level-GREATER THAN 11%</p> <p><u>STANDARD:</u> Verifies PZR level greater than 11%</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 27e:</u> Ensure S/I reset.</p> <p>1. ECCS</p> <p><u>STANDARD:</u> Depresses YELLOW ECCS "RESET" pushbuttons on 1MC-11. And verifies YELLOW "RESET" lights lit</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 27e:</u> Ensure S/I reset.</p> <p>2. D/G load sequencers</p> <p><u>STANDARD:</u> Depresses YELLOW Load Sequencer "RESET" pushbuttons (under covers) on 1MC-11. Verifies YELLOW "RESET" lights lit.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 27e:</u> Ensure S/I reset.</p> <p>3 IF AT ANY TIME a B/O occurs, then restart S/I equipment previously on.</p> <p><u>STANDARD:</u> Operator acknowledges step.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 27f:</u> Ensure only one NV pump on.</p> <p><u>STANDARD:</u> Depresses GREEN "OFF" pushbutton for either:</p> <ul style="list-style-type: none"> • NV Pump 1A OR • NV Pump 1B <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 27g:</u> Verify NC pressure stable or increasing.</p> <p><u>STANDARD:</u> Verifies NC pressure stable or increasing.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 27h:</u> Verify VI pressure greater than 50 psig.</p> <p><u>STANDARD:</u> Verifies VI pressure greater than 50 psig.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 27i:</u> Isolate NV S/I flow path.</p> <p>1. Verify the following valves open:</p> <ul style="list-style-type: none"> • 1NV-203A (NV Pumps A & B Recirc Isol) • 1NV-202B (NV Pumps A & B Recirc Isol) <p><u>STANDARD:</u> Determines valve 1NV-203A is closed and depresses open PB for 1NV-203A and verifies RED "OPEN" light lit and GREEN "CLSD" light dark.</p> <p>Determines valve 1NV-202B is closed and depresses open PB for 1NV-202B and determines the valve remains closed.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 27i RNO:</u> Dispatch operator to open affected valve:</p> <ul style="list-style-type: none"> • 1NV-202B (NV Pumps A & B Recirc Isol) <p><u>STANDARD:</u> Candidate dispatches an NLO to locally open 1NV-202B.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 27i RNO:</u> Close 1NV-309 (Seal Water Injection Flow)</p> <p><u>STANDARD:</u> Depresses RED "MAN" pushbutton for 1NV-309. Verifies its RED light is lit, then depresses the RED lower "OUTPUT" pushbutton until RED controller needle is at 0% (closed).</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 27j RNO:</u> IF control of 1NV-309 is lost from the control room, THEN dispatch operator with a radio to perform the following:</p> <p><u>STANDARD:</u> Determines that control from the control has not been lost.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 27 i RNO:</u> Establish charging as follows:</p> <p>Open the following valves:</p> <ul style="list-style-type: none"> • 1NV-312A (Chrg Line Cont Isol) • 1NV-314B (Chrg Line Cont Isol) <p><u>STANDARD:</u> Depresses RED "OPEN" pushbutton for 1NV-312A. Verifies RED "OPEN" light lit and GREEN "CLSD" light dark.</p> <p>Depresses RED "OPEN" pushbutton for 1NV-314B. Verifies RED "OPEN" light lit and GREEN "CLSD" light dark.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 27j RNO:</u> IF NC pressure is greater than 1950 PSIG, THEN throttle 1NV-309 or 1NV-311 to 50% open.</p> <p><u>STANDARD:</u> Candidate determines that NC pressure is greater than 1950 PSIG and throttles 1NV-309 to 50%.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 27j RNO:</u> Open 1NV-294 (NV Pmps A&B Disch Flow Ctrl)</p> <p><u>STANDARD:</u> Ensures 1NV-294 control is in manual and depressed open PB until controller output is 100%.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 27k:</u> If control of 1NV-294 is lost from the control room, then:</p> <p><u>STANDARD:</u> The candidate determines that control of 1NV-294 from the control room has not been lost.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 27i RNO:</u> Close the following valves:</p> <ul style="list-style-type: none"> • 1NI-9A (NV Pmp C/L Inj Isol) • 1NI-10B (NV Pmp C/L Inj Isol) <p><u>STANDARD:</u> Depresses GREEN "CLSD" pushbutton for 1NI-9A. Verifies RED "OPEN" light dark and GREEN "CLSD" light lit.</p> <p>Depresses GREEN "CLSD" pushbutton for 1NI-10B. Verifies RED "OPEN" light dark and GREEN "CLSD" light lit</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 27i:</u> If 1NI-9A and 1NI-10B cannot be closed, then:</p> <p><u>STANDARD:</u> Candidate determines that 1NI-9A and 1NI-10B are closed</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 27i RNO:</u> Throttle charging and seal injection to maintain the following:</p> <ul style="list-style-type: none"> • Charging line flow between 60 GPM and 180 GPM • NC pump seal injection flow. <p>STANDARD: Candidate adjusts 1NV-294 to establish 60 to 180 GPM charging flow. Candidate adjusts 1NV-309 to establish > 6 GPM seal injection flow.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 27i RNO:</u> WHEN 1NV-203A AND 1NV-202B are opened, THEN charging flow may be reduced below 60 GPM.</p> <p><u>STANDARD:</u> Upon receiving notification that 1NV-202B is open; the candidate may reduce charging flow using 1NV-294.</p> <p>EXAMINERS CUE: NLO reports that 1NV-202B has been opened.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 27K:</u> Control charging flow as follows:</p> <ol style="list-style-type: none"> 1) Control charging flow to maintain PZR level stable 2) Verify PZR level – stable or increasing. <p><u>STANDARD:</u> Candidate verifies PZR level is stable or increasing and adjusts 1NV-294 to maintain charging flow no less than 32 gpm.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 27l:</u> Ensure the following containment isolation signals reset:</p> <ul style="list-style-type: none"> • Phase A (Critical) • Phase B <p><u>STANDARD:</u> Depresses Phase A “RESET” pushbuttons on 1MC-11. Verifies YELLOW “RESET” lights lit.</p> <p>Verifies Phase B YELLOW “RESET” lights lit on 1MC-11.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 27m: Establish VI to containment as follows:</p> <ol style="list-style-type: none"> 1. Ensure 1VI-77B open. 2. Verify VI pressure greater than 85 psig. <p><u>STANDARD:</u> Verifies RED “OPEN” light for 1VI-77B is lit and GREEN “CLSD” light is dark.</p> <p>Verifies VI pressure is greater than 85 psig.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 27n:</u> Concurrently:</p> <ul style="list-style-type: none"> • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees) <p><u>STANDARD:</u></p> <p>EXAMINER CUE: The CRS has implemented EP/1/A/5000/F-0 (Critical Safety Function Status Trees)</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p>STEP 27n: Concurrently:</p> <ul style="list-style-type: none"> • Monitor EP/1/A/5000/ES-1.1 (Safety Injection Termination), Enclosure 1 (Foldout Page) <p>STANDARD:</p> <p>EXAMINER CUE: Another Operator is monitoring EP/1/A/5000/ES-1.1 (Safety Injection Termination), Enclosure 1 (Foldout Page)</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 27n: Concurrently:</p> <ul style="list-style-type: none"> • GO TO: EP/1/A/5000/ES-1.1 (Safety Injection Termination), Step 12 <p>STANDARD:</p> <p>EXAMINER CUE: The CRSRO has pulled EP/1/A/5000/ES-1.1 (Safety Injection Termination), and is ready to proceed with Step 12</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p style="text-align: center;">This JPM is complete.</p>	

STOP TIME: _____

CANDIDATE CUE SHEET

(To Be Returned To Examiner Upon Completion of Task)

INITIATING CUE:

An inadvertent Safety Injection has occurred during IAE testing. EP/1/A/5000/E-0 has been implemented through step 26. The Control Room Supervisor instructs you to complete step 27 of EP/1/A/5000/E-0, Reactor Trip or Safety Injection.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

26. Verify NC System is intact as follows:

- ☒ • Containment pressure - LESS THAN 1 PSIG.
- ☒ • **IF** normal off-site power is available, **THEN** verify containment pressure less than 0.3 PSIG.
- Containment high range EMFs - LESS THAN 3 R/HR:
- ☒ • 1EMF-53A (Containment Trn A)
- ☒ • 1EMF-53B (Containment Trn B).
- Containment EMF trip 1 lights - DARK:
- ☒ • 1EMF-38 (Containment Particulate)
- ☒ • 1EMF-39 (Containment Gas).
- ☒ • Containment sump level - STABLE.

Perform the following:

- a. **IF** both the following conditions exist,
 - ☐ • Containment pressure - GREATER THAN 1 PSIG
 - ☐ • Containment pressure - HAS REMAINED LESS THAN 3 PSIG
- ☐ **THEN** manually start one VX fan. **REFER TO** Enclosure 5 (VX Fan Manual Start).
- b. Concurrently:
 - ☐ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).
 - ☐ • **GO TO** EP/1/A/5000/E-1 (Loss Of Reactor Or Secondary Coolant).

27. Verify S/I termination criteria as follows:

- ☐ a. NC subcooling based on core exit T/Cs - GREATER THAN 0°F.
- b. Verify secondary heat sink as follows:
 - ☐ • N/R level in at least one S/G - GREATER THAN 11%
- OR
- ☐ • Total feed flow to S/Gs - GREATER THAN 450 GPM.
- ☐ c. NC pressure - STABLE OR INCREASING.

- ☐ a. **GO TO** Step 28.
- ☐ b. **GO TO** Step 28.
- ☐ c. **GO TO** Step 28.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

27. (Continued)

___ d. Pzr level - GREATER THAN 11%.

d. Perform the following:

___ 1) **IF** NC pressure is increasing **AND** normal Pzr spray is available, **THEN** attempt to stabilize NC pressure using normal Pzr spray.

___ 2) **RETURN TO** Step 27.a.

e. Ensure S/I - RESET:

___ 1) ECCS.

1) Perform the following:

___ a) **IF** either reactor trip breaker is closed, **THEN** dispatch operator to open Unit 1 reactor trip breakers.

___ b) Concurrently implement Enclosure 8 (ECCS Master Reset) while continuing in this procedure.

___ 2) D/G load sequencers.

2) Dispatch operator to open the affected sequencer(s) control power breaker:

___ • 1EDE-F01F (Diesel Generator Load Sequencer Panel 1DGLSA) (AB-577, BB-46, Rm 496)

___ • 1EDF-F01F (Diesel Generator Load Sequencer Panel 1DGLSB) (AB-560, BB-46, Rm 372).

___ 3) **IF AT ANY TIME** a B/O occurs, **THEN** restart S/I equipment previously on.

___ f. Ensure only one NV pump - ON.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

27. (Continued)

___ g. Verify NC pressure - STABLE OR INCREASING.

___ h. Verify VI pressure - GREATER THAN 50 PSIG.

i. Isolate NV S/I flowpath as follows:

1) Verify the following valves - OPEN:

- ___ • 1NV-203A (NV Pumps A&B Recirc Isol)
- ___ • 1NV-202B (NV Pmps A&B Recirc Isol).

g. Perform the following:

___ 1) Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).

___ 2) **GO TO** EP/1/A/5000/ES-1.2 (Post LOCA Cooledown And Depressurization).

h. In subsequent steps, control room control is lost for the following valves and local operation will be required:

- ___ • 1NV-294 (NV Pmps A&B Disch Flow Ctrl)
- ___ • 1NV-309 (Seal Water Injection Flow).

1) Perform the following:

___ a) Open affected valve(s).

___ b) **IF** 1NV-203A **AND** 1NV-202B are open, **THEN GO TO** Step 27.i.2.

c) Dispatch operator to open affected valve(s):

___ • 1NV-203A (NV Pumps A&B Recirc Isol) (AB-554, HH-JJ, 54-55, Rm 231) (Ladder needed)

___ • 1NV-202B (NV Pmps A&B Recirc Isol) (AB-554, HH-JJ, 54-55, Rm 231) (Ladder needed).

___ d) Close 1NV-309 (Seal Water Injection Flow).

(RNO continued on next page)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

27. (Continued)

e) **IF** control of 1NV-309 is lost from the control room, **THEN** dispatch operator with radio to perform the following:

- (1) Close 1NV-308 (Seal Wtr Inj Flow Ctrl Isol) (AB-554, JJ-54, Rm 233) (Ladder needed).
- (2) Throttle 1NV-311 (Seal Wtr Inj Flow Ctrl Byp) (AB-555, JJ-54, Rm 233) to maintain 32 GPM seal water flow in subsequent steps.

f) Open the following valves:

- • 1NV-312A (Chrg Line Cont Isol)
- • 1NV-314B (Chrg Line Cont Isol).

g) **IF** 1NV-312A **OR** 1NV-314B cannot be opened, **THEN** dispatch operator to open the affected valve(s). Refer to the following enclosure(s) for the affected valve(s):

- • Enclosure 10 (Locally Open 1NV-312A)
- • Enclosure 12 (Locally Open 1NV-314B).

— h) Do not continue in this procedure until 1NV-312A and 1NV-314B are open.

— i) **IF** NC pressure is greater than 1950 PSIG, **THEN** throttle 1NV-309 or 1NV-311 to 50% open.

(RNO continued on next page)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

27. (Continued)

___ j) Open 1NV-294 (NV Pmps A&B Disch Flow Ctrl).

k) **IF** control of 1NV-294 is lost from the control room, **THEN**:

___ (1) Place the controller for 1NV-294 in the 100% demand position.

___ (2) Dispatch operator with a radio to throttle 1NV-295 (NV Pmps A & B Disch Ctrl Isol) (AB-551, JJ-55, Rm 231) to control charging flow as required in subsequent steps.

l) Close the following valves:

___ • 1NI-9A (NV Pmp C/L Inj Isol)

___ • 1NI-10B (NV Pmp C/L Inj Isol).

m) **IF** 1NI-9A **OR** 1NI-10B cannot be closed, **THEN** dispatch operator to close the affected valve(s). Refer to the following enclosure(s) for the affected valve(s):

___ • Enclosure 9 (Locally Close 1NI-9A)

___ • Enclosure 11 (Locally Close 1NI-10B).

n) Throttle charging and seal injection to maintain the following:

___ • Charging line flow between 60 GPM and 180 GPM

___ • NC pump seal injection flow.

(RNO continued on next page)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

27. (Continued)

2) Close the following valves:

- ___ • 1NI-9A (NV Pmp C/L Inj Isol)
- ___ • 1NI-10B (NV Pmp C/L Inj Isol).

j. Establish charging as follows:

- ___ 1) Throttle 1NV-294 (NV Pmps A&B Disch Flow Ctrl) for 32 GPM charging line flow.

- ___ 2) Close 1NV-309 (Seal Water Injection Flow).

- ___ o) **WHEN** 1NV-203A **AND** 1NV-202B are opened, **THEN** charging flow may be reduced below 60 GPM.

- ___ p) **GO TO** Step 27.k.

2) Dispatch operator to close the affected valve(s). Refer to the following enclosure(s) for the affected valve(s):

- ___ • Enclosure 9 (Locally Close 1NI-9A)
- ___ • Enclosure 11 (Locally Close 1NI-10B).

1) Perform the following:

- ___ a) Place the controller for 1NV-294 in the 100% demand position.
- ___ b) Dispatch operator with a radio to throttle 1NV-295 (NV Pmps A & B Disch Ctrl Isol) (AB-551, JJ-55, Rm 231) for 32 GPM charging line flow.
- ___ c) Throttle 1NV-295 to control charging flow as required in subsequent steps.
- 2) Dispatch operator with radio to perform the following:
 - ___ a) Close 1NV-308 (Seal Wtr Inj Flow Ctrl Isol) (AB-554, JJ-54, Rm 233) (Ladder needed).
 - ___ b) Throttle 1NV-311 (Seal Wtr Inj Flow Ctrl Byp) (AB-555, JJ-54, Rm 233) to maintain 32 GPM seal water flow in subsequent steps.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

27. (Continued)

3) Open the following valves:

- ___ • 1NV-312A (Chrg Line Cont Isol)
- ___ • 1NV-314B (Chrg Line Cont Isol).

___ 4) Verify 1NV-309 - ABLE TO BE
OPERATED FROM THE CONTROL
ROOM.

___ 5) Place 1NV-309 in "AUTO".

6) Perform the following:

- ___ • Maintain charging flow less than
180 GPM.
- ___ • Maintain 32 GPM seal water flow.

3) Dispatch operator to open the
affected valve(s). Refer to the
following enclosure(s) for the
affected valve(s):

- ___ • Enclosure 10 (Locally
Open 1NV-312A)
- ___ • Enclosure 12 (Locally
Open 1NV-314B).

___ 4) **GO TO** Step 27.j.6.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

27. (Continued)

k. Control charging as follows:

___ 1) Control charging flow to maintain
Pzr level stable.

___ 2) Verify Pzr level - STABLE OR
INCREASING.

2) **IF** Pzr level is decreasing, **THEN:**

a) Open the following valves:

- ___ • 1NI-9A (NV Pmp C/L Inj Isol)
- ___ • 1NI-10B (NV Pmp C/L Inj Isol).

b) Close the following valves:

- ___ • 1NV-312A (Chrg Line Cont Isol)
- ___ • 1NV-314B (Chrg Line Cont Isol).

___ c) Implement EP/1/A/5000/F-0
(Critical Safety Function
Status Trees).

___ d) **GO TO** EP/1/A/5000/ES-1.2
(Post LOCA Cooldown And
Depressurization).

l. Ensure the following containment
isolation signals - RESET:

- ___ • Phase A
- ___ • Phase B.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

27. (Continued)

m. Establish VI to containment as follows:

- ___ • Ensure 1VI-77B (VI Cont Isol) - OPEN.
- ___ • Verify VI pressure - GREATER THAN 85 PSIG.

n. Concurrently:

- ___ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).
- ___ • Monitor EP/1/A/5000/ES-1.1 (Safety Injection Termination), Enclosure 1 (Foldout Page)
- ___ • **GO TO** EP/1/A/5000/ES-1.1 (Safety Injection Termination), Step 12.

___ 28. **Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).**

29. **Control S/G levels as follows:**

- ___ a. Verify N/R level in all S/Gs - GREATER THAN 11%.
- ___ b. Throttle feed flow to maintain all S/G N/R levels between 11% and 50%.

m. Perform the following:

1) Align N₂ to the Pzr PORVs by opening the following valves:

- ___ • 1NI-438A (Emer N2 From CLA A To 1NC-34A)
- ___ • 1NI-439B (Emer N2 From CLA B To 1NC-32B).

___ 2) **IF** VI pressure is less than 85 PSIG, **THEN** dispatch operator to ensure proper VI compressor operation.

___ a. Maintain total feed flow greater than 450 GPM until at least one S/G N/R level is greater than 11%.

___ b. **IF** N/R level in any S/G continues to increase in an uncontrolled manner, **THEN GO TO** EP/1/A/5000/E-3 (Steam Generator Tube Rupture).

**Catawba 2007
Initial License Examination
Job Performance Measure**

JPM F

Simulator

CANDIDATE: _____

EXAMINER: _____

**Catawba 2007
Initial License Examination
Job Performance Measure**

Task: Restore Normal Letdown

Alternate Path: No

Facility JPM #: OP-CN-PS-ILE-021

K/A Rating(s): 011 A2.07 (3.0 3.3)

SAFETY FUNCTION: 2

Task Standard: Normal letdown is in service on 1NV-10A at 75 GPM with 1NV-148 (Letdown Pressure Control) in automatic.

Preferred Evaluation Location:

Control Room X In-Plant

Preferred Evaluation Method:

Perform Simulate X

Procedure References:

AP/1/A/5500/012 (Case II Loss of Letdown)

Validation Time: 10 Minutes

Time Critical: No

Candidate: _____
NAME

Time Start: _____

Time Finish: _____

Performance Ratings:

SAT UNSAT Question Grade Performance Time:

Examiner: _____
NAME SIGNATURE DATE

=====

COMMENTS

Simulator Set- Up Sheet

Select the EOL 100% SNAP.

Verify the correct NC boron concentration for IC set in Initial Conditions and on
initiating cue of JPM

Secure letdown by closing 1NV-10A, on 1MC-10.

Freeze simulator and write to a SNAP. IC selected _____

IC SELECTED: 156

Read Password: 7539

Write Password: 1307

Simulator Operator Instructions:

Tools / Equipment / Procedures Needed:

AP/1/A/5500/012 (Case II Loss of Letdown)

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIATING CUE:

Unit 1 is at 100% power with a NC boron concentration of 76 ppm. Loss of letdown occurs due to IAE testing. IAE has resolved all issues which would prevent restoration of letdown. No power changes are in progress. You are instructed to restore letdown flow to 75 GPM by completing AP/1/A/5500/012 "Loss of Charging or Letdown" Case II, "Loss of Letdown" beginning at step 13.

START TIME: _____

<p><u>EXAMINER NOTE:</u> During this evolution, A VCT makeup will occur. If the candidate expresses concern that he should monitor this makeup, then provide the following cue:</p> <p><u>EXAMINER CUE:</u> Another operator will monitor the VCT makeup.</p>	
<p><u>STEP 13:</u> Verify at least one of the following valves - CLOSED:</p> <ul style="list-style-type: none"> • 1NV-1A (NC Letdn To Regen Hx Isol) <li style="text-align: center;">OR • 1NV-2A (NC Letdn To Regen Hx Isol). <p><u>STANDARD:</u> Determines both valves are open and continues to RNO.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 13 RNO:</u> GO TO Step 18.</p> <p><u>STANDARD:</u> Continues to step 18.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 18:</u> Establish letdown as follows:</p> <p style="padding-left: 40px;">a. Verify ability to establish normal letdown - RESTORED.</p> <p><u>STANDARD:</u></p> <p><u>EXAMINER CUE:</u> IAE has completed testing. Normal Letdown can be established</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 18:</u> Establish letdown as follows:</p> <p style="padding-left: 40px;">b. Ensure 1NV-849 (Letdn Flow Var Orif Ctrl) valve demand position - 0%.</p> <p><u>STANDARD:</u> RED pointer indicates '0%' on 1MC-10.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 18:</u> Establish letdown as follows:</p> <p>c. Verify the following valves - OPEN:</p> <ul style="list-style-type: none"> • 1NV-1A (NC Letdn To Regen Hx Isol) • 1NV-2A (NC Letdn To Regen Hx Isol). <p><u>STANDARD:</u> 1NV-1A RED "OPEN" light is lit and GREEN "CLSD" light is dark. 1NV-2A RED "OPEN" light is lit and GREEN "CLSD" light is dark.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 18:</u> NOTE If LTOP is in service, then 1NC-34A will be made inoperable then 1NV-10A is opened and returned operable when 1NV-11A or 1NV-13A is opened. (PIP #01-545)</p> <p><u>STANDARD:</u> Acknowledges note.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 18:</u> d. Open the following valves:</p> <ul style="list-style-type: none"> • 1NV-15B (Letdn Cont Isol) • 1NV-10A (Letdn Orif 1B Otlt Cont Isol). (Critical) <p><u>STANDARD:</u> 1NV-15B already open: verifies RED "OPEN" light lit and the GREEN "CLSD" light is dark.</p> <p>Turn 1NV-10A switch and hold in "OPEN" position until RED "OPEN" light is lit and GREEN "CLSD" light is dark on 1MC-10.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 18:</u> e. Adjust 1NV-294 (NV Pmps A&B Disch Flow Ctrl) as necessary to maintain letdown subcooled in following steps.</p> <p><u>STANDARD:</u> "MAN" button depressed on 1NV-294, RED "MAN" light lit on controller and letdown maintained subcooled. If evidence of flashing in letdown line occurs, charging flow is increased until flashing stops.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 18f:</u> Throttle 1NV-148 (Letdn Press Control) to 45% demand.</p> <p><u>STANDARD:</u> 1NV-148 manually taken to 45%.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 18:</u> g. Throttle open 1NV-849 (Letdn Flow Var Orif Ctrl) in 1% to 5% increments until one of the following conditions is met:</p> <ul style="list-style-type: none"> • Letdown flow and letdown pressure increases <li style="text-align: center;">OR • Valve demand position is 60% open. <p>h. Do not continue until one of the above conditions is met.</p> <p><u>STANDARD:</u> Turn control knob slowly clockwise until the red pointer increases 1-5% on the scale. Continues opening 1-5% increments until an increase in letdown flow and/or pressure is seen.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 18:</u> i. Verify letdown flow and letdown pressure - HAS INCREASED.</p> <p><u>STANDARD:</u> Observes letdown flow increasing.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 18j:</u> Adjust 1NV-148 (Letdn Press Control) to maintain letdown pressure between 150 - 200 PSIG.</p> <p><u>STANDARD:</u> Manual button depressed on 1NV-148 RED "MAN" light lit on controller and controls pressure for 150 - 200 psig.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p>STEP 18k: WHEN 5 minutes have elapsed, THEN perform the following:</p> <p>1) IF AT ANY TIME letdown flow is increased to greater than 80 GPM, THEN perform the following:</p> <p>STANDARD: Determines letdown flow will not be increases greater than 80 GPM.</p> <p>EXAMINER CUE: 5 minutes have elapsed</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 18k: 2) Adjust 1NV-849 (Letdn Flow VarOrif Ctrl) in 1% increments to desired letdown flow.</p> <p>STANDARD: Slowly increases 1NV-849 position until 75 GPM letdown is established.</p> <p>COMMENTS:</p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 18k: 3) WHEN letdown at desired flow, THEN perform the following:</p> <p>a) Adjust 1NV-148 (Letdn Press Control) to maintain letdown pressure at 350 PSIG.</p> <p>b) Ensure 1NV-148 (Letdn Press Control) - IN "AUTO".</p> <p>STANDARD: Manual button depressed on 1NV-148 RED "MAN" light lit on controller and controls pressure for 350 psig. RED "AUTO" pushbutton is depressed. RED "AUTO" light is lit and letdown pressure is maintained ~ 350 psig on 1MC-10.</p> <p>EXAMINER CUE: Another operator will complete the procedure.</p> <p>COMMENTS:</p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p>This JPM is complete.</p>	

STOP TIME: _____

CANDIDATE CUE SHEET

(To Be Returned To Examiner Upon Completion of Task)

INITIATING CUE:

Unit 1 is at 100% power with a NC boron concentration of 76 ppm. Loss of letdown occurs due to IAE testing. IAE has resolved all issues which would prevent restoration of letdown. No power changes are in progress. You are instructed to restore letdown flow to 75 GPM by completing AP/1/A/5500/012 "Loss of Charging or Letdown" Case II, "Loss of Letdown" beginning at step 13.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

12. **Ensure compliance with appropriate Tech Specs:**

- ☒ • 3.3.1 (Reactor Trip System (RTS) Instrumentation)
- ☒ • 3.3.3 (Post Accident Monitoring (PAM) Instrumentation)
- ☒ • 3.3.4 (Remote Shutdown System)
- ☒ • 3.4.1 (RCS Pressure, Temperature, and Flow Departure From Nucleate Boiling (DNB) Limits)
- ☒ • 3.4.12 (Low Temperature Overpressure Protection (LTOP) System)
- ☒ • 3.6.3 (Containment Isolation Valves).

13. **Verify at least one of the following valves - CLOSED:** **GO TO Step 18.**

- 1NV-1A (NC Letdn To Regen Hx Isol)
- OR
- 1NV-2A (NC Letdn To Regen Hx Isol).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

14. Verify the following Letdn Orif Otlt Cont
Isol valves - CLOSED:

- ___ • 1NV-10A (Letdn Orif 1B Otlt Cont Isol)
- ___ • 1NV-11A (Letdn Orif 1C Otlt Cont Isol)
- ___ • 1NV-13A (Letdn Orif 1A Otlt Cont Isol).

Perform the following:

- ___ a. Close affected valve(s).
- ___ b. Establish excess letdown. **REFER TO**
OP/1/A/6200/001 (Chemical and
Volume Control System).

NOTE Charging is maintained
greater than 32 GPM to
ensure charging line
downstream of 1NV-309
(Seal Water Injection
Flow) is pressurized.

- ___ c. Ensure charging flow maintained
greater than 32 GPM during letdown
line pressurization.
- ___ d. Dispatch operator(s) to pressurize the
normal letdown line. **REFER TO**
Enclosure 1 (Pressurization Of
Normal Letdown Line).
- ___ e. **GO TO** Step 17.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE

- If either NC loop letdown valve (1NV-1A or 1NV-2A) closed before all orifice isolation valves (1NV-10A, 1NV-11A and 1NV-13A), the letdown line will require local repressurization.
- If all valves closed from automatic signal(s), it can be assumed the orifice valves reached the closed position first.

15. **Verify all the following valves - CLOSED BY AUTOMATIC SIGNAL(s).**

- ___ • 1NV-1A (NC Letdn To Regen Hx Isol)
- ___ • 1NV-2A (NC Letdn To Regen Hx Isol)
- ___ • 1NV-10A (Letdn Orif 1B Otlt Cont Isol)
- ___ • 1NV-11A (Letdn Orif 1C Otlt Cont Isol)
- ___ • 1NV-13A (Letdn Orif 1A Otlt Cont Isol).

Perform the following:

- ___ a. **IF** all orifice isolation valves are known to have been closed prior to either NC loop letdown valve closing, **THEN GO TO** Step 18.
- ___ b. Establish excess letdown. **REFER TO** OP/1/A/6200/001 (Chemical and Volume Control System).

NOTE

Charging is maintained greater than 32 GPM to ensure charging line downstream of 1NV-309 (Seal Water Injection Flow) is pressurized.

- ___ c. Ensure charging flow maintained greater than 32 GPM during letdown line pressurization.
- ___ d. Dispatch operator(s) to pressurize the normal letdown line. **REFER TO** Enclosure 1 (Pressurization Of Normal Letdown Line).
- ___ e. **GO TO** Step 17.

___ 16. **GO TO** Step 18.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

17. **Do not continue in this procedure until one of the following is met:**

- ___ • Notified by dispatched operator that the letdown line is pressurized.

OR

- ___ • Station management authorizes normal letdown restoration.

18. **Establish letdown as follows:**

- ___ a. Verify ability to establish normal letdown
- RESTORED.

- a. Perform the following:

- ___ 1) Establish excess letdown. **REFER TO** OP/1/A/6200/001 (Chemical and Volume Control System).

- ___ 2) Do not continue in this procedure until the ability to establish normal letdown has been restored.

- ___ b. Ensure 1NV-849 (Letdn Flow Var Orif Ctrl) valve demand position - 0%.

- c. Verify the following valves - OPEN:

- ___ • 1NV-1A (NC Letdn To Regen Hx Isol)
___ • 1NV-2A (NC Letdn To Regen Hx Isol).

- c. Perform the following:

- ___ 1) Manually open the affected valve(s).

- ___ 2) **IF** the affected valve(s) will not open, **THEN**:

- ___ a) Establish excess letdown. **REFER TO** OP/1/A/6200/001 (Chemical and Volume Control System).

- ___ b) **WHEN** normal letdown can be restored, **THEN RETURN TO** Step 13.

- ___ c) **GO TO** Step 19.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

18. (Continued)

NOTE If LTOP is in service, then 1NC-34A will be made inoperable when 1NV-10A is opened and returned operable when 1NV-11A or 1NV-13A is opened. (PIP #01-545)

- | | |
|--|--|
| <p>d. Open the following valves:</p> <ul style="list-style-type: none"> ___ • 1NV-15B (Letdn Cont Isol) ___ • 1NV-10A (Letdn Orif 1B Otlt Cont Isol). <p>___ e. Adjust 1NV-294 (NV Pmps A&B Disch Flow Ctrl) as necessary to maintain letdown subcooled in following steps.</p> <p>___ f. Throttle 1NV-148 (Letdn Press Control) to 45% demand.</p> <p>___ g. Throttle open 1NV-849 (Letdn Flow Var Orif Ctrl) in 1% to 5% increments until one of the following conditions is met:</p> <ul style="list-style-type: none"> ___ • Letdown flow and letdown pressure increases <p>OR</p> <ul style="list-style-type: none"> ___ • Valve demand position is 60% open. <p>___ h. Do not continue until one of the above conditions is met.</p> | <p>d. Perform the following:</p> <ul style="list-style-type: none"> ___ 1) Ensure 1NV-10A (Letdn Orif 1B Otlt Cont Isol) - CLOSED. ___ 2) Establish excess letdown. REFER TO OP/1/A/6200/001 (Chemical and Volume Control System). ___ 3) WHEN normal letdown can be restored, THEN RETURN TO Step 13. ___ 4) GO TO Step 19. |
|--|--|

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

18. (Continued)

- ___ i. Verify letdown flow and letdown pressure - HAS INCREASED.

- i. Perform the following:

- 1) Close the following valves:

___ • 1NV-849 (Letdn Flow Var Orif Ctrl)

___ • 1NV-10A (Letdn Orif 1B Otlt Cont Isol).

- ___ 2) Establish excess letdown. **REFER TO** OP/1/A/6200/001 (Chemical and Volume Control System).

- ___ 3) **WHEN** normal letdown can be restored, **THEN RETURN TO** Step 13.

- ___ 4) **GO TO** Step 19.

- ___ j. Adjust 1NV-148 (Letdn Press Control) to maintain letdown pressure between 150 - 200 PSIG.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

18. (Continued)

k. **WHEN** 5 minutes have elapsed, **THEN** perform the following:

1) **IF AT ANY TIME** letdown flow is increased to greater than 80 GPM, **THEN** perform the following:

___ a) Determine current NC Dose Equivalent Iodine concentration (DEI). (OAC Point C1P0097)

___ b) Verify DEI specific activity - LESS THAN 0.18 $\mu\text{Ci}/\text{GM}$.

___ c) Notify Primary Chemistry that lower DEI limits are in effect due to NV letdown flows greater than 80 GPM.

___ 2) Adjust 1NV-849 (Letdn Flow Var Orif Ctrl) in 1% increments to desired letdown flow.

3) **WHEN** letdown at desired flow, **THEN** perform the following:

___ a) Adjust 1NV-148 (Letdn Press Control) to maintain letdown pressure at 350 PSIG.

___ b) Ensure 1NV-148 (Letdn Press Control) - IN "AUTO".

___ 4) **IF AT ANY TIME** additional letdown flow desired, **THEN** establish letdown with the 45 or 75 GPM orifice. **REFER TO** OP/1/A/6200/001 (Chemical and Volume Control System).

___ l. **WHEN** Pzr level is restored to programmed level, **THEN** ensure 1NV-294 (NV Pmps A&B Disch Flow Ctrl) is in "AUTO".

___ b) Ensure compliance with Tech Spec 3.4.16 (RCS Specific Activity).

CNS
AP/1/A/5500/012

LOSS OF CHARGING OR LETDOWN

Case II
Loss of Letdown

PAGE NO.
19 of 37
Revision 25

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

19. **Determine required notifications:**

- • **REFER TO** RP/0/A/5000/001
(Classification Of Emergency)
- • **REFER TO** RP/0/B/5000/013 (NRC
Notification Requirements).

— 20. **Verify excess letdown - ISOLATED.**

— **WHEN** normal letdown is restored, **THEN**
secure excess letdown. **REFER TO**
OP/1/A/6200/001 (Chemical and Volume
Control System).

— 21. **Determine long term plant status.**
RETURN TO procedure in effect.

END

**Catawba 2007
Initial License Examination
Job Performance Measure**

JPM G

Simulator

CANDIDATE: _____

EXAMINER: _____

**Catawba 2007
Initial License Examination
Job Performance Measure**

Task: Reset Radiation Monitor Trip Setpoints

Alternate Path: No

Facility JPM #: OP-CN-WE-EMF-001

K/A Rating(s): 073 A4.02 (3.7/3.7)

SAFETY FUNCTION: 7

Task Standard: EMF50L TRIP 1 setpoint is set to 6.3 E3 CPM and the TRIP 2 setpoint is set to 9.0 E3 CPM

Preferred Evaluation Location:

Control Room X In-Plant

Preferred Evaluation Method:

Perform Simulate X

Procedure References:

OP/0/A/6500/080 (EMF RP86A Output Modules)

Validation Time: 5 Minutes

Time Critical: No

Candidate: _____
NAME

Time Start: _____

Time Finish: _____

Performance Ratings:

SAT UNSAT Question Grade Performance Time:

Examiner: _____ / _____
NAME SIGNATURE DATE

=====

COMMENTS

Simulator Set- Up Sheet

Pick any I.C. set.

Ensure EMF50 is set with TRIP 1 and TRIP 2 setpoints of other than 6.3E3 and 9.0E3 respectively and greater than background.

Acknowledge annunciators. Write to a snap.

IC SELECTED: 157

Read Password: 7539

Write Password: 1307

Simulator Operator Instructions:

Tools / Equipment / Procedures Needed:

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIATING CUE:

Following a discussion with RP concerning a premature gaseous release termination, the Control Room Supervisor directs you to set EMF 50L setpoints using Encl. 4.2 OP/0/A/6500/080 to the following values:

- Trip 1 = 6300 CPM
- Trip 2 = 9000 CPM

OAC Program EMFLIB is currently not available.

START TIME: _____

<p><u>STEP 1.1:</u> Review the Limits and Precautions.</p> <p><u>STANDARD:</u> Review the Limits and Precautions.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 1.2:</u> Verify a need to adjust the EMF setpoints.</p> <p><u>STANDARD:</u> Initiating cue directs a need to adjust setpoint</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2.1 NOTE:</u> If desired, EMF setpoints adjustments may be performed from the "EMF SETPOINT" screen of OAC EMF Library (EMFLIB) Application. EMFLIB is user friendly, no procedure instructions are provided for this application.</p> <p><u>STANDARD:</u> Per cue this program is not available and cannot be used for this JPM.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2.1 NOTE:</u> The Trip Lamps can only be cleared if the activity level has decreased below the Trip Setpoint.</p> <p><u>STANDARD:</u> Candidate acknowledges note.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2.1 NOTE:</u> If any trip setpoint is >1000 cpm, the entered setpoint should be rounded down to the nearest 100 prior to entering to ensure the entered setpoint remains conservative.</p> <p><u>STANDARD:</u> Candidate acknowledges note.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 2.1:</u> If necessary, press clear key [CLR] to reset trip lamps</p> <p><u>STANDARD:</u> Trip lamps verified dark.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2.2:</u> Press the function key [FUN] to bring up the "Select Functions" screen.</p> <p><u>STANDARD:</u> Screen displayed on monitor</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2.3.1:</u> Press [1] for Trip 1 setting display screen.</p> <p><u>STANDARD:</u> Trip 1 setting screen displayed.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2.3.2:</u> Key in desired Trip 1 setpoint.</p> <p><u>STANDARD:</u> Numeric key pad is used to key in 6300 CPM.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2.3.3:</u> Ensure the setpoint is correctly displayed in the "ENTER" block on the setpoint display screen.</p> <p><u>STANDARD:</u> 6300 CPM is displayed in the ENTER block.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2.3.4 Note:</u> Once the enter key [ENT] is pressed, the change in Trip 1 alarm setpoint is active.</p> <p><u>STANDARD:</u> Candidate acknowledges note.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 2.3.4:</u> Press the enter key [ENT].</p> <p><u>STANDARD:</u> "TRIP 1" setpoint is 6.3 E3.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2.3.5:</u> Press the clear key [CLR] to return to "Select Function".</p> <p><u>STANDARD:</u> Select Function screen is now displayed.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2.4.1:</u> Press [2] for Trip 2 setting display screen.</p> <p><u>STANDARD:</u> Trip 2 setting screen is now displayed.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2.4.2:</u> Key in the desired Trip 2 setpoint.</p> <p><u>STANDARD:</u> Numeric key pad is used to key in 9000 CPM.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2.4.3:</u> Ensure the Setpoint is correctly displayed in the ENTER block on the Setpoint display screen.</p> <p><u>STANDARD:</u> 9000 CPM is displayed in the ENTER block</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2.4.4 NOTE:</u> Once the enter key [ENT] is pressed, the changes in Trip 2 alarm setpoint is active.</p> <p><u>STANDARD:</u> Candidate acknowledges note.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 2.4.4:</u> Press the enter key [ENT].</p> <p><u>STANDARD:</u> "TRIP 2" Setpoint is 9.0 E3.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2.5:</u> Press clear key [CLR] twice to return to the normal display screen.</p> <p><u>STANDARD:</u> Normal display screen is displayed.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2.6:</u> Enter the new EMF setpoints in the EMF Setpoint Logbook</p> <p><u>STANDARD:</u> Logbook entries are made.</p> <p>EXAMINER NOTE: Once the need to make the logbook entry is determined, provide copy of logbook page (OP)/A/6500/080 Encl 4.6).</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>This JPM is complete.</p>	

STOP TIME: _____

CANDIDATE CUE SHEET

(To Be Returned To Examiner Upon Completion of Task)

INITIATING CUE:

Following a discussion with RP concerning a premature gaseous release termination, the Control Room Supervisor directs you to set EMF 50L setpoints using Encl. 4.2 OP/0/A/6500/080 to the following values:

- Trip 1 = 6300 CPM
- Trip 2 = 9000 CPM

OAC Program EMFLIB is currently not available.

<div>Duke Energy Catawba Nuclear Station EMF RP86A Output Modules</div> <div>Multiple Use</div>	Procedure No. OP/0/A/6500/080
	Revision No. 011
	Electronic Reference No. CN005FFO
<div>PERFORMANCE</div>	<div>***** UNCONTROLLED FOR PRINT *****</div> <div>(ISSUED) - PDF Format</div>

EMF Output Modules

1. Purpose

- 1.1 To aid the operator in the correct methods of operating digital EMF output modules.
- 1.2 Provide instructions for adjusting radiation monitor setpoints.

2. Limits and Precautions

- 2.1 The EMF RP86A green "OPERATE" light goes dark and the failure relay de-energizes under any of the following conditions:
 - The operate/calibrate switch is set to calibrate
 - Loss of high voltage
 - Loss of signal (0 counts in 2 minutes)
 - Safety loop open
 - Loss of power
- 2.2 If an EMF RP86A Trip 1 is set higher than Trip 2, the entered value will be accepted.

3. Procedure

Refer to Section 4 (Enclosures).

4. Enclosures

- 4.1 EMF RP86A Operability Check
- 4.2 EMF RP86A Trip Setpoint Adjustment
- 4.3 Verification of EMF RP86A Trip Setpoints
- 4.4 Removing Inoperable EMF RP86A From Alarm Circuitry
- 4.5 EMF RP-2A and RP-2C Modules Trip Setpoint Adjustment
- 4.6 Control Room EMF Setpoint Log
- 4.7 Control Room EMF Setpoint Log for EMF-38
- 4.8 Control Room EMF Setpoint Log for EMF-71, EMF-72, EMF-73, and EMF-74

Enclosure 4.2
EMF RP86A Trip Setpoint Adjustment
Information Use

OP/0/A/6500/080
Page 1 of 2

1. Initial Conditions

- 1.1 Review the Limits and Precautions.
- 1.2 Verify a need to adjust the EMF setpoints.

2. Procedure

NOTE:

- 1. If desired, EMF setpoints adjustments may be performed from the "EMF SETPOINT" screen of OAC EMF Library (EMFLIB) Application. EMFLIB is user friendly, no procedure instructions are provided for this application.
- 2. The Trip Lamps can only be cleared if the activity level has decreased below the Trip Setpoint.
- 3. If any trip setpoint is >1000 cpm, the entered setpoint should be rounded down to the nearest 100 prior to entering to ensure the entered setpoint remains conservative.

- 2.1 **IF** necessary, press the clear key [CLR] to reset trip lamps.
- 2.2 Press the function key [FUN] to bring up the "SELECT FUNCTION" screen.
- 2.3 Adjust Trip 1 Setpoint as follows:
 - 2.3.1 Press [1] for Trip 1 setting display screen.
 - 2.3.2 Key in the desired Trip 1 setpoint.
 - 2.3.3 Ensure the setpoint is correctly displayed in the "ENTER" block on the setpoint display screen.

NOTE: Once the enter key [ENT] is pressed, the change in Trip 1 alarm setpoint is active .

- 2.3.4 Press the enter key [ENT]. This value is now displayed under "TRIP 1" and the "ENTER" block is cleared.
- 2.3.5 Press the clear key [CLR] to return to the "SELECT FUNCTION" screen.

Enclosure 4.2
EMF RP86A Trip Setpoint Adjustment
Information Use

OP/0/A/6500/080
Page 2 of 2

- 2.4 Adjust Trip 2 Setpoint as follows:
 - 2.4.1 Press [2] for Trip 2 setting display screen.
 - 2.4.2 Key in the desired Trip 2 setpoint.
 - 2.4.3 Ensure the setpoint is correctly displayed in the "ENTER" block on the setpoint display screen.

NOTE: Once the enter key [ENT] is pressed, the changes in Trip 2 alarm setpoint is active.

- 2.4.4 Press the enter key [ENT]. This value is now displayed under "TRIP 2" and the "ENTER" block is cleared.
- 2.5 Press the clear key [CLR] twice to return to the normal display screen.
- 2.6 Enter the new EMF setpoints on the Control Room EMF Setpoint Log.

**Catawba 2007
Initial License Examination**

Job Performance Measure

JPM H

Simulator

CANDIDATE: _____

EXAMINER: _____

**Catawba 2007
Initial License Examination
Job Performance Measure**

Task: Respond to a 1A KC Surge Tank Lo Lo Level.

Alternate Path: No

Facility JPM #: New

K/A Rating(s): 008 A2.02 (3.2 3.5)

SAFETY FUNCTION: 8

Task Standard: KC trains separated with A train pumps off and B train pumps on.

Preferred Evaluation Location:

Preferred Evaluation Method:

Control Room X In-Plant

Perform Simulate X

Procedure References:

AP/1/A/5500/021 (Loss of Component Cooling)

Validation Time: 10 Minutes

Time Critical: No

Candidate: _____
NAME

Time Start: _____

Time Finish: _____

Performance Ratings:

SAT UNSAT Question Grade Performance Time:

Examiner: _____
NAME SIGNATURE DATE

=====

COMMENTS

Simulator Set- Up Sheet

JPM requires 1A surge tank decreasing with trains cross connected. It may be necessary to split the trains for a portion of the level decrease to ensure only A Train is in low level.

Insert the following as required to cause level to decrease:

MAL-KC002A (CCW System Relief Valve KC061 Failure) = OPEN

MAL-KC002C (CCW System Relief Valve KC386 Failure) = OPEN

MAL-KC002E (CCW System Relief Valve KC313 Failure) = OPEN

MAL-KC002D (CCW System Relief Valve KC086 Failure) = OPEN

LOA-KC010 (KC106 KC Surge Tank 1A Drn Block) = 1

LOA-KC014 (KC123 KC Surge Tank 1B Drn Block) = 1

Insert the following to fail the auto actions for A non-ess isol.

VLV-KC001A (KC001A Aux Bldg Non-ess Rtn Hdr Fail Auto)

VLV-KC003A (KC003A Aux Bldg Non-ess Rtn Hdr Fail Auto)

VLV-KC012A (KC230A Aux Bldg Non-ess Rtn Hdr Fail Auto)

VLV-KC005A (KC050A Aux Bldg Non-ess Rtn Hdr Fail Auto)

Ensure the following pumps are in service:

1A1 KC Pump

1A NV Pump

KF pump 1B on

IC SELECTED: 158

Read Password: 7539

Write Password: 1307

Simulator Operator Instructions:

Tools / Equipment / Procedures Needed:

AP/1/A/5500/021 (Loss of Component Cooling)

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIATING CUE:

Unit 1 is at 100% RTP. A leak in the KC system has occurred. YM makeup to 1A KC Surge Tank is in progress. Operators have been dispatched to search for the leak.

The Control Room Supervisor directs you to respond to the loss of KC Surge Tank Level per step 12 of AP/1/A/5500/021 (Loss of Component Cooling).

START TIME: _____

<p><u>STEP 12:</u> Verify 1AD-10, A/1 "KC SURGE TANK A LO-LO LEVEL" - DARK.</p> <p><u>STANDARD:</u> Determines 1AD-10 A/1 is lit, continues to RNO.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 12 RNO a:</u> Ensure the following valves - CLOSED:</p> <ul style="list-style-type: none">• 1KC-230A (Rx Bldg Non-Ess Hdr Isol) <p><u>STANDARD:</u> Closes 1KC-230A.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 12 RNO a:</u> Ensure the following valves - CLOSED:</p> <ul style="list-style-type: none">• 1KC-3A (Rx Bldg Non-Ess Ret Hdr Isol) <p><u>STANDARD:</u> Closes 1KC-3A.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 12 RNO a:</u> Ensure the following valves - CLOSED:</p> <ul style="list-style-type: none">• 1KC-50A (Aux Bldg Non-Ess Hdr Isol) <p><u>STANDARD:</u> Closes 1KC-50A.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 12 RNO a:</u> Ensure the following valves - CLOSED:</p> <ul style="list-style-type: none">• 1KC-1A (Aux Bldg Non-Ess Ret Hdr Isol). <p><u>STANDARD:</u> Closes 1KC-1A.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 12 RNO b:</u> Ensure both Train B KC pumps - ON.</p> <p><u>STANDARD:</u> Starts both B Train KC Pumps.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 12 RNO c:</u> IF KC Surge Tank 1A level continues to decrease OR is empty, THEN:</p> <p>1) Ensure the following Train B essential equipment - IN SERVICE AS NEEDED:</p> <ul style="list-style-type: none"> • NV Pump 1B • NI Pump 1B • ND Pump 1B • ND Hx 1B • CA Pump 1B • NS Pump 1B • KF Pump 1B. <p><u>STANDARD:</u> Determines only pump start required is NV Pump 1B. Starts NV Pump 1B and, in the next step secures NV Pump 1A prior to high temperature alarms being received on NV Pump 1A.</p> <p><u>EXAMINER NOTE:</u> The candidate may perform one or more of the following as a “good practice” but they are not required for this JPM:</p> <ul style="list-style-type: none"> • Page prior to starting the pump • Start of the auxiliary oil pump • Use of the OP to swap the trains of NV <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 12 RNO c:</u> 2) Ensure the following Train A essential equipment - OFF:</p> <ul style="list-style-type: none"> • NV Pump 1A • NI Pump 1A • ND Pump 1A • CA Pump 1A • NS Pump 1A • KF Pump 1A. <p><u>STANDARD:</u> Determines only pump affect is 1A NV Pump. Stops NV Pump 1A prior to high temperature alarms being received on NV Pump 1A.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 12 RNO c:</u> 3) Ensure both Train A KC pumps - OFF.</p> <p><u>STANDARD:</u> Secures 1A1 KC Pump.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 12 RNO c:</u> 4) Locate and isolate leak on Train A essential header.</p> <p><u>STANDARD:</u> Per initiating cue operators have already been dispatched.</p> <p>EXAMINER CUE: Operators have been dispatched to locate the leak.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>This JPM is complete.</p>	

STOP TIME: _____

CANDIDATE CUE SHEET

(To Be Returned To Examiner Upon Completion of Task)

INITIATING CUE:

Unit 1 is at 100% RTP. A leak in the KC system has occurred. YM makeup to 1A KC Surge Tank is in progress. Operators have been dispatched to search for the leak.

The Control Room Supervisor directs you to respond to the loss of KC Surge Tank Level per step 12 of AP/1/A/5500/021 (Loss of Component Cooling).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

- ___ 12. **Verify 1AD-10, A/1 "KC SURGE TANK A LO-LO LEVEL" - DARK.**

Perform the following:

- a. Ensure the following valves - CLOSED:

- ___ • 1KC-230A (Rx Bldg Non-Ess Hdr Isol)
- ___ • 1KC-3A (Rx Bldg Non-Ess Ret Hdr Isol)
- ___ • 1KC-50A (Aux Bldg Non-Ess Hdr Isol)
- ___ • 1KC-1A (Aux Bldg Non-Ess Ret Hdr Isol).

- ___ b. Ensure both Train B KC pumps - ON.

- c. **IF** KC Surge Tank 1A level continues to decrease **OR** is empty, **THEN**:

- 1) Ensure the following Train B essential equipment - IN SERVICE AS NEEDED:

- ___ • NV Pump 1B
- ___ • NI Pump 1B
- ___ • ND Pump 1B
- ___ • ND Hx 1B
- ___ • CA Pump 1B
- ___ • NS Pump 1B
- ___ • KF Pump 1B.

- 2) Ensure the following Train A essential equipment - OFF:

- ___ • NV Pump 1A
- ___ • NI Pump 1A
- ___ • ND Pump 1A
- ___ • CA Pump 1A
- ___ • NS Pump 1A
- ___ • KF Pump 1A.

- ___ 3) Ensure both Train A KC pumps - OFF.

- ___ 4) Locate and isolate leak on Train A essential header.

FINAL
ADMIN JPMS

CATAWBA
2007-301

**Catawba 2007
Initial License Examination
Job Performance Measure**

**ADMIN JPM
S-5**

CANDIDATE: _____

EXAMINER: _____

**Catawba 2007
Initial License Examination
Job Performance Measure**

Task: Review of Surveillance PT and determine TS entry

Alternate Path: N/A

Facility JPM #: New

K/A Rating(s): 2.1.33 Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications. 3.4\4.0

Topic Area: Conduct of Operations

Task Standard: The following items must be identified:

1. The PT is incorrectly filled out for a Loops Filled Condition
2. The Loops Not Filled condition requires 2 operable ND trains and one operable D/G.
TS 3.4.8 Condition A and B must be entered and
 - a. Immediately suspend operations that would cause introduction of coolant into the RCS with boron concentration less than required to meet SDM of LCO 3.1.1.
 - b. Immediately initiate action to restore one RHR loop to OPERABLE status and operation.

Preferred Evaluation Location:

Control Room X In-Plant

Preferred Evaluation Method:

Perform X Simulate

Procedure References:

PT/1/A/4600/002E Mode 5 Periodic Surveillance Items.

Validation Time: 30 Minutes

Time Critical: No

Candidate: _____
NAME

Time Start: _____

Time Finish: _____

Performance Ratings:

SAT UNSAT Question Grade Performance Time:

Examiner: _____ / _____
NAME SIGNATURE DATE

=====

COMMENTS

Tools / Equipment / Procedures Needed:

PT/1/A/4600/002E Mode 5 Periodic Surveillance Items. Procedure filled out as required for the task.

READ TO OPERATOR**DIRECTION TO CANDIDATE:**

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIATING CUE:

Unit 1 is in Mode 5 following a refueling outage. Preparations are being made to continue the plant heatup to Mode 4.

The plant and equipment status is as follows:

- NC Temperature is 190 deg F.
- Both trains of BDMS are operable and inservice.
- All Reactor Trip and Bypass Breakers are open.
- PZR Cold Cal Level is 50%.
- All S/G N/R levels = 39%
- 1A ND Train is operating in RHR mode.
- 1B ND Train is tagged out due to a pump breaker failure and is expected to return to operable in 24 hours. Suction and discharge are aligned in RHR Mode.
- 1A D/G is tagged out due to a bearing failure and is expected to return to operable in 48 hours.
- 1B D/G is operable.
- All CLA are isolated with no alarms
- LTOP is selected for PORVs
- 1A NV Pump is white tagged for equipment protection
- 1A NI Pump is white tagged for equipment protection
- FWST Temperature is 78 deg F
- 1A VF Train is operable and in service
- 1B VF Train is inoperable for filter change out.
- No Fuel movement is occurring in the Spent Fuel Pool
- RVLIS UR Level is 99%
- All other equipment is operable as required for the current conditions.

The Unit 1 BOP has given you the completed Mode 5 Periodic Surveillance Items PT for review. The surveillance was performed between 0700 and 1000 on non-weekend Dayshift. Determine what actions, if any, are required to meet all TS LCO for the above conditions.

START TIME: _____

<p>STEP 1: The candidate must determine the PT has incorrectly been filled out for the Loops Filled condition and should be for the Loops Not Filled condition.</p> <p>NC Loops Filled for > 140 deg F requires PZR Cold Cal Level greater than or equal to 65% per SD 3.1.30.</p> <p>PT states "see TS 3.4.7 bases for loops filled requirement" but there are no criteria given in the bases only generalities. The "definition" of loops filled is given in SD 3.1.30.</p> <p>Per the PT at least the operable ND trains requires an operable D/G for loops filled. If the candidate incorrectly assumes a Loops Filled condition he will state that per TS 3.4.7 and SD 3.1.30 (Unit Shutdown Configuration Control) the 1A D/G or the 1B ND train will be required.</p> <p>Per SD 3.1.30 for Mode 5 Loops Not Filled (Low Decay Heat), 2 operable ND Pumps are required, 1 operable D/G is required. For the conditions given, neither TS 3.4.7 or 3.4.8 are met but for different reasons. (If the candidate incorrectly assumes he is in Loops filled then 3.4.7 is not met.)</p> <p>STANDARD: The following items must be identified:</p> <ul style="list-style-type: none">3. The PT is incorrectly filled out for a Loops Filled Condition4. The Loops Not Filled condition requires 2 operable ND trains and one operable D/G. TS 3.4.8 Condition A and B must be entered and<ul style="list-style-type: none">c. Immediately suspend operations that would cause introduction of coolant into the RCS with boron concentration less than required to meet SDM of LCO 3.1.1.d. Immediately initiate action to restore one RHR loop to OPERABLE status and operation. <p>COMMENTS:</p>	<p>Critical Task</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p>This JPM is complete.</p>	

STOP TIME: _____

CANDIDATE CUE SHEET

(To Be Returned To Examiner Upon Completion of Task)

INITIATING CUE:

Unit 1 is in Mode 5 following a refueling outage. Preparations are being made to continue the plant heatup to Mode 4.

The plant and equipment status is as follows:

- NC Temperature is 190 deg F.
- Both trains of BDMS are operable and inservice.
- All Reactor Trip and Bypass Breakers are open.
- PZR Cold Cal Level is 50%.
- All S/G N/R levels = 39%
- 1A ND Train is and operating in RHR mode.
- 1B ND Train is tagged out due to a pump breaker failure and is expected to return to operable in 24 hours. Suction and discharge are aligned in RHR Mode.
- 1A D/G is tagged out due to a bearing failure and is expected to return to operable in 48 hours.
- 1B D/G is operable.
- All CLA are isolated with no alarms
- LTOP is selected for PORVs
- 1A NV Pump is white tagged for equipment protection
- 1A NI Pump is white tagged for equipment protection
- FWST Temperature is 78 deg F
- 1A VF Train is operable and in service
- 1B VF Train is inoperable for filter change out.
- No Fuel movement is occurring in the Spent Fuel Pool
- RVLIS UR Level is 99%
- All other equipment is operable as required for the current conditions.

The Unit 1 BOP has given you the completed Mode 5 Periodic Surveillance Items PT for review. The surveillance was performed between 0700 and 1000 on non-weekend Dayshift. Determine what actions, if any, are required to meet all TS LCO for the above conditions.

CANDIDATE CUE SHEET

(To Be Returned To Examiner Upon Completion of Task)

INITIATING CUE:

Unit 1 is in Mode 5 following a refueling outage. Preparations are being made to continue the plant heatup to Mode 4.

The plant and equipment status is as follows:

- NC Temperature is 190 deg F.
- Both trains of BDMS are operable and inservice.
- All Reactor Trip and Bypass Breakers are open.
- PZR Cold Cal Level is 50%.
- All S/G N/R levels = 39%
- 1A ND Train is and operating in RHR mode.
- 1B ND Train is tagged out due to a pump breaker failure and is expected to return to operable in 24 hours. Suction and discharge are aligned in RHR Mode.
- 1A D/G is tagged out due to a bearing failure and is expected to return to operable in 48 hours.
- 1B D/G is operable.
- All CLA are isolated with no alarms
- LTOP is selected for PORVs
- 1A NV Pump is white tagged for equipment protection
- 1A NI Pump is white tagged for equipment protection
- FWST Temperature is 78 deg F
- 1A VF Train is operable and in service
- 1B VF Train is inoperable for filter change out.
- No Fuel movement is occurring in the Spent Fuel Pool
- RVLIS UR Level is 99%
- All other equipment is operable as required for the current conditions.

The Unit 1 BOP has given you the completed Mode 5 Periodic Surveillance Items PT for review. The surveillance was performed between 0700 and 1000 on non-weekend Dayshift. Determine what actions, if any, are required to meet all TS LCO for the above conditions.

Duke Energy
Catawba Nuclear Station
Mode 5 Periodic Surveillance Items

Procedure No.

PT/1/A/4600/002 E

Revision No.

076

Electronic Reference No.

CN005G9M

Continuous Use

PERFORMANCE

***** UNCONTROLLED FOR PRINT *****

(ISSUED) - PDF Format

Mode 5 Periodic Surveillance Items

1. Purpose

- 1.1 To verify compliance with technical specification surveillance items which have a frequency of verification from once per twelve hours (semi-daily) to once per seven days (weekly).
- 1.2 To give guidance for the proper operation of various instruments and/or systems.

2. References

- 2.1 Improved Technical Specifications
- 2.2 FSAR Chapter 16 Selected Licensee Commitments

3. Time Required

- 3.1 Manpower - One NCO
- 3.2 Frequency - Time
 - 3.2.1 Semi-daily, daily - One hour thirty minutes
[Day shift (0700-1000)
Night shift (1900-2200)]
 - 3.2.2 Weekly - Two hours
[Day shift, Sunday (0700-1000)]

4. Prerequisite Tests

None

5. Test Equipment

None

6. Limits and Precautions


- 6.1 If the Operator Aid Computer (OAC) becomes inoperable, perform the applicable steps requiring the computer per PT/1/A/4600/009 (Loss of Operator Aid Computer).
- 6.2 If an Operator Aid Computer Point is inoperable, perform the applicable surveillance item using the available control room or local indication.

TODAY'S DATE

PT/1/A/4600/002 E

Page 3 of 5

7. Required Unit Status

 Mode 5

8. Prerequisite System Condition

None

9. Test Method

- 9.1 A visual inspection shall be made to verify various systems' instrumentation is operating properly and/or indicating acceptable values or system status.
- 9.2 The OAC shall be used for various required calculations, when operable. When it is **NOT** available, manual calculations will be performed per PT/1/A/4600/009 (Loss of Operator Aid Computer).
- 9.3 Performance of this PT will include all the applicable surveillance items based on the frequency of the surveillance.

10. Data Required

Enclosure 13.1 (Periodic Surveillance Items Data)

11. Acceptance Criteria

- 11.1 Enclosure 13.1 (Periodic Surveillance Items Data) contains acceptance criteria for individual surveillance items.
- 11.2 Channel checks meet the acceptance criteria when the redundant channels are within the tolerances listed in Enclosure 13.1 (Periodic Surveillance Items Data). Redundant channels may be checked on the OAC, control room or local gauges. The acceptance criteria shall **NOT** be met by checking the same channel on two redundant indications such as a control room gauge and the OAC.


12. Procedure

- 12.1 Complete Enclosure 13.1 (Periodic Surveillance Items Data) for the applicable surveillance items as described in the following steps:
 - 12.1.1 Perform the surveillance items in Enclosure 13.1 (Periodic Surveillance Items Data) based on frequency (semi-daily, daily and weekly).
 - 12.1.2 Frequency Requirements:
 - 12.1.2.1 Day shift and night shift will perform the semi-daily surveillance items.
 - 12.1.2.2 The daily surveillance items will be performed along with the semi-daily items of the shift specified.
 - 12.1.2.3 Day shift will perform weekly surveillance items along with the performance of the semi-daily items on Sunday or the day specified. These items are identified by a **(W)** or **(day of week)** in the SHIFT INITIALS column.
 - 12.1.2.4 The non-shaded blocks under the SHIFT INITIALS column are for the operators to sign off in for the performed surveillance items that meet their acceptance criteria.
 - 12.1.3 Numbers in parenthesis refer to notes and qualifying conditions specific to the surveillance requirement. These conditions are explained at the bottom of that page.
 - 12.1.4 N/A all sign offs **NOT** required based on frequency of surveillance.
 - 12.1.5 **IF** a surveillance item exists with a qualifying condition, and plant conditions are such that the qualifying condition is **NOT** met, the item may be N/A'd and initialed.


TODAY'S DATE

PT/1/A/4600/002 E
Page 5 of 5

12.2 Evaluate the acceptance criteria by performing one of the following:

 12.2.1 Verify the acceptance criteria specified in Section 11 is met.

OR


 12.2.2 **IF** the acceptance criteria are **NOT** met, perform the following:

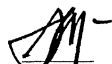
☐ Notify the Unit/WCC SRO that the acceptance criteria are **NOT** met.

_____/_____
Unit/WCC SRO Contacted Date Time


☐ Initiate a PIP to document the test failure.

☐ Document all issues on a procedure discrepancy sheet.

 12.3 **IF** any discrepancy is noted during the performance of this test that does **NOT** keep the test from meeting the acceptance criteria, it shall be given to the Unit/WCC SRO for evaluation via a discrepancy sheet.

 12.4 This test was completed to satisfy the following requirement(s):

- ☒ Semi-daily
- ☐ Daily
- ☐ Weekly

 12.5 Submit PT/1/A/4600/002 E (Mode 5 Periodic Surveillance Items) to the Unit/WCC SRO.

13. Enclosures

13.1 Periodic Surveillance Items Data

Enclosure 13.1

PT/1/A/4600/002 E
Page 1 of 15

Periodic Surveillance Items Data

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
1	Source Range Monitor Channel Check (SR 3.3.1.1, SR 3.3.9.4, Table 3.3.1-1 Item 5)	Each indication is within ½ decade of the other channel.	(1)	C1A1500 C1A1506	N/A M-	
2	Cold Leg Accumulators Isolated (SR 3.4.12.2)	Cold Leg Accumulator Discharge Isolation Valves closed with power removed.	(2)(3)		M-	
3	Power Operated Relief Valve Isolation Valves (SR 3.4.12.4)	Two isolation valves are open 1NC-31B 1NC-33A	(4)	C1D0388 C1D0389 C1D0024 C1D0025		

-
- (1) If reactor trip breakers are closed and Rod Control System is capable of rod withdrawal or if one or both trains of BDMS are inoperable.
- (2) Accumulators required to be isolated only when accumulator pressure is \geq the maximum Reactor Coolant System pressure for the existing Reactor Coolant System cold leg temperature allowed by the pressure/temperature limit curves in ITS 3.4.3.
- (3) Accumulator Discharge Isolation Valves may be verified by the Monitor Panel.
(1NI-54A, group 2, A/3) (1NI-65B, group 2, A/11) (1NI-76A, group 2, B/2) (1NI-88B, group 2 B/10)
- (4) If this surveillance is **NOT** met, the surveillance may be N/A'd if the applicable component is placed in TSAIL to ensure the surveillance is performed prior to declaring the component operable.

Enclosure 13.1

PT/1/A/4600/002 E

Periodic Surveillance Items Data

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#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
4	Power Operated Relief Valves (LCO 3.4.12)	1. INC-32B and INC-34A operable with select switches positioned to "LOW PRESSURE". 2. CLA-A and CLA-B pressure \geq 200 psig. 3. CLA-A and CLA-B levels < Hi level alarm (1AD-9 D/1 and D/2). 4. 1NI-438A and 1NI-439B open 5. Each Cold Leg temp \geq 70°F.	(5)(6)			

(5) If this item is **NOT** met, the item may be N/A'd if the applicable component is placed in TSAIL to ensure the item is performed prior to declaring the component operable.

(6) When the Reactor Coolant Pumps are secured, the cold leg temperature shall be measured at the Residual Heat Removal Heat Exchanger Outlet.

Enclosure 13.1

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Periodic Surveillance Items Data

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#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
5	RHR Suction Isolation Valves (SR 3.4.12.3)	<p>1. The following valves are open:</p> <p>a. 1ND-1B (ND Pump 1A Suct Frm Loop B) 1ND-2A (ND Pump 1A Suct Frm Loop B)</p> <p>b. 1ND-36B (ND Pump 1B Suct Frm Loop C) 1ND-37A (ND Pump 1B Suct Frm Loop C)</p> <p>2. Each Cold Leg temp $\geq 70^{\circ}\text{F}$</p>	(7)(8)		SMc	


-
- (7) If this item is **NOT** met, the item may be N/A'd if the applicable component is placed in TSAIL to ensure the item is performed prior to declaring the component operable. The applicable components are 1ND-3 (1A ND Pump Suction From NC Loop B Header Relief) or 1ND-38 (1B ND Pump Suction From NC Loop C Header Relief).
- (8) When the Reactor Coolant Pumps are secured, the cold leg temperature shall be measured at the Residual Heat Removal Heat Exchanger Outlet.

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Periodic Surveillance Items Data

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
6	NV and/or NI Pump Secured (SR 3.4.12.1) & {PIP 97-1639}	Any two NV <u>OR</u> NI pumps are inoperable with pump motor breaker racked out <u>AND</u> white tagged <u>OR</u> pumps are isolated from the NC System by two closed isolation valves. Inoperable pumps/white Tag# NV Pmp 1A <u>w/ 4143</u> NV Pmp 1B _____ NI Pmp 1A <u>w/ 4144</u> NI Pmp 1B _____				

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Periodic Surveillance Items Data

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
7	Boron Injection Flow Path (BAT To NCS) (TR 16.9-7-1)	The temperature of the heated portion of the flow path is $\geq 65^{\circ}\text{F}$. (Heat trace temperature monitor points Pt 3-Pt 7 on 1EHCR0001 (AB-560, KK-56, Rm 300))	(9)(10)		(W) 	

(9) Obtained by the Aux Bldg Rounds person.

(10) Temperatures may also be obtained by one of the following methods:

(a) Issue Model W/O 00971128 for SPOC to obtain the following temperature points:

Pt 3, Pt 4, Pt 5, Pt 6 and Pt 7 at recorder 1EHCR0001 (AB-560, KK-56, Rm 300)

OR

Locally at the Junction Boxes:

Ch 3	Junction Box 1(P) NV1-03	(AB-556, HH-JJ, 54, Rm 234)
Ch 4	Junction Box 1(P) NV1-04	(AB-550, HH-JJ, 53-54, Rm 234)
Ch 5	Junction Box 1(P) NV1-05	(AB-566, LL-MM, 52-53, Rm 315)
Ch 6	Junction Box 1(P) NV1-06	(AB-567, MM, 52-53, Rm 310)
Ch 7	Junction Box 1(P) NV1-08	(AB-569, NN-58, Rm 300)

(b) Issue Model W/O 00994073 for SPOC to obtain the following temperatures points at the Centralized Temperature Control Cabinets:

Ch 3, Ch 4, Ch 5, Ch 6 and Ch 7.

Refer to CNM-1354.05-0118 and CNM-1354.05-0119 for point location if required.

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#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
8	Boric Acid Storage Solution Tank Temp (TR 16.9-11-2)	Temp: $\geq 65^{\circ}\text{F}$ (1NVP5720)	(11)		(W) <i>N/A JM</i>	
9	Boric Acid Storage Tank Level (TR 16.9-11-4)	Contained volume \geq minimum value as specified in the COLR	(12)	C1A1406	(W) <i>N/A JM</i>	

- (11) Temperature may also be obtained by the rounds person using a calibrated contact pyrometer and measuring the exterior of the BAT.

If this method is used record the instrument number and calibration due date.


Instrument number: _____, Cal due date _____

- (12) If OAC point C1A1406 is **NOT** available, add 520 gallons to the minimum value as specified in the COLR if using instruments 1NVP5740 or 1NVP6070 to satisfy this surveillance item.

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Periodic Surveillance Items Data

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
10	ND System Loop in operation (SR 3.4.7.1 & SR 3.4.7.2)	a. One train of ND operable AND in operation AND either the other ND train operable OR 2 S/Gs with level \geq 12% NR Operating pump <u>1A</u> Operable pump <u>1A</u> Record S/G's used below: <u>A</u> <u>B</u> Record instrument(s) used to verify S/G \geq 12% NR Level _____	(13)(14)(15)	C1A0902 C1A0908 C1P1900 C1P1901 C1P1902 C1P1903		
	(SR 3.4.8.1)	b. Verify one RHR Loop is in operation	(16)	C1A0902 C1A0908	N/AJM	
11	FWST Borated Water Volume (TR 16.9-11-4)	Contained volume \geq minimum value as specified in the COLR		C1A1262 C1A1268 C1A1250 C1A1256	(W) N/AJM	

(13) All RHR loops may be removed from operation during planned heatup to Mode 4 when at least one NCS loop is in operation.

(14) When NC loops are filled, refer to TS 3.4.7, Bases for "loops filled" requirement.

(15) At least one operable train of ND shall have an operable Train related Diesel Generator.

(16) When NC loops **NOT** filled.

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Periodic Surveillance Items Data

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
12	FWST Solution Temp (TR 16.9-11-1)	$\geq 70^{\circ}\text{F}$	(17)(18)(19)	C1P1913 <u>OR</u> the average of C1A1154 C1A1160 C1A0545		
13	Groundwater Level (WZ) (TR 16.7-8-1)	Monitor Well Levels \leq the top of the adjacent floor slab as verified by: 1. Absence of Alarm Annunciator 1AD13 D/1, D/2 and D/3 <u>AND</u> 2. Locally on 0ELMC0001 as follows: Monitor Well #2 Level ≤ 550 ft.-0" Monitor Well #4 Level ≤ 558 ft.-6" Monitor Well #5 Level ≤ 558 ft.-6" Monitor Well #7 Level ≤ 550 ft.-0" Monitor Well #10 Level ≤ 560 ft.-0" Monitor Well #11 Level ≤ 560 ft.-0"	(20)		(W) N/A JM	
14	Spent Fuel Pool Water Level (SR 3.7.14.1) & (TR 16.9-21-1)	Level: ≥ 37.6 ft (≥ 23 ft above fuel assemblies) (1KFP5120)			(W) N/A JM	

(17) If OAC is out of service, temperature shall be obtained locally using IP/1/B/3101/001 (Calibration Procedure For Refueling Water System).

(18) When the FWST is the source of Borated Water and outside air temperature is less than 70°F .

(19) If a temperature channel(s) is out of service, the remaining in service channel(s) may be averaged.

(20) Local levels from 0ELMC0001 are obtained by the Aux Bldg Rounds person. Each small division on 0ELMC0001 equals 3 inches.

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Periodic Surveillance Items Data

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
15	Control Room Air Temp. (SR 3.7.11.1)	All thermometers are $\leq 85^{\circ}\text{F}$	(21)		AM	
16	Wind Speed Monitor Channel Check (TR 16.7-3-1)	Lower wind speed has power and is indicating on scale	(22)(23)			
		Upper wind speed has power and is indicating on scale	(22)(23)			
17	Wind direction Monitor Channel Check (TR 16.7-3-1)	Lower Wind direction has power and is indicating on scale	(22)(23)			
		Upper wind direction has power and is indicating on scale	(22)(23)			
18	Outside Air Temp ΔT (TR 16.7-3-1)	Instrument has power and is indicating on scale	(22)(23)			
19	Outside Air Ambient Temp (TR 16.7-3-1)	Instrument has power and is indicating on scale	(22)(23)			
20	Precipitation Sensor Channel Check (TR 16.7-3-1)	Instrument has power and is indicating on scale	(22)(23)			
21	IEMF15 Channel Check (TR 16.7-10-1)	1. Power light on 2. Meter is reading $\geq \frac{1}{2}$ of background from setpoint logbook	(24)		AM	

(21) Thermometers located at CC-55, CC-57 and CC-59.

(22) Initiate work request (R005) is for IAE to inspect the Meteorological Instrumentation System for any failures or abnormalities.

(23) Traces should be variable for wind speeds, wind directions, delta temperature and ambient temperature. If any channel is drawing a straight line it should be evaluated for operability. The precipitation trace will be a straight line unless it is currently raining/snowing.

(24) If meter reading is **NOT** $\geq \frac{1}{2}$ of background from setpoint logbook, contact Radiation Protection for operability determination.

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Periodic Surveillance Items Data

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#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
22	1EMF31 Channel Check (TR 16.11-2-1)	1. Power light on 2. No "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading $\geq \frac{1}{2}$ of background from setpoint logbook	(25)			
23	1EMF35 Channel Check (TR 16.11-7-5) 35L	1. Power light on 2. No "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading $\geq \frac{1}{2}$ of background from setpoint logbook	(25)		(W) N/A JM-	
24	1EMF36 Channel Check (TR 16.11-7-4) 36L	1. Power light on 2. No "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading $\geq \frac{1}{2}$ of background from setpoint logbook	(25)			
25	1EMF37 Channel Check (TR 16.11-7-5)	1. Power light on 2. No "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading $\geq \frac{1}{2}$ of background from setpoint logbook	(25)		(W) N/A JM-	
26	1EMF 38 and 39 Cont Isolation Valve Position	1MISV5230 Open			JM	
		1MISV5231 Open			JM	
		1MISV5232 Open			JM	
		1MISV5233 Open			JM	

(25) If meter reading is **NOT** $\geq \frac{1}{2}$ of background from setpoint logbook, contact Radiation Protection for operability determination.

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#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
27	1EMF39 Channel Check (TR 16.7-10-1 and TR 16.11-7-2 and TR 16.11-7-3) 39L	1. Power light on 2. No "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading $\geq \frac{1}{2}$ of background from setpoint logbook	(26)	C1E0155		
28	1EMF42 Channel Check (TR 16.7-10-1)	1. Power light on 2. No "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading $\geq \frac{1}{2}$ of background from setpoint logbook	(26)	C1E0214	AM	
29	EMF43 Channel Check (TR 16.7-10-1) 43A	1. Power light on 2. No "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading $\geq \frac{1}{2}$ of background from setpoint logbook	(26)	C1E0218	AM	
	43B	1. Power light on 2. No "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading $\geq \frac{1}{2}$ of background from setpoint logbook	(26)	C1E0222	AM	

(26) If meter reading is **NOT** $\geq \frac{1}{2}$ of background from setpoint logbook, contact Radiation Protection for operability determination.

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Periodic Surveillance Items Data

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
30	EMF46 Channel Check (TR 16.7-10-1) 46A	1. Power light on 2. IF a train related KC pump is on, verify no "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading $\geq \frac{1}{2}$ of background from setpoint logbook	(27)		<i>SM-</i>	
	46B	1. Power light on 2. IF a train related KC pump is on, verify no "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading $\geq \frac{1}{2}$ of background from setpoint logbook	(27)		<i>SM-</i>	
31	EMF49 Channel Check (TR 16.11-2-1) 49L	1. Power light on 2. No "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading $\geq \frac{1}{2}$ of background from setpoint logbook	(27)	C1E0263		
32	Shutdown Margin (SR 3.1.1.1)	SDM within the limit as specified in the COLR.	(28)			
33	Fuel Building Ventilation (SR 3.7.13.1)	Two trains of VF are operable with flow being discharged through HEPA filters 1A1/1A2 or 1B1/1B2 and Charcoal Filters. (1A1- 1VFP5040 1A2- 1VFP5050) (1B1- 1VFP5060) 1B2- 1VFP5070)	(29)		<i>N/A SM-</i>	

(27) If meter reading is **NOT** $\geq \frac{1}{2}$ of background from setpoint logbook, contact Radiation Protection for operability determination.

(28) Attach applicable enclosure from OP/0/A/6100/006 (Reactivity Balance Calculation) to this PT when complete.

(29) During movement of recently irradiated fuel assemblies in the fuel building.

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#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
34	RL Minimum Flow Interlock Channel (TR 16.11-2-2)	<u>IF</u> RL Disch Flow is above the RL Disch Lo Flow setpoint on ORLP5080, verify (MC9)Annunciator 1AD12 F/3 dark , <u>OR</u> <u>IF</u> RL Disch Flow is equal to or below the RL Disch Lo Flow setpoint on 0RLP5080, verify (MC9)Annunciator 1AD12 F/3 lit	(30)			
35	RL Discharge Flow Channel Check	OAC point C1P0903 or C2P0903 and C1P0904 or C2P0904 are in service, <u>NOT</u> overranged <u>OR</u> negative.	(30)	C1P0903 C1P0904 C2P0903 C2P0904	M-	

(30) If RL instruments inoperable, refer to PT/0/A/4250/011 (RL Temperature and Discharge Flow Determinations).

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Periodic Surveillance Items Data

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
36	Unit Vent Stack Flow Rate Meter Channel Check (TR 16.11-7-4)	Instrument in service with > 0 SCFM indicated with any systems exhausting to the unit vent Circle method used to determine flow rate Local/Computer (%) x 195,000 cfm = _____ cfm	(31)(32)	C1A1104		
37	D/G 1A Prelube Oil Filter ΔP	≤ 20 PSID	(33)(34)		(W) N/AJM-	
38	D/G 1B Prelube Oil Filter ΔP	≤ 20 PSID	(33)(34)		(W) N/AJM-	

- (31) The unit vent stack flow rate meter is **NOT** accurate below a flowrate of 97,500 scfm because the loop is **NOT** calibrated below that flowrate. This is due to the inaccuracy of the loop at low flows which is induced by the square root extractor. If the flowrate is below 97,500 scfm determine if this is being caused by ventilation system alignments. If the low flow is due to ventilation system alignments then consider the instrument operable, otherwise consider the instrument inoperable. If the unit vent stack flow rate meter is inoperable or reading less than 97,500 scfm, refer to PT/1/A/4450/017 (Unit Vent Flow Manual Calculation).
- (32) If C1A1104 is **NOT** in service, determine unit vent flow rate by multiplying 195,000 cfm by reading on local meter 1VAP8300 (AB-594, HH-52) and record in space provided above.
- (33) Obtained by Aux Bldg Rounds person, when engine aligned for Stby Readiness.
- (34) If differential pressure > 20 psid, the acceptance criteria is met if a high priority work request is written to investigate the reason for excessive pressure.

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#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
39	RL Intake Temp Channel Check	C1P1521 or C2P1521 in service and on scale	(35)	C1P1521 C2P1521	AM	
40	RL Discharge Temp Channel Check	C1P1376 or C2P1376 in service and on scale	(35)	C1P1376 C2P1376	AM	
		C1P1377 or C2P1377 in service and on scale	(35)	C1P1377 C2P1377	AM	
41	Boron Dilution Mitigation System Channel Check (SR 3.3.9.1)	Each indication is within ½ decade of the other channel			AM	
42	RVLIS U/R level	Available train(s) of RVLIS U/R level ≥ 97%	(36)		AM	

(35) If RL instruments inoperable, refer to PT/0/A/4250/011 (RL Temperature & Discharge Flow Determination).

(36) If acceptance criteria are **NOT** met, vent the Reactor Vessel Head per OP/1/A/6150/001, (Filling And Venting The Reactor Coolant System).
N/A with RVLIS unavailable or NC System drained to < 50% wide range level or Reactor Coolant Pumps on.

**Catawba 2007
Initial License Examination
Administrative
Job Performance Measure**

**JPM
S-4**

CANDIDATE: _____

EXAMINER: _____

Catawba 2007
Initial License Examination
Job Performance Measure

Task: Protective action recommendations update determination.

Alternate Path: No

Facility JPM #: New

K/A Rating(s): 2.4.44 Knowledge of emergency plan protective action recommendations.

Administrative Topic: Emergency Plan

Task Standard: Student should recommend evacuation of the following zones: B2, C2, D2, E1, E2, F1, F2 and F3 and consideration of KI use by the public.

Preferred Evaluation Location:

Preferred Evaluation Method:

Control Room X In-Plant

Perform Simulate X

Procedure References:

Validation Time: 35 Minutes

Time Critical: No

Candidate: _____
NAME

Time Start: _____

Time Finish: _____

Performance Ratings:

SAT UNSAT Question Grade Performance Time:

Examiner: _____
NAME SIGNATURE DATE

=====

COMMENTS

Tools / Equipment / Procedures Needed:

RP/0/A/5000/005 (General Emergency)

READ TO OPERATOR**DIRECTION TO CANDIDATE:**

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIATING CUE:

3 hours ago a General Emergency was declared for Unit 1. Per the initial notification, protective action zones A0, B1, C1 and D1 were recommended to be evacuated with all other zones recommended to shelter in place.

The following information has been received in the control room:

Upper Wind Direction = 52 deg
Lower Wind Direction = 60 deg
Upper Wind Speed = 12 mph
Lower Wind Speed = 6 mph
1EMF-53A = 135 R/hr
1EMF-53B = 143 R/hr

Zone Dose Projections:

Zone	Dose in rem	
	TEDE	CDE Thyroid
A0	12	8
A1	0.6	0.3
A2	0.5	0.2
A3	0.2	0.1
B1	2	0.8
B2	1	0.6
C1	2	1
C2	4	3
D1	11	6
D2	9	7
E1	10	9
E2	7	6
F1	2	3
F2	3	1
F3	2	1

The OSM directs you to evaluate and assess the need to update Protective Action Recommendations made to states and counties in previous notification per subsequent action step 3.3 of RP/0/A/5000/005 (General Emergency).

START TIME: _____

<p><u>EXAMINER NOTE:</u> RP/0/A/5000/005 (General Emergency) is a required reference for this JPM.</p> <p><u>EXAMINER NOTE:</u> Summary of answer in step 5 of the JPM.</p>	
<p><u>STEP 1:</u> Student should refer to Enclosure 4.3 of RP/05 and determine if the large fission product inventory is greater than gap activity in containment. (Refer to Encl 4.3 pg 2 of 3).</p> <p><u>STANDARD:</u> Determines fission product inventory is NOT greater than gap activity.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2:</u> Determine if the offsite dose projections are ≥ 1 rem TEDE and/or ≥ 5 rem CDE thyroid in any zones not previously evacuated?</p> <p><u>STANDARD:</u> Determines B2, C2, D2, E1, E2, F1, F2 and F3 zones are affected. Recommends evacuation of the zones.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 3:</u> Determine if wind speed or wind direction changed sufficiently to affect zones not previously evacuated?</p> <p><u>STANDARD:</u> Determines E-1 is affected and already recommended to be evacuated in the previous step.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 4:</u> Determines if dose projections or field measurements ≥ 5 rem CDE thyroid?</p> <p><u>STANDARD:</u> Determines dose projections have exceeded 5 rem and recommends considering KI use by the public.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

Overall answer to JPM: Student should recommend evacuation of the following zones: B2, C2, D2, E1, E2, F1, F2 and F3 Student should recommend consideration of KI use by the public.	Critical Task ___ SAT ___ UNSAT
<p style="text-align: center;">This JPM is complete.</p>	

STOP TIME: _____

CANDIDATE CUE SHEET

(To Be Returned To Examiner Upon Completion of Task)

INITIATING CUE:

3 hours ago a General Emergency was declared for Unit 1. Per the initial notification, protective action zones A0, B1, C1 and D1 were recommended to be evacuated with all other zones recommended to shelter in place.

The following information has been received in the control room:

Upper Wind Direction = 52 deg
Lower Wind Direction = 60 deg
Upper Wind Speed = 12 mph
Lower Wind Speed = 6 mph
1EMF-53A = 135 R/hr
1EMF-53B = 143 R/hr

Zone Dose Projections:

Zone	Dose in rem	
	TEDE	CDE Thyroid
A0	12	8
A1	0.6	0.3
A2	0.5	0.2
A3	0.2	0.1
B1	2	0.8
B2	1	0.6
C1	2	1
C2	4	3
D1	11	6
D2	9	7
E1	10	9
E2	7	6
F1	2	3
F2	3	1
F3	2	1

The OSM directs you to evaluate and assess the need to update Protective Action Recommendations made to states and counties in previous notification per subsequent action step 3.3 of RP/0/A/5000/005 (General Emergency).

<div>Duke Power Company Catawba Nuclear Station</div> <div>General Emergency</div> <div>Reference Use</div>		Procedure No. RP/ 0/A/5000/005
		Revision No. 044
		Electronic Reference No. CN005GNO
<div>PERFORMANCE</div> <div>***** UNCONTROLLED FOR PRINT *****</div> <div>(ISSUED) - PDF Format</div>		

General Emergency

1. Symptoms

- 1.1 Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or **HOSTILE ACTION** that results in an actual loss of physical control of the facility.

2. Immediate Actions

NOTE:

1. Lines in left margin are for place keeping. Immediate actions may be performed simultaneously.
2. Security events may require the suspension of access to and movement about the site. Staffing and activation of the on-site emergency response facilities could complicate or interfere with security operations resulting in unwarranted casualties.

- _____ 2.1 **IF** a security event exists, discuss the feasibility of conducting a site assembly and activating the TSC/OSC with the Security Captain at 5765 or 5766.
- _____ 2.1.1 **IF** site assembly and activation of the TSC/OSC are not feasible, refer to the following procedure enclosures for guidance and N/A the associated steps in this procedure under Immediate Actions concerning site assembly and ERO activation:
- _____ A. RP/0/B/5000/026, "Site Response to Security Events," Enclosure 4.2 - Step 5 that evaluates taking protective action
- _____ B. RP/0/B/5000/026, "Site Response to Security Events," Enclosure 4.3 - Activation of ERO during an Imminent Security Event
- _____ 2.1.2 **IF** the security event involves an insider threat, implement 2-person rule for access to all vital areas.
- _____ 2.1.3 Consider delaying other actions in this procedure that could endanger site personnel until the security threat is contained.
- _____ 2.2 **IF** TSC, OSC and EOF have **NOT** been previously activated, notify the ERO to staff emergency response facilities by performing the following steps (2.2.1 and 2.2.2):
- _____ 2.2.1 Notify site personnel to activate the TSC and OSC by making the following announcement **twice** over public address system:

"This is the Operations Shift Manager. A General Emergency has been declared. Unit(s) _____ is (are) affected. Activate the TSC, OSC, and EOF."

- _____ 2.2.2 Activate Emergency Response Organization by completing Enclosure 4.1 of this procedure.
- _____ 2.3 Make immediate Protective Action Recommendations (PAR) on Line 5 of the Emergency Notification Form as follows:
 - _____ 2.3.1 Determine PAR for evacuating and sheltering the public based on current lower tower wind speed, OAC Pt. C1P0253 (use upper tower wind speed, OAC Pt. C1P0251, if lower tower wind speed is not available) as below:

WIND SPEED LESS THAN OR EQUAL TO 5 MPH

Evacuate zones: A0, A1, B1, C1, D1, E1, F1

AND

Shelter in place zones: A2, A3, B2, C2, D2, E2, F2, F3

OR

WIND SPEED GREATER THAN 5 MPH

Evacuate two mile radius **AND** all affected zones 5 miles downwind **AND** shelter in place remaining 10 mile EPZ as shown on Enclosure 4.2, page 2 of 2.

- _____ 2.3.2 **IF** off-site dose projections or field measurements indicate greater than or equal to 5 rem CDE Thyroid dose, recommend the consideration of KI use by the public.
- _____ 2.4 Notify off-site agencies within 15 minutes of Emergency declaration time using an Emergency Notification Form. Refer to one of the following procedures for instructions:
 - RP/0/A/5000/006A, "Notifications to States and Counties from the Control Room"
 - RP/0/A/5000/006B, "Notifications to States and Counties from the Technical Support Center"
 - SR/0/B/2000/004, "Notifications to States and Counties from the Emergency Operations Facility"
- _____ 2.5 **IF** there is an indication of a radioactive release **AND** the TSC is not activated, contact RP shift to perform off-site dose assessment per HP/0/B/1009/026.

- _____ 2.6 **IF** a radioactive release or hazardous material spill is occurring or has occurred **AND** the TSC is not activated, contact Environmental Management (EM), ext. 3333, for assistance in reporting to state, local or federal authorities. After hours, contact the Environmental Duty person by phone or pager. **IF** no answer, page 8-777-3333 which will page all Environmental Management personnel.
- _____ 2.7 Conduct a Site Assembly using RP/0/A/5000/010, "Conducting a Site Assembly or Preparing the Site for an Evacuation."
- _____ 2.8 Conduct a Site Evacuation using RP/0/A/5000/010, "Conducting a Site Assembly or Preparing the Site for an Evacuation."
- _____ 2.9 Notify the NRC using RP/0/B/5000/013, "NRC Notification Requirements." This notification should be made as quickly as possible but shall be made within one hour of the emergency declaration time.
- _____ 2.10 **IF** Emergency Response Data System (ERDS) transmission has not been initiated (Alert or SAE classification), initiate ERDS within 1 hour of initial Alert or higher declaration by performing the following:
 - _____ 2.10.1 Type "**ERDS**" or select "**Main**," then "**General**," then "**ERDS**" on a Control Room OAC workstation connected to the affected unit's OAC.
 - _____ 2.10.2 Initiate ERDS transmission by depressing **F1** or clicking "**Activate**."
 - _____ 2.10.3 **IF** ERDS transmission will not connect to the NRC, inform the NRC using ENS. The TSC Data Coordinator will troubleshoot and initiate ERDS transmission upon arrival in the TSC

3. Subsequent Actions

NOTE: Subsequent Actions are not required to be followed in any particular sequence.

- _____ 3.1 **IF** a security event has occurred, perform the following to account for site personnel:
 - _____ 3.1.1 **WHEN** Security notifies the OSM that the security threat has been terminated, make the following announcement **twice** over the public address system:

"This is the Operations Shift Manager. The security event has been terminated. The security event has been terminated."
 - _____ 3.1.2 Conduct a site assembly per RP/0/A/5000/10, "Conducting a Site Assembly or Preparing the Site for an Evacuation."
- _____ 3.2 Ensure RP has dispatched On-Site and Off-Site Field Monitoring Teams with associated communications equipment per HP/0/B/1009/009, "Guidelines for Accident and Emergency Response."

_____ 3.3 Evaluate specific plant conditions, off-site dose projections, field monitoring team data, and assess need to update Protective Action Recommendations made to states and counties in previous notification. Refer to:

- Enclosure 4.3, page 1 of 3, Guidance for Protective Actions, Protective Action Recommendation Flowchart
- Enclosure 4.4, Evacuation Time Estimates for Catawba Plume Exposure EPZ

_____ 3.4 Make follow-up notifications to state and county authorities:

- Every hour until the emergency is terminated

OR

- If there is any significant change to the situation

OR

- As agreed upon with an Emergency Management official from each individual agency

_____ 3.5 RP/0/A/5000/018, "Emergency Worker Dose Extension," shall be used to authorize emergency worker doses expected to exceed normal occupational exposure limits during a declared emergency event or exceed blanket dose extension limits authorized by the Radiation Protection Manager.

_____ 3.6 Augment shift resources to assess and respond to the emergency situation as needed.

_____ 3.7 Announce over the plant public address system the current emergency classification level and summary of plant status.

_____ 3.8 Assess the emergency conditions and the corresponding emergency classification. See RP/0/A/5000/001, "Classification of Emergency," then:

- Remain in a General Emergency

OR

- Terminate the emergency (Refer to RP/0/A/5000/020 or SR/0/B/2000/003 for Termination Criteria).

_____ 3.9 Announce any emergency classification level changes over the plant public address system, including a summary of plant status.

NOTE: Turnover of command and control to the TSC or EOF relieves the OSM/Emergency Coordinator of classification, notification and Protective Action Recommendation (PAR) responsibilities allowing a focused effort on plant response.

- 3.10 Turnover the responsibility of command and control for the emergency as follows:
- _____ 3.10.1 Provide turnover to the TSC Emergency Coordinator using Enclosure 4.5.
 - _____ 3.10.2 **IF** the emergency situation prevents activation of the TSC within 75 minutes of declaration, contact the EOF Director and perform a turnover. Refer to EOF Director Turnover Form in RP/0/A/5000/020, "Technical Support Center (TSC) Activation," Enclosure 4.1.
 - _____ 3.10.3 **IF** neither facility can take turnover, maintain command and control until one of the facilities is capable of accepting turnover.
 - _____ 3.11 In the event that a worker's behavior or actions contributed to an actual or potential substantial degradation of the level of safety of the plant (incidents resulting in an Alert or higher emergency declaration), the supervisor must consider and establish whether or not a for cause drug/alcohol screen is required. The FFD Program Administrator is available to discuss/assist with the incident.
 - _____ 3.12 EOF Director will terminate the emergency and recommend entry into Recovery by briefing the off-site authorities at the Emergency Operations Facility or if necessary by phone. Document the termination briefing using Enclosure 4.6.
 - _____ 3.13 The EOF Director shall assign an individual to provide a written report within thirty days. This report could be an LER or a written report if an LER is not required.

Person Assigned Responsibility _____

4. Enclosures

- 4.1 Emergency Organization Activation
- 4.2 10 Mile Emergency Planning Zone (EPZ) Map and Protective Action Zone Determination Tables
- 4.3 Guidance for Protective Actions
 - Page 1 of 3, Protective Action Recommendation Flowchart
 - Page 2 of 3, Guidance for Determination of GAP Activity
 - Page 3 of 3, Protective Action Guides For Large Fission Product Inventory Greater Than Gap Activity In containment
- 4.4 Evacuation Time Estimates for Catawba Plume Exposure EPZ
- 4.5 OSM to Emergency Coordinator Turnover Form
- 4.6 General Emergency Termination Briefing with States and Counties

Enclosure 4.1
Emergency Organization Activation

RP/0/A/5000/005
Page 1 of 3

1. Activate ERO Pagers using Quiktel Key Pad

- NOTE:**
1. Quiktel key pads for pager activation are located in the following areas:
 - Control Room (behind MC14)
 - TSC (in Off-site Agency Communicator's cubicle)
 - CAS (CAS operator's desk)
 - Simulator (behind MC14)
 2. Pager activation can be delayed up to 5 minutes depending on pager system status.
 3. Steps 1 and 3 may be performed simultaneously if sufficient resources are available.

- _____ 1.1 **IF** the Quiktel key pads are not available, immediately go to step 2.
- _____ 1.2 Ensure confirmation pagers are turned on.
- _____ 1.3 Activate the ERO pagers at a Quiktel key pad as follows:
- _____ 1.3.1 Press the <EXIT> key to assure key pad is cleared.
- _____ 1.3.2 Type "**ERO**"
- _____ 1.3.3 Press <ENTER> key
- _____ 1.3.4 Press <M> key (for Message)
- _____ 1.3.5 **IF** activation is for an **actual emergency**, perform the following:
- _____ A. Type the following message:
- "Catawba Emergency. A General Emergency was declared at _____ (time). Activate the TSC, OSC and EOF."**
- _____ B. Press <ENTER> key
- _____ C. Go to step 3 while monitoring the confirmation pagers located at the Quiktel key pad to verify proper ERO pager activation.
- _____ 1.3.6 **IF** activation is for an **ERO drill**, perform the following:
- _____ A. Type the following message:
- "Catawba Drill. A General Emergency was declared at _____ (time). Activate the TSC, OSC and EOF."**
- _____ B. Press <ENTER> key
- _____ C. Go to step 3 while monitoring the confirmation pagers located at the Quiktel key pad to verify proper ERO pager activation.

Enclosure 4.1
Emergency Organization Activation

RP/0/A/5000/005
Page 2 of 3

2. Activate ERO Pagers for Drills and Emergencies using a Touchtone Phone

NOTE: The following guidance generates an "intended group" pager activation.

- _____ 2.1 Dial 8-777-8376.
- _____ 2.2 When prompted, enter the activation code **6789**.
- _____ 2.3 Monitor the pager located at the Quiktel key pad to verify proper ERO pager activation.
- _____ 2.4 **IF** the ERO pagers fail to activate, notify the duty emergency planner of the failure.

Enclosure 4.1
Emergency Organization Activation

RP/0/A/5000/005
Page 3 of 3

3. Activate Automatic Dialing Call Back System (Community Alert Network)

NOTE: Back-up telephone number for Community Alert Network is 1-877-786-8478.

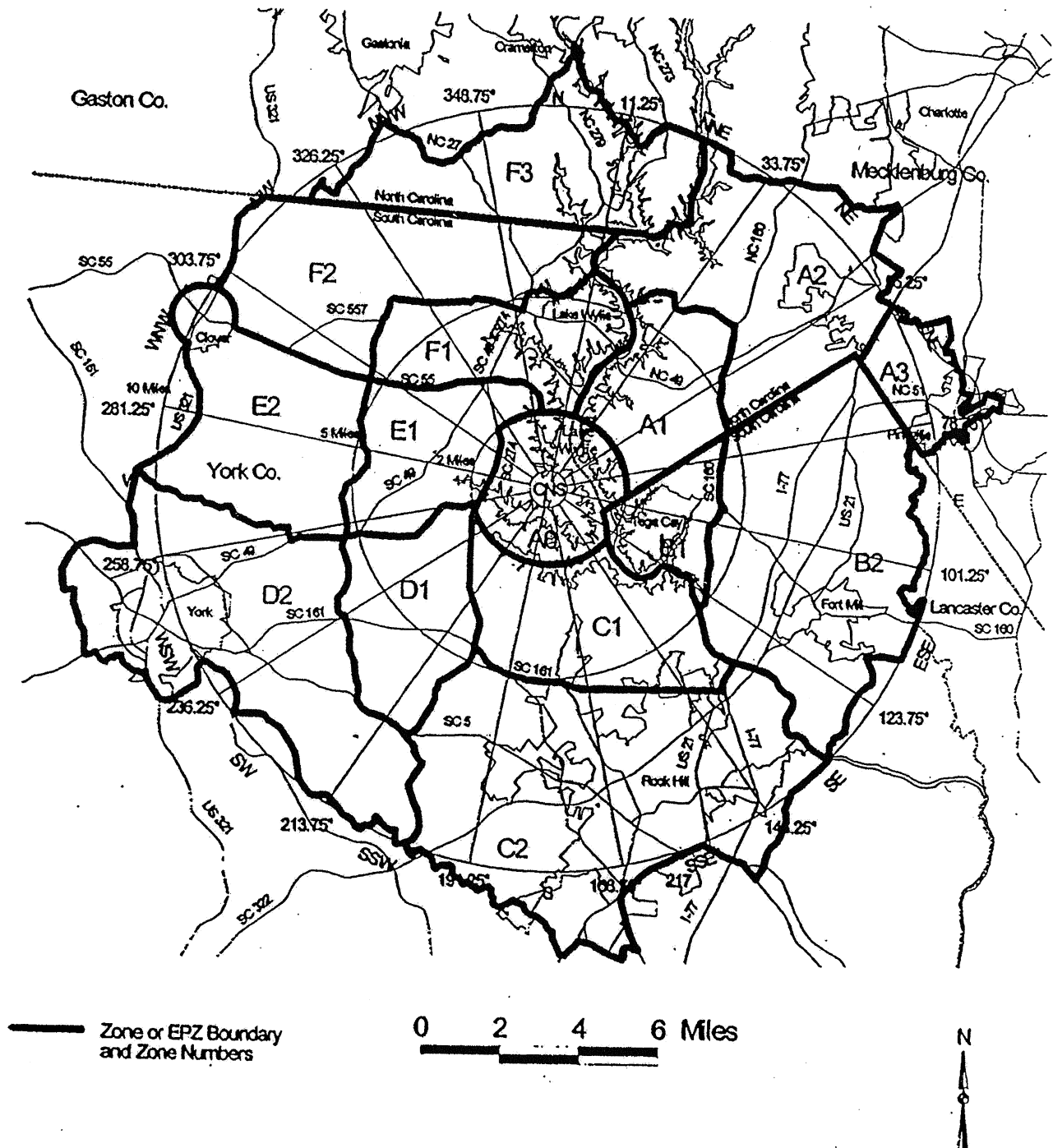
- _____ 3.1 Dial 1-800-552-4226 (Hotline/Activation Line)
- _____ 3.2 **IF** CAN is being activated for a **DRILL**, read one of the following messages depending on day and time.
- _____ • **IF** Monday through Thursday between 0700 through 1730, read the following message:
"This is _____ (name) _____ from Duke Power, Catawba. The Password is Catawba. Please run Catawba Day List message number 5. Please call me back to verify system operation at _____."
(Phone # in Simulator)
 - _____ • **IF NOT** Monday through Thursday between 0700 through 1730, read the following message:
"This is _____ (name) _____ from Duke Power, Catawba. The Password is Catawba. Please run Catawba Night List message number 5. Please call me back to verify system operation at _____."
(Phone # in Simulator)
- _____ 3.3 **IF** CAN is being activated for an **EMERGENCY**, read one of the following messages depending on day and time.
- _____ • **IF** Monday through Thursday between 0700 through 1730, read the following message:
"This is _____ (name) _____ from Duke Power, Catawba. The Password is Catawba. Please run Catawba Day List message number 6. Please call me back to verify system operation at (803) 831-7332."
 - _____ • **IF NOT** Monday through Thursday between 0700 through 1730, read the following message:
"This is _____ (name) _____ from Duke Power, Catawba. The Password is Catawba. Please run Catawba Night List message number 6. Please call me back to verify system operation at (803) 831-7332."
- _____ 3.4 **IF** ERO pager activation in step 1 was not successful, ensure step 2 (Activate ERO pagers for Drills and Emergencies using a Touchtone Phone) has been performed.

Enclosure 4.2

RP/0/A/5000/005

10 Mile Emergency Planning Zone (EPZ) Map
and Protective Action Zone Determination Tables

Page 1 of 2



Enclosure 4.2

RP/0/A/5000/005

10 Mile Emergency Planning Zone (EPZ) Map and Protective Action Zone Determination Tables

Page 2 of 2

Use this table to determine the recommended zones for evacuation within the:
2 mile radius and 5 miles downwind, when the wind speed (OAC Pt. C1P0253) is greater than 5 mph.

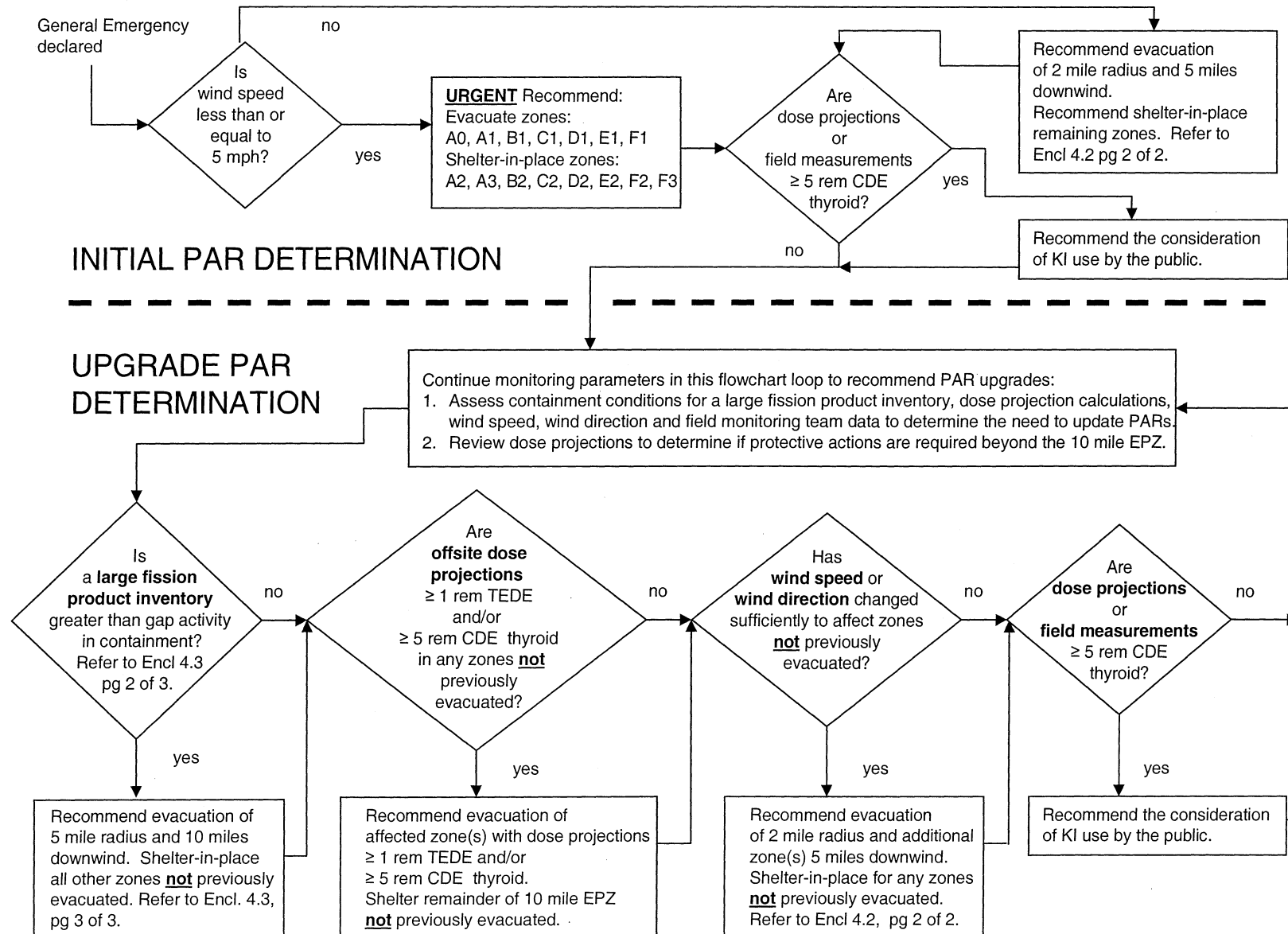
- NOTE:**
1. Upper tower wind direction (OAC Pt. C1P0250) is preferred. If not available, use lower tower wind direction (OAC Pt. C1P0252). Use wind direction from National Weather Service if site meteorological information is not available. NWS: Primary: 1-800-268-7785 Backup: 864-879-1085.
 2. Wind direction indicator in Control Room has a scale of 0 to 540 degrees. Both 0 and 360 degrees indicate North.
 3. Subtract 360 from wind direction indications greater than 360 degrees to arrive at wind direction for table below.

PROTECTIVE ACTION ZONES DETERMINATION TABLE		
Wind Direction (Degrees from North) (See Notes 2 & 3)	2 Mile Radius - 5 miles Downwind	Remainder of EPZ
	<i>EVACUATE</i>	<i>IN-PLACE SHELTER</i>
348.75 -11.25	A0, B1, C1, D1	A1, A2, A3, B2, C2, D2, E1, E2, F1, F2, F3
11.26 -33.75	A0, C1, D1	A1, A2, A3, B1, B2, C2, D2, E1, E2, F1, F2, F3
33.76 -56.25	A0, C1, D1, E1	A1, A2, A3, B1, B2, C2, D2, E2, F1, F2, F3
56.26 -78.75	A0, C1, D1, E1, F1	A1, A2, A3, B1, B2, C2, D2, E2, F2, F3
78.76 -101.25	A0, C1, D1, E1, F1	A1, A2, A3, B1, B2, C2, D2, E2, F2, F3
101.26 -123.75	A0, D1, E1, F1	A1, A2, A3, B1, B2, C1, C2, D2, E2, F2, F3
123.76 -146.25	A0, E1, F1	A1, A2, A3, B1, B2, C1, C2, D1, D2, E2, F2, F3
146.26 -168.75	A0, A1, E1, F1	A2, A3, B1, B2, C1, C2, D1, D2, E2, F2, F3
168.76 -191.25	A0, A1, E1, F1	A2, A3, B1, B2, C1, C2, D1, D2, E2, F2, F3
191.26 -213.75	A0, A1, B1, E1, F1	A2, A3, B2, C1, C2, D1, D2, E2, F2, F3
213.76 -236.25	A0, A1, B1, F1	A2, A3, B2, C1, C2, D1, D2, E1, E2, F2, F3
236.26 -258.75	A0, A1, B1, F1	A2, A3, B2, C1, C2, D1, D2, E1, E2, F2, F3
258.76 -281.25	A0, A1, B1, C1	A2, A3, B2, C2, D1, D2, E1, E2, F1, F2, F3
281.26 -303.75	A0, A1, B1, C1	A2, A3, B2, C2, D1, D2, E1, E2, F1, F2, F3
303.76 -326.25	A0, B1, C1	A1, A2, A3, B2, C2, D1, D2, E1, E2, F1, F2, F3
326.26 -348.74	A0, B1, C1, D1	A1, A2, A3, B2, C2, D2, E1, E2, F1, F2, F3

Enclosure 4.3

Guidance for Protective Actions Protective Action Recommendation Flowchart

RP/0/A/5000/005
Page 1 of 3



Enclosure 4.3
Guidance for Protective Actions

RP/0/A/5000/005
Page 2 of 3

Guidance for Determination of Gap Activity

Fission product inventory inside Containment is greater than gap activity if the containment radiation level exceeds the levels in the table below:

TIME AFTER SHUTDOWN (HOURS)	HIGH RANGE CONTAINMENT MONITOR READING - EMF 53A and/or EMF 53B <i>100 % Gap Activity Release</i>
0 - 2	864 R/Hr
2 - 4	624 R/Hr
4 - 8	450 R/Hr
>8	265 R/Hr

Enclosure 4.3

Guidance for Protective Actions

RP/0/A/5000/005

Page 3 of 3

This Table Only Used For Large Fission Product Inventory Greater Than Gap Activity In Containment.

Use this table to determine the recommended zones for evacuation within the:

5 mile radius and 10 miles downwind for any wind speed (OAC Pt. C1P0253).

- NOTE:** 1. Upper tower wind direction (OAC Pt. C1P0250) is preferred. If not available, use lower tower wind direction (OAC Pt. C1P0252). Use wind direction from National Weather Service if site meteorological information is not available. NWS: Primary: 1-800-268-7785 Backup: 864-879-1085.
2. Wind direction indicator in Control Room has a scale of 0 to 540 degrees. Both 0 and 360 degrees indicate North.
3. Subtract 360 from wind direction indications greater than 360 degrees to arrive at wind direction for table below.

PROTECTIVE ACTION ZONES DETERMINATION TABLE		
Wind Direction (Degrees from North)	5 Mile Radius - 10 miles Downwind	Remainder of EPZ
(See Notes 2 & 3)	<i>EVACUATE</i>	<i>IN-PLACE SHELTER</i>
348.75 -11.25	A0, A1, B1, B2, C1, C2, D1, D2, E1, F1	A2, A3, E2, F2, F3
11.26 -33.75	A0, A1, B1, C1, C2, D1, D2, E1, F1	A2, A3, B2, E2, F2, F3
33.76 -56.25	A0, A1, B1, C1, C2, D1, D2, E1, E2, F1	A2, A3, B2, F2, F3,
56.26 -78.75	A0, A1, B1, C1, C2, D1, D2, E1, E2, F1, F2	A2, A3, B2, F3
78.76 -101.25	A0, A1, B1, C1, D1, D2, E1, E2, F1, F2	A2, A3, B2, C2, F3,
101.26 -123.75	A0, A1, B1, C1, D1, D2, E1, E2, F1, F2, F3	A2, A3, B2, C2
123.76 -146.25	A0, A1, B1, C1, D1, E1, E2, F1, F2, F3	A2, A3, B2, C2, D2
146.26 -168.75	A0, A1, A2, B1, C1, D1, E1, E2, F1, F2, F3	A3, B2, C2, D2
168.76 -191.25	A0, A1, A2, B1, C1, D1, E1, F1, F2, F3	A3, B2, C2, D2, E2
191.26 -213.75	A0, A1, A2, A3, B1, B2, C1, D1, E1, F1, F2, F3	C2, D2, E2
213.76 -236.25	A0, A1, A2, A3, B1, B2, C1, D1, E1, F1, F2, F3	C2, D2, E2
236.26 -258.75	A0, A1, A2, A3, B1, B2, C1, D1, E1, F1, F3	C2, D2, E2, F2
258.76 -281.25	A0, A1, A2, A3, B1, B2, C1, C2, D1, E1, F1	D2, E2, F2, F3
281.26 -303.75	A0, A1, A2, A3, B1, B2, C1, C2, D1, E1, F1	D2, E2, F2, F3
303.76 -326.25	A0, A1, A3, B1, B2, C1, C2, D1, E1, F1	A2, D2, E2, F2, F3
326.26 -348.74	A0, A1, B1, B2, C1, C2, D1, D2, E1, F1	A2, A3, E2, F2, F3

Enclosure 4.4

Evacuation Time Estimates for Catawba Plume Exposure EPZ

RP/0/A/5000/005
Page 1 of 1

Analysis Case	Approx. Distance (Miles)	Approx. Direction	Subareas Included	Evacuation Time (minutes) ¹					
				Fair Weather			Adverse Weather ²		
				Winter Weekday	Winter Weeknight	Summer Weekend	Winter Weekday	Winter Weeknight	Summer Weekend
1	0-2	180°, E	A0 ¹	160	160	160	160	160	160
2	0-2	180°, W	A0 ²	160	160	160	180	180	180
3	0-5	90°, NE	A0 ¹ , A1	280	200	200	380	260	240
4	0-5	90°, SE	A0 ² , B1, C1	320	260	280	380	300	300
5	0-5	90°, NW	A0 ² , E1, F1	180	180	180	200	200	180
6	0-5	90°, SW	A0 ² , D1	180	180	180	200	200	200
7	0-10	90°, NE	A0 ¹ , A1, A2, A3	340	260	420	460	340	490
8	0-10	90°, SE	A0 ¹ , B1, C1, B2, C2	320	260	280	380	300	300
9	0-10	90°, NW	A0 ² , E1, E2, F1, F2, F3	260	240	220	360	320	280
10	0-10	90°, SW	A0 ² , D1, D2	180	180	180	200	200	200
11	0-10	360°	Entire EPZ: A0 ¹ , A0 ² , A1, A2, A3, B1, B2, C1, C2, D1, D2, E1, E2, F1, F2, F3	340	260	420	460	340	490

¹Includes times associated with notification, preparation, and travel out of the EPZ Area, rounded to the nearest 5-minute interval. Evacuation of transient facilities throughout the entire EPZ is included in all evacuation cases, per the offsite RERP's.

²Reduction in roadway capacities and travel speeds of 20% for summer weekend conditions (rain), 30% for winter weekday and winter weeknight conditions (ice).

Enclosure 4.5
OSM to Emergency Coordinator Turnover
Form

RP/0/A/5000/005
Page 1 of 1

1. Plant Status:

Unit 1: _____

Unit 2: _____

2. Emergency Classification: _____

Time Declared: _____

3. Off-Site Agency Notifications Turnover to TSC Complete? ____ (Y/N)

4. Time Next Notification Due: _____

5. Significant Events:

_____ Radioactive Release
Y/N

_____ Injured Personnel
Y/N

_____ Other (Specify __)
Y/N

6. Protective Actions in Progress:

_____ Site Assembly (Time Initiated _____)
Y/N

_____ Off-Site Protective Actions Recommended
Y/N (List) _____

_____ Other (Specify _____)
Y/N

7. Response Procedure In Progress: _____

RP _____ RP _____ RP _____

8. Actions in Progress:

Enclosure 4.6
General Emergency Termination Briefing
with States and Counties

RP/0/A/5000/005

Page 1 of 1

1. Plant Status:

Unit 1: _____

Unit 2: _____

2. Emergency Classification: _____

Time Declared: _____

3. Off-Site Agency Notifications Turnover to TSC Complete? _____ (Y/N)

4. Time Next Notification Due: _____

5. Significant Events:

_____ Radioactive Release
Y/N

_____ Injured Personnel
Y/N

_____ Other (Specify _____)
Y/N

6. Protective Actions in Progress:

_____ Site Assembly (Time Initiated _____)
Y/N

_____ Off-Site Protective Actions Recommended
Y/N (List) _____

_____ Other (Specify _____)
Y/N

7. Response Procedure In Progress: _____

RP _____ RP _____ RP _____

8. Actions in Progress:

5-4 KEY

RP/0/A/5000/005

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_____ 2.2.2 Activate Emergency Response Organization by completing Enclosure 4.1 of this procedure.

_____ 2.3 Make immediate Protective Action Recommendations (PAR) on Line 5 of the Emergency Notification Form as follows:

_____ 2.3.1 Determine PAR for evacuating and sheltering the public based on current lower tower wind speed, OAC Pt. C1P0253 (use upper tower wind speed, OAC Pt. C1P0251, if lower tower wind speed is not available) as below:

WIND SPEED LESS THAN OR EQUAL TO 5 MPH

Evacuate zones: A0, A1, B1, C1, D1, E1, F1

AND

Shelter in place zones: A2, A3, B2, C2, D2, E2, F2, F3

OR

WIND SPEED GREATER THAN 5 MPH

Evacuate two mile radius **AND** all affected zones 5 miles downwind **AND** shelter in place remaining 10 mile EPZ as shown on Enclosure 4.2, page 2 of 2.

ORIGINAL
PAGE

_____ 2.3.2 **IF** off-site dose projections or field measurements indicate greater than or equal to 5 rem CDE Thyroid dose, recommend the consideration of KI use by the public.

_____ 2.4 Notify off-site agencies within 15 minutes of Emergency declaration time using an Emergency Notification Form. Refer to one of the following procedures for instructions:

- RP/0/A/5000/006A, "Notifications to States and Counties from the Control Room"
- RP/0/A/5000/006B, "Notifications to States and Counties from the Technical Support Center"
- SR/0/B/2000/004, "Notifications to States and Counties from the Emergency Operations Facility"

_____ 2.5 **IF** there is an indication of a radioactive release **AND** the TSC is not activated, contact RP shift to perform off-site dose assessment per HP/0/B/1009/026.

_____ 3.3 Evaluate specific plant conditions, off-site dose projections, field monitoring team data, and assess need to update Protective Action Recommendations made to states and counties in previous notification. Refer to:

- Enclosure 4.3, page 1 of 3, Guidance for Protective Actions, Protective Action Recommendation Flowchart
- Enclosure 4.4, Evacuation Time Estimates for Catawba Plume Exposure EPZ

_____ 3.4 Make follow-up notifications to state and county authorities:

- Every hour until the emergency is terminated

OR

- If there is any significant change to the situation

OR

- As agreed upon with an Emergency Management official from each individual agency

_____ 3.5 RP/0/A/5000/018, "Emergency Worker Dose Extension," shall be used to authorize emergency worker doses expected to exceed normal occupational exposure limits during a declared emergency event or exceed blanket dose extension limits authorized by the Radiation Protection Manager.

_____ 3.6 Augment shift resources to assess and respond to the emergency situation as needed.

_____ 3.7 Announce over the plant public address system the current emergency classification level and summary of plant status.

_____ 3.8 Assess the emergency conditions and the corresponding emergency classification. See RP/0/A/5000/001, "Classification of Emergency," then:

- Remain in a General Emergency

OR

- Terminate the emergency (Refer to RP/0/A/5000/020 or SR/0/B/2000/003 for Termination Criteria).

_____ 3.9 Announce any emergency classification level changes over the plant public address system, including a summary of plant status.

Enclosure 4.2

RP/0/A/5000/005

**10 Mile Emergency Planning Zone (EPZ) Map
and Protective Action Zone Determination Tables**

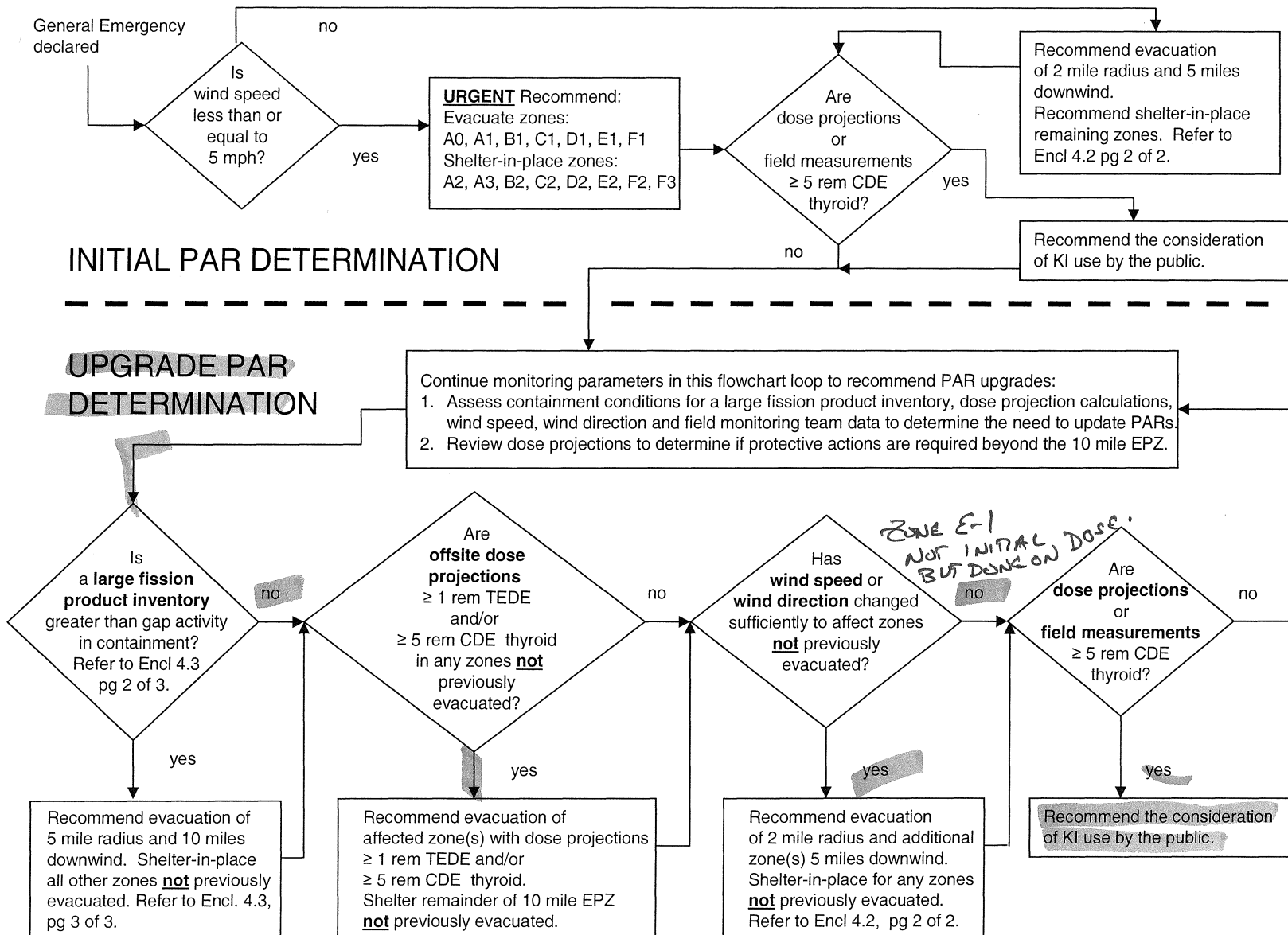
Page 2 of 2

Use this table to determine the recommended zones for evacuation within the:
**2 mile radius and 5 miles downwind, when the wind speed (OAC Pt. C1P0253) is
greater than 5 mph.**

- NOTE:**
1. Upper tower wind direction (OAC Pt. C1P0250) is preferred. If not available, use lower tower wind direction (OAC Pt. C1P0252). Use wind direction from National Weather Service if site meteorological information is not available. NWS: Primary: 1-800-268-7785 Backup: 864-879-1085.
 2. Wind direction indicator in Control Room has a scale of 0 to 540 degrees. Both 0 and 360 degrees indicate North.
 3. Subtract 360 from wind direction indications greater than 360 degrees to arrive at wind direction for table below.

PROTECTIVE ACTION ZONES DETERMINATION TABLE		
Wind Direction (Degrees from North) (See Notes 2 & 3)	2 Mile Radius - 5 miles Downwind	Remainder of EPZ
	EVACUATE	IN-PLACE SHELTER
348.75 -11.25	A0, B1, C1, D1	A1, A2, A3, B2, C2, D2, E1, E2, F1, F2, F3
11.26 -33.75	A0, C1, D1	A1, A2, A3, B1, B2, C2, D2, E1, E2, F1, F2, F3
33.76 -56.25	A0, C1, D1, E1	A1, A2, A3, B1, B2, C2, D2, E2, F1, F2, F3
56.26 -78.75	A0, C1, D1, E1, F1	A1, A2, A3, B1, B2, C2, D2, E2, F2, F3
78.76 -101.25	A0, C1, D1, E1, F1	A1, A2, A3, B1, B2, C2, D2, E2, F2, F3
101.26 -123.75	A0, D1, E1, F1	A1, A2, A3, B1, B2, C1, C2, D2, E2, F2, F3
123.76 -146.25	A0, E1, F1	A1, A2, A3, B1, B2, C1, C2, D1, D2, E2, F2, F3
146.26 -168.75	A0, A1, E1, F1	A2, A3, B1, B2, C1, C2, D1, D2, E2, F2, F3
168.76 -191.25	A0, A1, E1, F1	A2, A3, B1, B2, C1, C2, D1, D2, E2, F2, F3
191.26 -213.75	A0, A1, B1, E1, F1	A2, A3, B2, C1, C2, D1, D2, E2, F2, F3
213.76 -236.25	A0, A1, B1, F1	A2, A3, B2, C1, C2, D1, D2, E1, E2, F2, F3
236.26 -258.75	A0, A1, B1, F1	A2, A3, B2, C1, C2, D1, D2, E1, E2, F2, F3
258.76 -281.25	A0, A1, B1, C1	A2, A3, B2, C2, D1, D2, E1, E2, F1, F2, F3
281.26 -303.75	A0, A1, B1, C1	A2, A3, B2, C2, D1, D2, E1, E2, F1, F2, F3
303.76 -326.25	A0, B1, C1	A1, A2, A3, B2, C2, D1, D2, E1, E2, F1, F2, F3
326.26 -348.74	A0, B1, C1, D1	A1, A2, A3, B2, C2, D2, E1, E2, F1, F2, F3

Guidance for Protective Actions
Protective Action Recommendation Flowchart



Enclosure 4.3
Guidance for Protective Actions

RP/0/A/5000/005
Page 2 of 3

Guidance for Determination of Gap Activity

Fission product inventory inside Containment is greater than gap activity if the containment radiation level exceeds the levels in the table below:

TIME AFTER SHUTDOWN (HOURS)	HIGH RANGE CONTAINMENT MONITOR READING - EMF 53A and/or EMF 53B <i>100 % Gap Activity Release</i>	
0 - 2	864 R/Hr	
2 - 4	624 R/Hr	> 143
4 - 8	450 R/Hr	
>8	265 R/Hr	

NO GAP ACTIVITY.

**Catawba 2007
Initial License Examination**

Job Performance Measure

Admin JPM

S-3

CANDIDATE: _____

EXAMINER: _____

**Catawba 2007
Initial License Examination
Job Performance Measure**

Task: Perform a review of a tagout.

Alternate Path: N/A

Facility JPM #: Bank from 2003 NRC Exam

K/A Rating(s): 2.2.13 Knowledge of tagging and clearance procedures. (CFR: 41.10 / 45.13)
3.6/3.8

Topic Area: Equipment Control

Task Standard: The R&R is reviewed for technical correctness and it is determined that the vent path requires one additional valve to be tagged open (1KF-9 or 1KF-11), the drain path requires 1KF-13 to be tagged open, the pump breaker has the wrong unit designation and the tagging sequence is incorrect. (Sequence of suction and discharge valve closure is not significant for this pump.)

Preferred Evaluation Location:

Control Room X In-Plant

Preferred Evaluation Method:

Perform X Simulate

Procedure References:

CN-1570-1.0 (Flow Diagram of the KF System) Revision 19
SOMP 02-01 (Safety Tagging and Configuration Control)

Validation Time: 20 Minutes

Time Critical: No

Candidate: _____
NAME

Time Start: _____

Time Finish: _____

Performance Ratings:

SAT _____ UNSAT _____ Question Grade _____ Performance Time: _____

Examiner: _____ / _____
NAME SIGNATURE DATE

=====

COMMENTS

Tools / Equipment / Procedures Needed:

CN-1570-1.0 (Flow Diagram of the KF System) Revision 19
SOMP 02-01 (Safety Tagging and Configuration Control)

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIATING CUE:

Unit 1 is operating at 100% power.

1A KF Pump indicated no flow with the pump running and has been removed from service.

1B KF pump has been placed in service.

The Safety Tagging Computer program is not available.

An NLO has manually generated a tag out of the 1A KF pump for maintenance to investigate the impeller and repair as required.

The Tagout boundary is not affected by any MODS.

You are directed to review the R&R that will be used to tagout the 1A KF pump.

Correct any errors found.

Return the R&R to the examiner with any corrections made.

EXAMINER NOTE: Provide student with a copy of flow diagram CN-1570-1.0.	
<p><u>STEP 1:</u> Verify all required blanks on page 1 of the Removal Enclosure are completed. (Down to Prepared-By Sign Off Block).</p> <p><u>STANDARD:</u> Station, Department, Page Number, Tagout ID, Enclosure Type, Enclosure Name, Unit, System, Reason, Prepared By and Date prepared are entered.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2:</u> Verify all tag information blocks are completed as follows:</p> <p><u>STANDARD:</u> Verifies the following information on pages 2 and 3 of the Removal Enclosure.</p> <ul style="list-style-type: none"> • Sequence Number. • Equipment tag • Equipment Description • Equipment Location. • Equipment Position • Label used <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 3:</u> Component verified to be completely isolated and that all components are tagged in the proper position</p> <p><u>STANDARD:</u> The pump is found not to be completely isolated.</p> <p>The candidate recognizes the motor breaker for the 2A KF Pump is to be racked out. Corrects R&R to reflect 1A KF pump motor breaker.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 4:</u> Verify proper sequence.</p> <p><u>STANDARD:</u> Candidate determines that the isolation sequence is incorrect and should be re-ordered as follows</p> <p> 1) Pump motor breaker 2) Discharge Isolation valve closed 3) Suction Isolation valve closed</p> <p> OR</p> <p> 1) Pump motor breaker 2) Suction Isolation valve closed 3) Discharge Isolation valve closed</p> <p>EXAMINER NOTE: Sequence of suction and discharge valve closure is not significant for this pump.</p> <p><u>COMMENTS</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 5:</u> Verifies technical accuracy.</p> <p><u>STANDARD:</u> Candidate determines from flow diagram CN-1570-1.0 that the drain path and vent path are not complete.</p> <p> To complete the drain path 1KF-13 must be tagged open.</p> <p> To complete the vent path one of the following two valves must be tagged opened:</p> <p> • 1KF-9 • 1KF-11</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

STOP TIME: _____

CANDIDATE CUE SHEET

(To Be Returned To Examiner Upon Completion of Task)

INITIATING CUE:

Unit 1 is operating at 100% power.

1A KF Pump indicated no flow with the pump running and has been removed from service.

1B KF pump has been placed in service.

The Safety Tagging Computer program is not available.

An NLO has manually generated a tag out of the 1A KF pump for maintenance to investigate the impeller and repair as required.

The Tagout boundary is not affected by any MODS.

You are directed to review the R&R that will be used to tagout the 1A KF pump.

Correct any errors found.

Return the R&R to the examiner with any corrections made.

Blank R&R Enclosures

Removal or Removal Addendum

Station: CATAWBA NUCLEAR STATION		Dept: OPERATIONS Page 1 of 3		Tagout ID: 07-2650	
Enclosure Type: REMOVAL					
Enclosure Name REMOVAL				Unit # 1	
System:		KF			
Reason:		INSPECT + REPLACE 1A KF Pump IMPELLER AS NECESSARY			
Remarks:					
Modification:		TAGOUT BOUNDARY IS NOT AFFECTED BY ANY MOD			
Prepared By: <i>SBM</i>		at: 11/12/07		Reviewed By: at:	
Cross Disciplinary		at:		Approved By: at:	
Rev By:					
Technical Specifications / SLC Determination By:					
Risk Evaluation By:			SSF Degrade Reported By:		
Containment Closure/Integrity Evaluation By:			Fire Impairment By:		
			Pre Job Briefing Given By:		
Control Room SRO Acknowledge:			In Progress Procedure and Tagout Review:		
1.47 Panel Reviewed By: (CNS ONLY)		<u>Unit 1</u>		<u>Unit 2</u> <u>N/A</u>	
OAC Points Removed From Service By:		<u>Unit 1</u>		<u>Unit 2</u> <u>Unit 3</u>	
Control Room Logs Updated By:		<u>Unit 1</u>		<u>Unit 2</u> <u>Unit 3</u>	
Safety Tag Program Updated By:			Enclosure Filed By:		

Blank R&R Enclosures

Enclosure Execution Section

Enclosure Execution Start Date / Time: ____/____/____

Seq # 1	Equip Tag: 1KF-2	Position: CLOSED	Placed By:
Red Tag ID RED	Equipment Description: 1A KF Pump Suction ISOL	As Found:	DV By:
Location: Aux E 581 Rm 418 QQ 52		LBL: 0	SV By:

Seq # 2	Equip Tag: 1KF-4	Position: CLOSED	Placed By:
Red Tag ID RED	Equipment Description: 1A KF Pump Disch ISOL	As Found:	DV By:
Location: Aux E 588 Rm 418 QQ 52		LBL: 0	SV By:

Seq # 3	Equip Tag: 2ETA 15	Position: RACKED OUT	Placed By:
Red Tag ID RED	Equipment Description: 1A KF Pump MOTOR	As Found:	DV By:
Location: Aux E 577 Rm 496 AA 49		LBL: 1	SV By:

Seq # 4	Equip Tag: 1KF-10	Position: OPEN	Placed By:
Red Tag ID RED	Equipment Description: 1A KF Pump VENT TO WFT	As Found:	DV By:
Location: Aux E 580 Rm 418 QQ 52		LBL: 0	SV By:

Seq # 4	Equip Tag: 1KF-12	Position: OPEN	Placed By:
Red Tag ID RED	Equipment Description: 1A KF Pump DRAIN	As Found:	DV By:
Location: Aux E 578 Rm 418 QQ 52		LBL: 0	SV By:

Enclosure Execution Completion Date / Time: ____/____/____

Attachment 13.3

SOMP 02-01

Blank R&R Enclosures

Page 3 of 3
SM

Enclosure Execution Section

Enclosure Execution Start Date / Time: ____/____/____

Seq # 4	Equip Tag: 1 KF -121	Position: OPEN	Placed By:
Red Tag ID RED	Equipment Description: 1A KF Pump DRAIN	As Found:	DV By:
Location: Aux E 581 RM 418 QQ 51		LBL: 0	SV By:

Seq #	Equip Tag:	Position:	Placed By:
Red Tag ID	Equipment Description:	As Found:	DV By:
Location:		LBL:	SV By:

Seq #	Equip Tag:	Position:	Placed By:
Red Tag ID	Equipment Description:	As Found:	DV By:
Location:		LBL:	SV By:

Seq #	Equip Tag:	Position:	Placed By:
Red Tag ID	Equipment Description:	As Found:	DV By:
Location:		LBL:	SV By:

Seq #	Equip Tag:	Position:	Placed By:
Red Tag ID	Equipment Description:	As Found:	DV By:
Location:		LBL:	SV By:

Enclosure Execution Completion Date / Time: ____/____/____

KEY

Attachment 13.3

SOMP 02-01

Blank R&R Enclosures

Page 1 of 3

Removal or Removal Addendum

Station: CATAWBA NUCLEAR STATION		Dept: OPERATIONS Page 1 of 3		Tagout ID: 07-2650	
Enclosure Type: REMOVAL					
Enclosure Name: REMOVAL				Unit # 1	
System:		KF			
Reason:		INSPECT + REPLACE 1A KF Pump IMPELLER AS NECESSARY			
Remarks:					
Modification:		TAGOUT BOUNDARY IS NOT AFFECTED BY ANY MOD			
Prepared By: <i>SBM</i>		at: 11/12/07		Reviewed By: at:	
Cross Disciplinary		at:		Approved By: at:	
Rev By:					
Technical Specifications / SLC Determination By:					
Risk Evaluation By:			SSF Degrade Reported By:		
Containment Closure/Integrity Evaluation By:			Fire Impairment By:		
			Pre Job Briefing Given By:		
Control Room SRO Acknowledge:			In Progress Procedure and Tagout Review:		
1.47 Panel Reviewed By: (CNS ONLY)		<u>Unit 1</u>		<u>Unit 2</u>	
				N/A	
OAC Points Removed From Service By:		<u>Unit 1</u>		<u>Unit 2</u>	
				<u>Unit 3</u>	
Control Room Logs Updated By:		<u>Unit 1</u>		<u>Unit 2</u>	
				<u>Unit 3</u>	
Safety Tag Program Updated By:			Enclosure Filed By:		

KEY

Attachment 13.3

SOMP 02-01

Blank R&R Enclosures

Page 2 of 3

Enclosure Execution Section

Enclosure Execution Start Date / Time: ____/____/____

Seq # 1	Equip Tag: 1 ETA 15	Position: RACKED OUT	Placed By:
Red Tag ID RED	Equipment Description: 1A KF Pump MOTOR	As Found:	DV By:
Location: Aux E 577 RM 496 AA 49		LBL: 1	SV By:

Seq # 2	Equip Tag: 1 KF-4	Position: CLOSED	Placed By:
Red Tag ID RED	Equipment Description: 1A KF Pump DISCH ISOL	As Found:	DV By:
Location: Aux E 588 RM 418 QQ 52		LBL: 0	SV By:

Seq # 3	Equip Tag: 1 KF-2	Position: CLOSED	Placed By:
Red Tag ID RED	Equipment Description: 1A KF Pump Suction ISOL	As Found:	DV By:
Location: Aux E 581 RM 418 QQ 52		LBL: 0	SV By:

Seq # 4	Equip Tag: 1 KF-10	Position: OPEN	Placed By:
Red Tag ID RED	Equipment Description: 1A KF Pump VENT TO WEFT	As Found:	DV By:
Location: Aux E 580 RM 418 QQ 52		LBL: 0	SV By:

Seq # 4	Equip Tag: 1 KF-9	Position: OPEN	Placed By:
Red Tag ID RED	Equipment Description: 1A KF Pump VENT	As Found:	DV By:
Location: Aux E 580 RM 418 QQ 52		LBL: 0	SV By:

Enclosure Execution Completion Date / Time: ____/____/____

EXAMINER

NOTE: 1 KF-11 COULD HAVE BEEN
USED IN PLACE OF 1 KF-9

Key

Attachment 13.3

SOMP 02-01

Blank R&R Enclosures

Page 2 of 3

Enclosure Execution Section

Enclosure Execution Start Date / Time: ____/____/____

Seq # 4	Equip Tag: 1 KF-12	Position: OPEN	Placed By:
Red Tag ID RED	Equipment Description: 1A KF Pump DRAIN	As Found:	DV By:
Location: Aux E 578 RM 418 AQ 52		LBL: 0	SV By:

Seq # 4	Equip Tag: 1 KF-121	Position: OPEN	Placed By:
Red Tag ID RED	Equipment Description: 1A KF Pump DRAIN	As Found:	DV By:
Location: Aux E 581 RM 418 AQ 51		LBL: 0	SV By:

Seq # 4	Equip Tag: 1 KF-13	Position: OPEN	Placed By:
Red Tag ID RED	Equipment Description: 1A KF Pump DRAIN TO WEFT	As Found:	DV By:
Location: Aux E 578 RM 418 AQ 51		LBL: 0	SV By:

Seq #	Equip Tag:	Position:	Placed By:
Red Tag ID	Equipment Description:	As Found:	DV By:
Location:		LBL:	SV By:

Seq #	Equip Tag:	Position:	Placed By:
Red Tag ID	Equipment Description:	As Found:	DV By:
Location:		LBL:	SV By:

Enclosure Execution Completion Date / Time: ____/____/____

**Catawba 2007
Initial License Examination
Job Performance Measure**

**ADMIN JPM
R-4**

CANDIDATE: _____

EXAMINER: _____

**Catawba 2007
Initial License Examination
Job Performance Measure**

Task: Calculate RL Discharge Flow

Alternate Path: N/A

Facility JPM #: Modified

K/A Rating(s): 2.2.12 Knowledge of surveillance procedures.

Administrative Topic: Equipment Control

Task Standard: The operator should calculate RL Discharge Flow per PT/0/A/4250/011 (RL Temperature and Discharge Flow Determinations)

Preferred Evaluation Location:

Control Room X In-Plant

Preferred Evaluation Method:

Perform Simulate X

Procedure References:

PT/0/A/4250/011 (RL Temperature and Discharge Flow Determinations)

Validation Time: 15 minutes

Time Critical: No

Candidate: _____
NAME

Time Start: _____

Time Finish: _____

Performance Ratings:

SAT UNSAT Question Grade Performance Time:

Examiner: _____
NAME SIGNATURE DATE

=====

COMMENTS

Tools / Equipment / Procedures Needed:

PT/0/A/4250/011 (RL Temperature and Discharge Flow Determinations)

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIATING CUE:

Unit 1 and Unit 2 OAC's are inoperable. The Control Room Supervisor directs you to perform PT/0/A/4250/011 (RL Temperature and Discharge Flow Determinations) Enclosure 13.2 (Total Discharge Flow Calculation Sheet) to meet the 24 hour surveillance requirement. No releases are in progress or planned. No other equipment is inoperable.

Unit 1 RTP = 100%

Unit 1 MW = 1219 MW

Unit 2 RTP = 98%

Unit 2 MW = 1213 MW

RL HDR Pressure (0RLP5030) = 64 PSIG

1A RN Pump is on

No other RN Pumps are in service.

RN A Discharge Flow (1RNP7520) = 18000 gpm

Lake Wylie Level = 567 FT

RL pumps B & C are on

START TIME: _____

<p><u>STEP 1.1:</u> Obtain Total RL Supply (A) as follows:</p> <p>Perform the following calculations to obtain Total Discharge Head:</p> <p>RL Disch Pressure = 0RLP5030 + 5.6 psi RL Disch Pressure = _____ + 5.6 psi = _____ psig</p> <p>RL Discharge Press (0RLP5030) = 64 PSIG</p> <p>RL Disch Pressure = 64 + 5.6 = 69.6 PSI</p> <p><u>STANDARD:</u> 69.6 PSI</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 1.1:</u></p> <p>(_____ psig x 2.311 ft/psig) + (577.25 - _____ ft) = _____ ft RL Disch Pressure Lake Elev Total Disch Head</p> <p>(69.6 PSIG X 2.311 FT/PSIG) + (577.25 FT- 567 FT) = 171.1 FT</p> <p><u>STANDARD:</u> 171 FT of Total Discharge Head is calculated.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>

<p>STEP 1.1: Enter below the RL Pump Flow values using Total Discharge Head from Enclosure 13.7 (RL Pump Head - Capacity Curves) and calculate.</p> <p>_____ + _____ + _____ = _____ gpm (A) RL Pump A Flow + RL Pump B Flow + RL Pump C Flow = Total RL Supply</p> <p><u>STANDARD:</u> Using + or - ½ the smallest increment on the graph the following flow rates are acceptable</p> <p>RL pump A = 0 GPM RL Pump B = 37,500 – 40,500 GPM RL Pump C = 29,000 – 34,000 GPM</p> <p>0 GPM + 40,500 GPM + 34,000 GPM = 74,500 GPM 0 GPM + 37,500 GPM + 29,000 GPM = 66,500 GPM</p> <p><u>STANDARD:</u> 66,500 - 74,500 GPM</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 1.1: Enter Total RL supply (A) value in Step 1.4.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 1.2: Obtain Total RN Flow (B) as follows: Perform the following calculations to obtain RN Pump Train A Flow:</p> <p>_____ + _____ = _____ gpm 1RNP7520 + 2RNP7520 = RN Pump Train A flow</p> <p>18,000 gpm + 0 gpm = 18,000 gpm (B)</p> <p><u>STANDARD:</u> 18,000 GPM</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 1.2:</u> Perform the following calculations to obtain RN Pump Train B Flow:</p> $\frac{1\text{RNP7510}}{\text{gpm}} + \frac{\text{gpm}}{2\text{RNP7510}} = \text{RN Pump Train B flow}$ <p>0 gpm + 0 gpm = 0 gpm (B)</p> <p><u>STANDARD:</u> 0 GPM</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 1.2:</u> Perform the following calculations to obtain Total RN Flow:</p> $\text{RN Pump Train A Flow} + \text{RN Pump Train B Flow} = \text{Total RN Flow}$ <p>0 gpm + 18,000 gpm = 18,000 gpm (B)</p> <p><u>STANDARD:</u> 18,000 GPM</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 1.2:</u> Enter Total RN Flow (B) in Step 1.4.</p> <p><u>STANDARD:</u></p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 1.3:</u> Obtain Total Cooling Tower Evaporation (C) as follows:</p> <p>IF a Unit 1 NC Pump is inservice, perform the following:</p> <p>IF OAC is in service for Unit 1 Cooling Tower evaporation, perform the following calculations:</p> $\frac{(\text{C1P1355} - \text{C1A1632} + 19) \times 6.837\text{gpm/mw}}{\text{Cooling Tower Evaporation}} = \text{gpm}$ <p><u>STANDARD:</u> N/A no OAC in service.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p>STEP 1.3: IF OAC is NOT in service for Unit 1 Cooling Tower evaporation, perform the following calculations:</p> $((3411\text{MW})(\frac{\quad}{\% \text{ Rx Pwr}}) + 19 - \frac{\quad}{\text{Gen MW}}) \times 6.837\text{gpm/MW} = \frac{\quad}{\text{Cooling Tower Evaporation}} \text{gpm}$ <p>(ex. 95% = 0.95)</p> $((3411 \times 1) + 19 - 1219) \times 6.837 \text{ GPM} = 15116 \text{ GPM}$ <p>STANDARD: 15116 GPM</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 1.3: Enter Unit 1 Cooling Tower evaporation in Step 1.3.5.</p> <p>STANDARD:</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 1.3: IF a Unit 1 NC Pump is NOT inservice AND Unit 1 is in Mode 5, 6, or No Mode, Enter 0 for Unit 1 Cooling Tower Evaporation in Step 1.3.5.</p> <p>STANDARD: Step is not applicable</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 1.3: IF a Unit 2 NC Pump is inservice, perform the following:</p> <p>IF OAC is in service for Unit 2 Cooling Tower evaporation, perform the following calculations:</p> $(\frac{\quad}{\text{C2P1355}} - \frac{\quad}{\text{C2A1632}} + 19) \times 6.837\text{gpm/mw} = \frac{\quad}{\text{Cooling Tower Evaporation}} \text{gpm}$ <p>STANDARD: Step is not applicable</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p>STEP 1.3: IF OAC is NOT in service for Unit 2 Cooling Tower evaporation, perform the following calculations:</p> $((3411\text{MW})(\frac{\quad}{\% \text{ Rx Pwr}}) + 19 - \frac{\quad}{\text{Gen MW}}) \times 6.837\text{gpm/MW} = \frac{\quad}{\text{Cooling Tower Evaporation}} \text{gpm}$ <p>(ex. 95% = 0.95)</p> $((3411 \times .98) + 19 - 1213) \times 6.837 \text{ GPM} = 14691 \text{ GPM}$ <p>STANDARD: 14691 GPM</p> <p>COMMENTS:</p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 1.3: Enter Unit 2 Cooling Tower evaporation in Step 1.3.5.</p> <p>STANDARD: 14691 GPM</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 1.3: IF a Unit 2 NC Pump is NOT inservice AND Unit 2 is in Mode 5, 6, or No Mode, Enter 0 for Unit 2 Cooling Tower Evaporation in Step 1.3.5.</p> <p>STANDARD: Step is not applicable.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 1.3: Calculate Cooling Tower Total Evaporation as follows:</p> $\frac{\quad}{\quad} + \frac{\quad}{\quad} = \frac{\quad}{\quad} \text{gpm (C)}$ <p>Unit 1 Cooling Tower Evaporation + Unit 2 Cooling Tower Evaporation = Total Evaporation</p> $15116 + 14691 = 29807\text{GPM}$ <p>STANDARD: 29807 GPM</p> <p>COMMENTS:</p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 1.3:</u> Enter Total Evaporation (C) in Step 1.4.</p> <p><u>STANDARD:</u></p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 1.4:</u> Perform the following calculation to obtain Total RL Disch Flow:</p> <p>_____ + _____ - _____ = _____ gpm</p> <p>Total RL Supply (A) + Total RN Flow (B) - Total Evaporation (C) = Total RL Disch Flow</p> <p>74,500 GPM + 18,000 GPM - 29807 GPM = 62693 GPM</p> <p>66,500 GPM + 18,000 GPM - 29807 GPM = 54693 GPM</p> <p><u>STANDARD:</u> 54693 GPM to 62693 GPM</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 12:</u> Candidate should sign and date the calculation</p> <p><u>STANDARD:</u></p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 13:</u> Candidate should state the calculation requires IV.</p> <p><u>EXAMINER CUE:</u> Another operator will verify the calculation.</p> <p><u>STANDARD:</u></p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>This JPM is complete.</p>	

STOP TIME: _____

CANDIDATE CUE SHEET

(To Be Returned To Examiner Upon Completion of Task)

INITIATING CUE:

Unit 1 and Unit 2 OAC's are inoperable. The Control Room Supervisor directs you to perform PT/0/A/4250/011 (RL Temperature and Discharge Flow Determinations) Enclosure 13.2 (Total Discharge Flow Calculation Sheet) to meet the 24 hour surveillance requirement. No releases are in progress or planned. No other equipment is inoperable.

Unit 1 RTP = 100%

Unit 1 MW = 1219 MW

Unit 2 RTP = 98%

Unit 2 MW = 1213 MW

RL HDR Pressure (0RLP5030) = 64 PSIG

1A RN Pump is on

No other RN Pumps are in service.

RN A Discharge Flow (1RNP7520) = 18000 gpm

Lake Wylie Level = 567 FT

RL pumps B & C are on

Enclosure 13.2
Total Discharge Flow Calculation Sheet

PT/0/A/4250/011
Page 1 of 3

1. Procedure

1.1 Obtain Total RL Supply (A) as follows:

_____ 1.1.1 Perform the following calculations to obtain Total Discharge Head:

RL Disch Pressure = 0RLP5030 + 5.6 psi

RL Disch Pressure = _____ + 5.6 psi = _____ psig

(_____ psig x 2.311 ft/psig) + (577.25 - _____ ft) = _____ ft
RL Disch Pressure Lake Elev Total Disch Head

_____ 1.1.2 Enter below the RL Pump Flow values using Total Discharge Head from Enclosure 13.7 (RL Pump Head - Capacity Curves) and calculate.

_____ + _____ + _____ = _____ gpm (A)
RL Pump A Flow + RL Pump B Flow + RL Pump C Flow = Total RL Supply

_____ 1.1.3 Enter Total RL supply (A) value in Step 1.4.

1.2 Obtain Total RN Flow (B) as follows:

* _____ 1.2.1 Perform the following calculations to obtain ~~RL~~^N Pump Train A Flow:
_____ + _____ = _____ gpm
1RNP7520 + 2RNP7520 = RN Pump Train A flow

* _____ 1.2.2 Perform the following calculations to obtain ~~RL~~^N Pump Train B Flow:
_____ + _____ = _____ gpm
1RNP7510 + 2RNP7510 = RN Pump Train B flow

_____ 1.2.3 Perform the following calculations to obtain Total RN Flow:

_____ + _____ = _____ gpm (B)
RN Pump Train A Flow + RN Pump Train B Flow = Total RN Flow

_____ 1.2.4 Enter Total RN Flow (B) in Step 1.4.

* STEPS 1.2.1 AND 1.2.2 HAS A TYPOGRAPHICAL
ERROR. CHANGED RL TO RN. NED

Enclosure 13.2

PT/0/A/4250/011

Total Discharge Flow Calculation Sheet

Page 2 of 3

1.3 Obtain Total Cooling Tower Evaporation (C) as follows:

_____ 1.3.1 **IF** a Unit 1 NC Pump is inservice, perform the following:

_____ 1.3.1.1 **IF** OAC is in service for Unit 1 Cooling Tower evaporation, perform the following calculations:

$$\left(\frac{\text{C1P1355} - \text{C1A1632}}{\text{Cooling Tower Evaporation}} + 19 \right) \times 6.837 \text{ gpm/mw} = \text{_____ gpm}$$

_____ 1.3.1.2 **IF** OAC is **NOT** in service for Unit 1 Cooling Tower evaporation, perform the following calculations:

$$\left((3411 \text{ MW}) \left(\frac{\% \text{ Rx Pwr}}{\text{Gen MW}} \right) + 19 - \text{_____} \right) \times 6.837 \text{ gpm/MW} = \text{_____ gpm}$$

(ex. 95% = 0.95) Cooling Tower Evaporation

_____ 1.3.1.3 Enter Unit 1 Cooling Tower evaporation in Step 1.3.5.

_____ 1.3.2 **IF** a Unit 1 NC Pump is **NOT** inservice **AND** Unit 1 is in Mode 5, 6, or No Mode, Enter 0 for Unit 1 Cooling Tower Evaporation in Step 1.3.5.

_____ 1.3.3 **IF** a Unit 2 NC Pump is inservice, perform the following:

_____ 1.3.3.1 **IF** OAC is in service for Unit 2 Cooling Tower evaporation, perform the following calculations:

$$\left(\frac{\text{C2P1355} - \text{C2A1632}}{\text{Cooling Tower Evaporation}} + 19 \right) \times 6.837 \text{ gpm/mw} = \text{_____ gpm}$$

_____ 1.3.3.2 **IF** OAC is **NOT** in service for Unit 2 Cooling Tower evaporation, perform the following calculations:

$$\left((3411 \text{ MW}) \left(\frac{\% \text{ Rx Pwr}}{\text{Gen MW}} \right) + 19 - \text{_____} \right) \times 6.837 \text{ gpm/MW} = \text{_____ gpm}$$

(ex. 95% = 0.95) Cooling Tower Evaporation

_____ 1.3.3.3 Enter Unit 2 Cooling Tower evaporation in Step 1.3.5.

_____ 1.3.4 **IF** a Unit 2 NC Pump is **NOT** inservice **AND** Unit 2 is in Mode 5, 6, or No Mode, Enter 0 for Unit 2 Cooling Tower Evaporation in Step 1.3.5.

Enclosure 13.2

PT/0/A/4250/011

Total Discharge Flow Calculation Sheet

Page 3 of 3

_____ 1.3.5 Calculate Cooling Tower Total Evaporation as follows:

$$\underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \text{ gpm (C)}$$

Unit 1 Cooling Tower Evaporation + Unit 2 Cooling Tower Evaporation = Total Evaporation

_____ 1.3.6 Enter Total Evaporation (C) in Step 1.4.

_____ 1.4 Perform the following calculation to obtain Total RL Disch Flow:

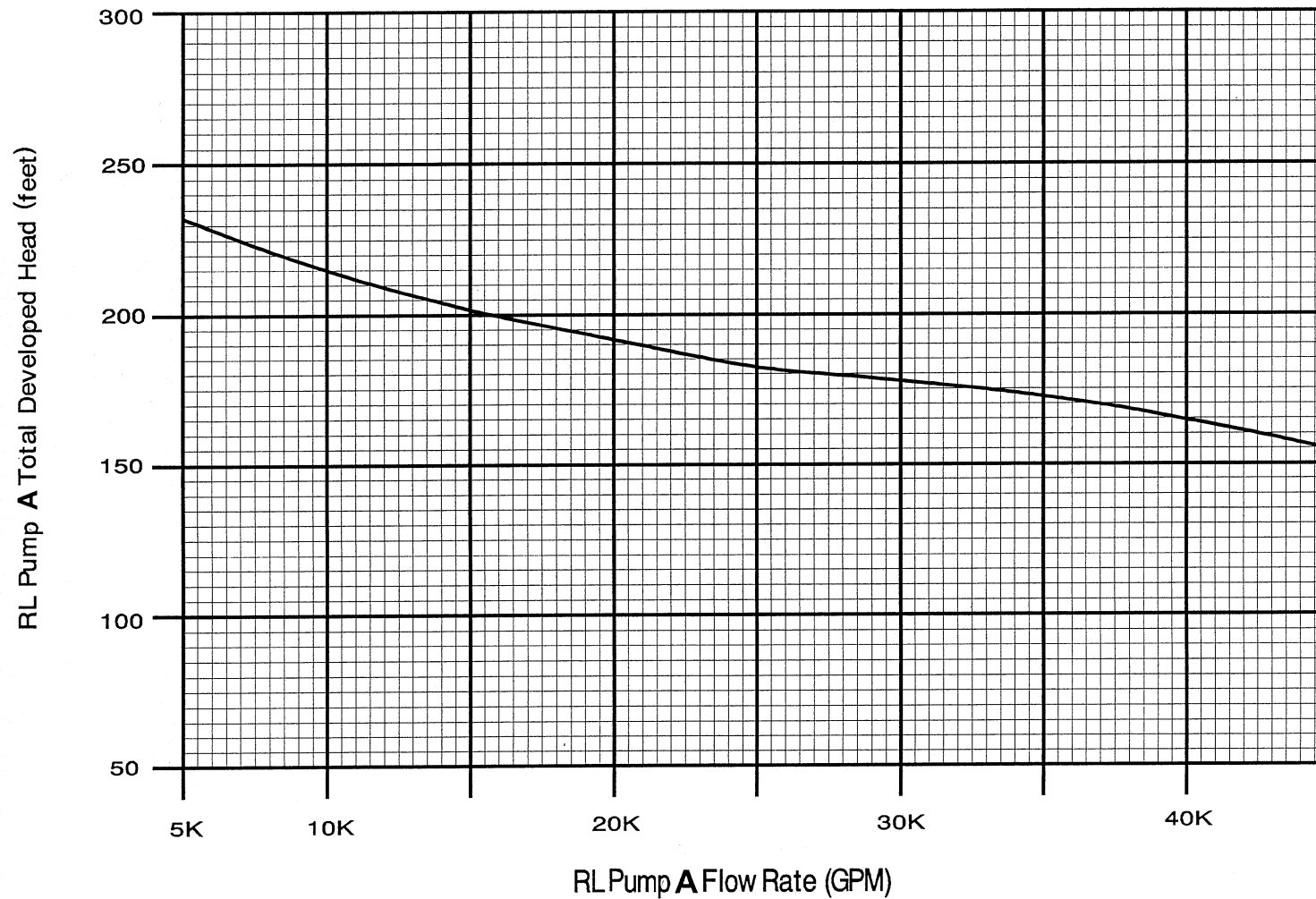
$$\underline{\hspace{2cm}} + \underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \text{ gpm}$$

Total RL Supply (A) + Total RN Flow (B) - Total Evaporation (C) = Total RL Disch Flow

Data Recorded By _____
Operator/Initials Date/Time

Data IV By _____
Operator/Initials Date/Time

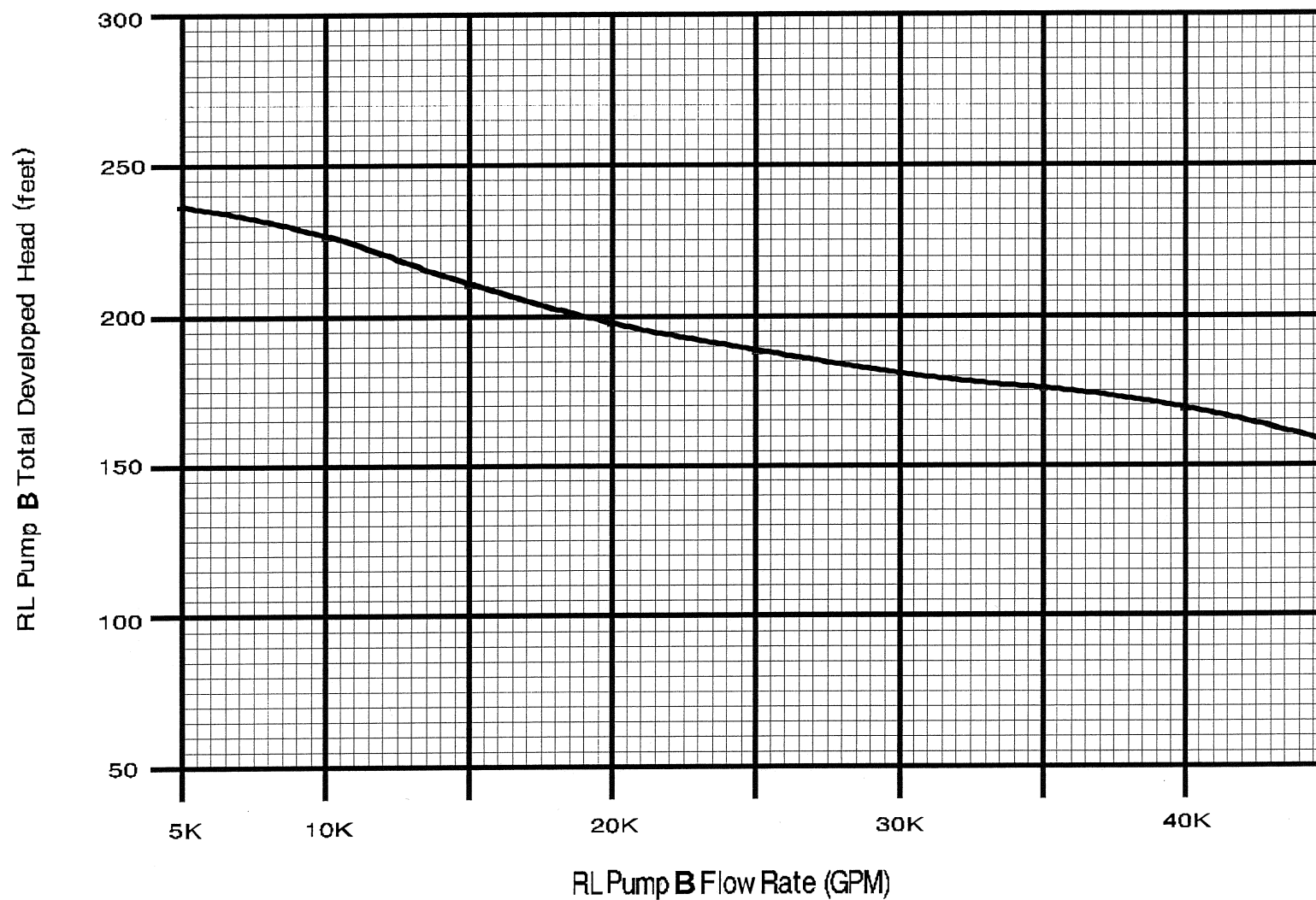
RL Pump Head-Capacity Curve
RL PUMP A HEAD-CAPACITY CURVE



$$\text{TDH} = [\text{Disch Press (psig)} \times 2.311] + [577.25 - \text{Lake Level Elevation in feet}]$$

RL Pump Head-Capacity Curve

RL PUMP B HEAD-CAPACITY CURVE



$$TDH = [\text{Disch Press (psig)} \times 2.311] + [577.25 - \text{Lake Level Elevation in feet}]$$

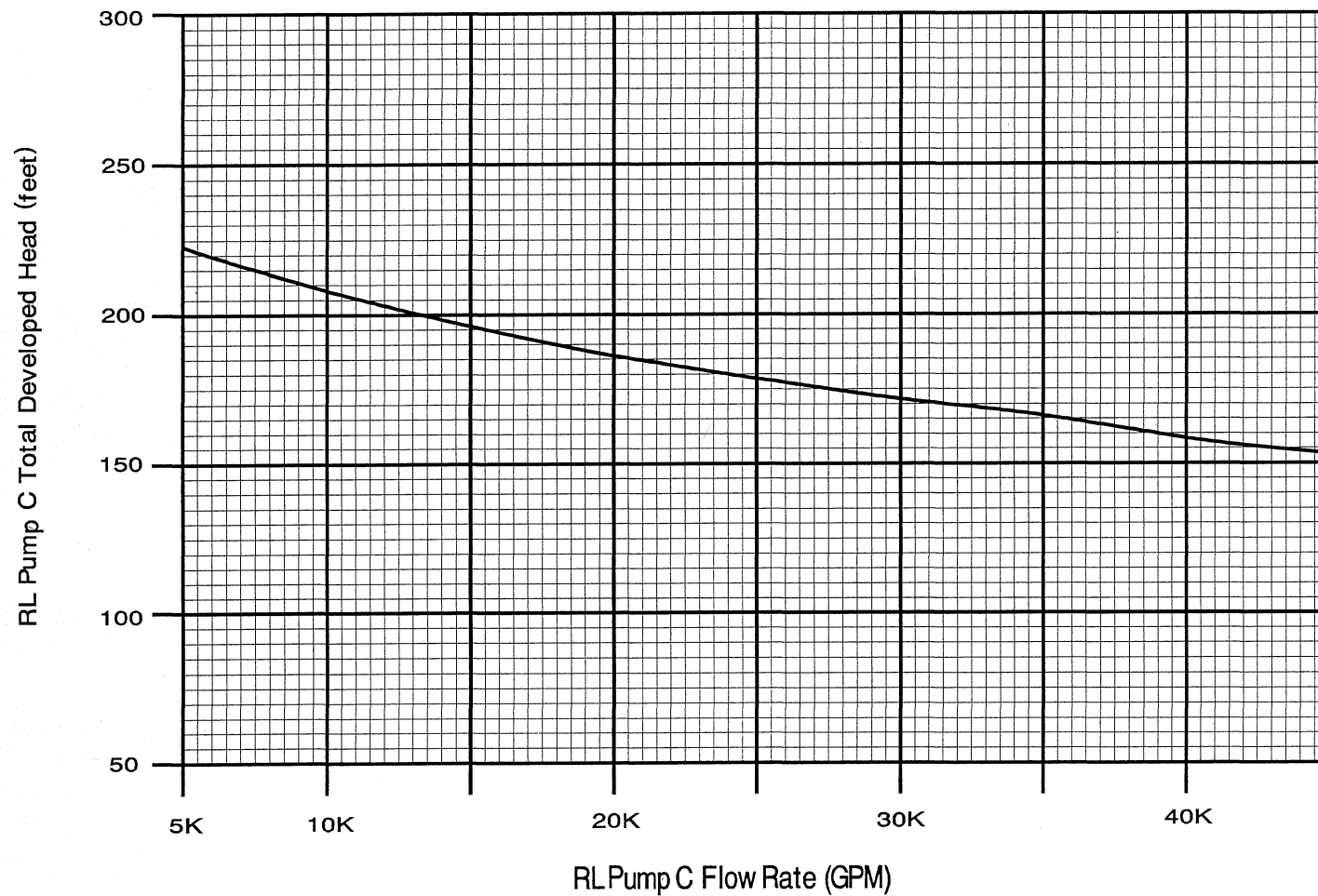
Enclosure 13.7

RL Pump Head-Capacity Curve

RL PUMP C HEAD-CAPACITY CURVE

PT/0/A/4250/011

Page 3 of 3



$$\text{TDH} = [\text{Disch Press (psig)} \times 2.311] + [577.25 - \text{Lake Level Elevation in feet}]$$

Enclosure 13.2

PT/0/A/4250/011

Total Discharge Flow Calculation Sheet

Page 1 of 3

1. Procedure

1.1 Obtain Total RL Supply (A) as follows:

1.1.1 Perform the following calculations to obtain Total Discharge Head:

$$\text{RL Disch Pressure} = 0\text{RLP5030} + 5.6 \text{ psi}$$

$$\text{RL Disch Pressure} = \underline{64} + 5.6 \text{ psi} = \underline{69.6} \text{ psig}$$

$$(\underline{69.6} \text{ psig} \times 2.311 \text{ ft/psig}) + (577.25 - \underline{567} \text{ ft}) = \underline{171} \text{ ft}$$

RL Disch Pressure Lake Elev Total Disch Head

1.1.2 Enter below the RL Pump Flow values using Total Discharge Head from Enclosure 13.7 (RL Pump Head - Capacity Curves) and calculate

$$\underline{0} + \underline{37,500} + \underline{28,000} = \underline{66,500} \text{ gpm (A)}$$

RL Pump A Flow + RL Pump B Flow + RL Pump C Flow = Total RL Supply

1.1.3 Enter Total RL supply (A) value in Step 1.4.

1.2 Obtain Total RN Flow (B) as follows:

* 1.2.1 Perform the following calculations to obtain ~~RL~~^N Pump Train A Flow:

$$\underline{18000} + \underline{0} = \underline{18000} \text{ gpm}$$

1RNP7520 + 2RNP7520 = RN Pump Train A flow

* 1.2.2 Perform the following calculations to obtain ~~RL~~^N Pump Train B Flow:

$$\underline{0} + \underline{0} = \underline{0} \text{ gpm}$$

1RNP7510 + 2RNP7510 = RN Pump Train B flow

1.2.3 Perform the following calculations to obtain Total RN Flow:

$$\underline{18000} + \underline{0} = \underline{18000} \text{ gpm (B)}$$

RN Pump Train A Flow + RN Pump Train B Flow = Total RN Flow

1.2.4 Enter Total RN Flow (B) in Step 1.4.

* STEPS 1.2.1 AND 1.2.2 HAS A TYPOGRAPHICAL ERROR. CHANGED RL TO RN. N/C

Enclosure 13.2

PT/0/4250/011

Total Discharge Flow Calculation Sheet

Page 2 of 3

1.3 Obtain Total Cooling Tower Evaporation (C) as follows:

_____ 1.3.1 **IF** a Unit 1 NC Pump is inservice, perform the following:

_____ 1.3.1.1 **IF** OAC is in service for Unit 1 Cooling Tower evaporation, perform the following calculations:

$$\left(\frac{\text{C1P1355} - \text{C1A1632}}{\text{Cooling Tower Evaporation}} + 19 \right) \times 6.837 \text{ gpm/mw} = \text{_____ gpm}$$

_____ 1.3.1.2 **IF** OAC is **NOT** in service for Unit 1 Cooling Tower evaporation, perform the following calculations:

$$\left((3411 \text{ MW}) \left(\frac{1.00}{\% \text{ Rx Pwr}} \right) + 19 - \frac{1219}{\text{Gen MW}} \right) \times 6.837 \text{ gpm/MW} = \frac{15116}{\text{Cooling Tower Evaporation}} \text{ gpm}$$

(ex. 95% = 0.95)

_____ 1.3.1.3 Enter Unit 1 Cooling Tower evaporation in Step 1.3.5.

_____ 1.3.2 **IF** a Unit 1 NC Pump is **NOT** inservice **AND** Unit 1 is in Mode 5, 6, or No Mode, Enter 0 for Unit 1 Cooling Tower Evaporation in Step 1.3.5.

_____ 1.3.3 **IF** a Unit 2 NC Pump is inservice, perform the following:

_____ 1.3.3.1 **IF** OAC is in service for Unit 2 Cooling Tower evaporation, perform the following calculations:

$$\left(\frac{\text{C2P1355} - \text{C2A1632}}{\text{Cooling Tower Evaporation}} + 19 \right) \times 6.837 \text{ gpm/mw} = \text{_____ gpm}$$

_____ 1.3.3.2 **IF** OAC is **NOT** in service for Unit 2 Cooling Tower evaporation, perform the following calculations:

$$\left((3411 \text{ MW}) \left(\frac{0.98}{\% \text{ Rx Pwr}} \right) + 19 - \frac{1213}{\text{Gen MW}} \right) \times 6.837 \text{ gpm/MW} = \frac{14691}{\text{Cooling Tower Evaporation}} \text{ gpm}$$

(ex. 95% = 0.95)

_____ 1.3.3.3 Enter Unit 2 Cooling Tower evaporation in Step 1.3.5.

_____ 1.3.4 **IF** a Unit 2 NC Pump is **NOT** inservice **AND** Unit 2 is in Mode 5, 6, or No Mode, Enter 0 for Unit 2 Cooling Tower Evaporation in Step 1.3.5.

Enclosure 13.2

PT/0/A/4250/011

Total Discharge Flow Calculation Sheet

Page 3 of 3

1.3.5 Calculate Cooling Tower Total Evaporation as follows:

$$\underline{15116} + \underline{17691} = \underline{29807} \text{ gpm (C)}$$

Unit 1 Cooling Tower Evaporation + Unit 2 Cooling Tower Evaporation = Total Evaporation

1.3.6 Enter Total Evaporation (C) in Step 1.4.

1.4 Perform the following calculation to obtain Total RL Disch Flow:

$$\begin{array}{r} 66500 \\ 74500 \end{array} + \underline{18000} - \underline{29807} = \underline{62693} \text{ gpm}$$

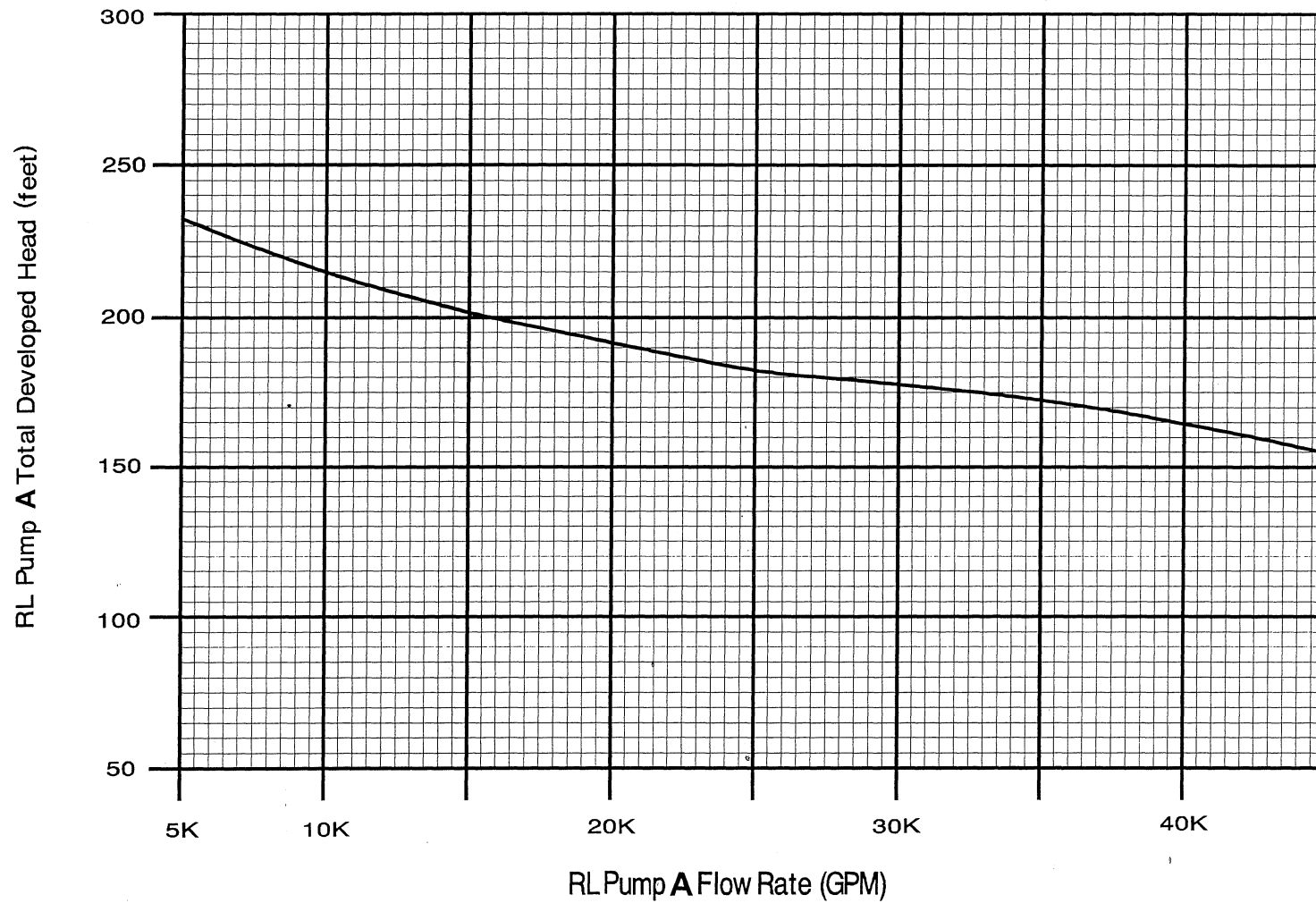
Total RL Supply (A) + Total RN Flow (B) - Total Evaporation (C) = Total RL Disch Flow

Data Recorded By _____
Operator/Initials _____ Date/Time _____

Data IV By _____
Operator/Initials _____ Date/Time _____

RL Pump Head-Capacity Curve

RL PUMP A HEAD-CAPACITY CURVE

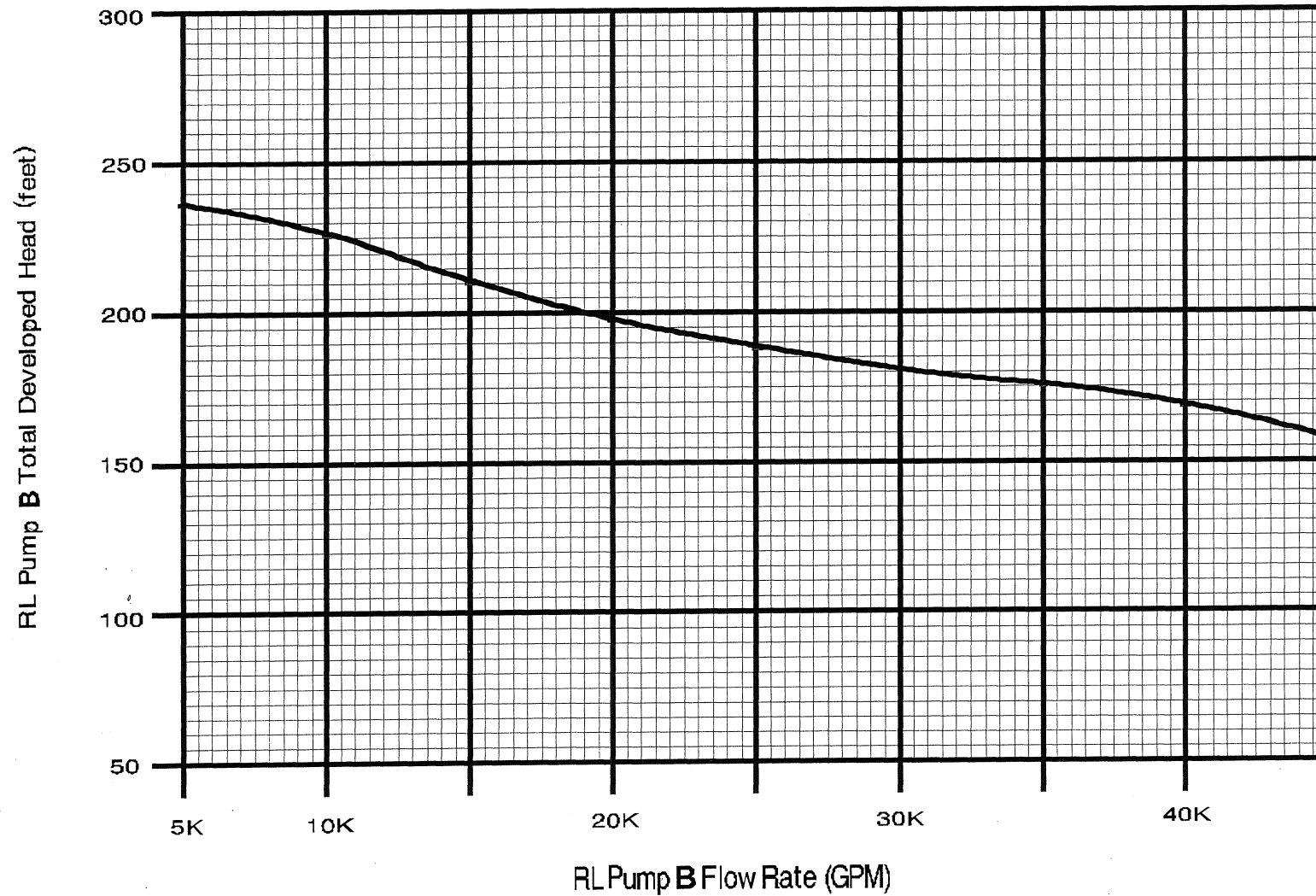


$$\text{TDH} = [\text{Disch Press (psig)} \times 2.311] + [577.25 - \text{Lake Level Elevation in feet}]$$

NOT USED.

RL Pump Head-Capacity Curve

RL PUMP B HEAD-CAPACITY CURVE

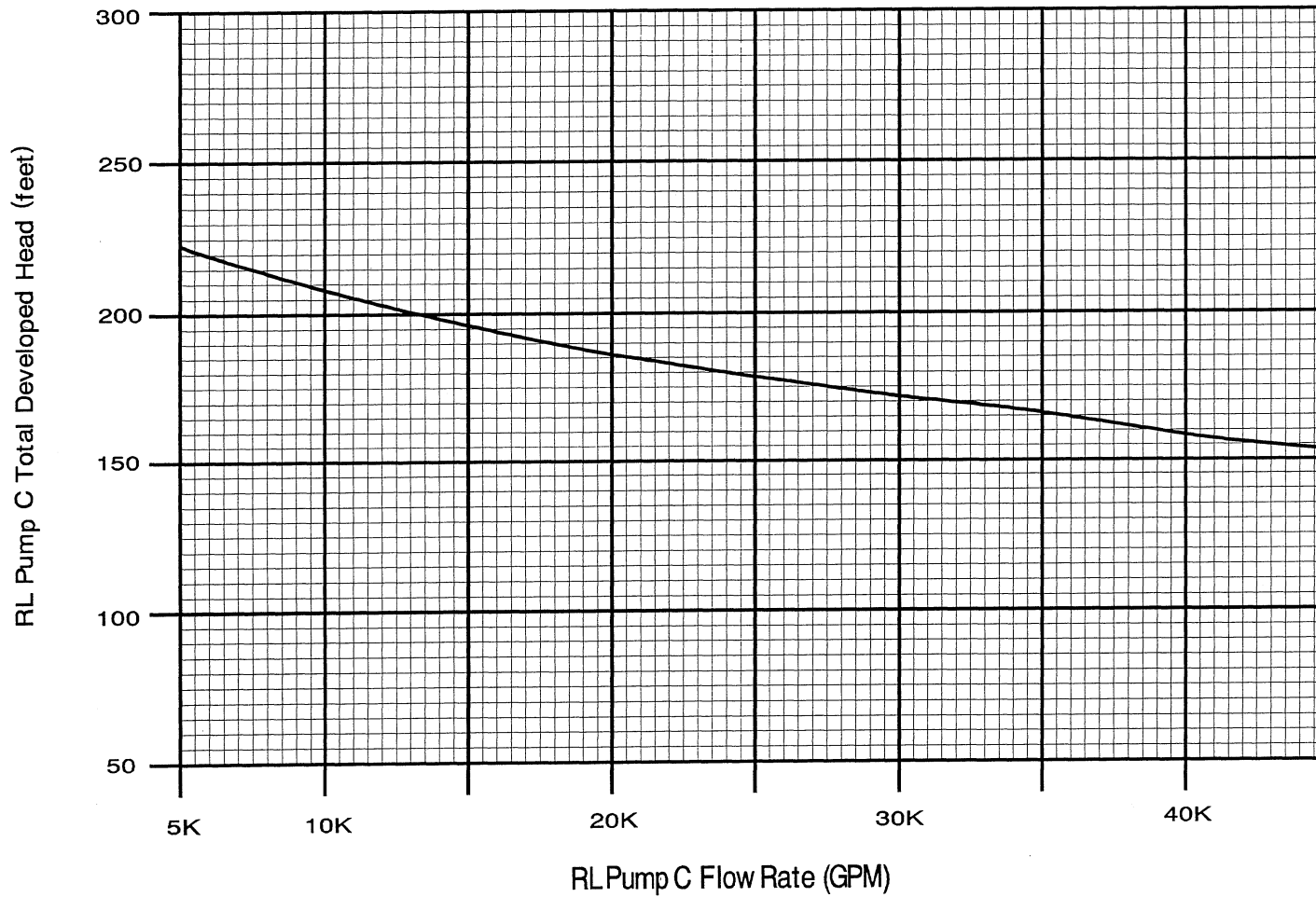


$$TDH = [\text{Disch Press (psig)} \times 2.311] + [577.25 - \text{Lake Level Elevation in feet}]$$

Enclosure 13.7

PT/0/A/4250/011
Page 3 of 3

RL Pump Head-Capacity Curve
RL PUMP C HEAD-CAPACITY CURVE



$$\text{TDH} = [\text{Disch Press (psig)} \times 2.311] + [577.25 - \text{Lake Level Elevation in feet}]$$

**Catawba 2007
Initial License Examination
Job Performance Measure**

**ADMIN JPM
R3**

CANDIDATE: _____

EXAMINER: _____

**Catawba 2007
Initial License Examination
Administrative
Job Performance Measure**

Task: Determine NC Subcooling on a loss of Subcooling Monitor and OAC.

Alternate Path: No

Facility JPM #: New

K/A Rating(s): 2.1.25 Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data. (CFR: 41.10 / 43.5 / 45.12) IMPORTANCE RO 2.8 SRO 3.1

Administrative Topic: Conduct of Ops

Task Standard: Determine Subcooling Margin is met for the given conditions.

Preferred Evaluation Location:

Control Room X In-Plant

Preferred Evaluation Method:

Perform X Simulate

Procedure References:

PT/1/A/4600/009 (Loss of Operator Aid Computer)
Data Book Figure 58 Reactor Coolant Saturation Curve, Narrow Range

Validation Time: 25 Minutes

Time Critical: No

Candidate: _____
NAME

Time Start: _____

Time Finish: _____

Performance Ratings:

SAT _____ UNSAT _____ Question Grade _____ Performance Time: _____

Examiner: _____ / _____
NAME SIGNATURE DATE

=====

COMMENTS

Tools / Equipment / Procedures Needed:

PT/1/A/4600/009 (Loss of Operator Aid Computer)
Data Book Figure 58 Reactor Coolant Saturation Curve, Narrow Range.

READ TO OPERATOR**DIRECTION TO CANDIDATE:**

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIATING CUE:

Unit 1 has had a medium sized LOCA and is currently cooling down per EP/1/A/5000/ES-1.2 (Post LOCA Cooldown and Depressurization). The OAC is out of service. Both trains of Inadequate Core Cooling Plasma Display Monitors are inoperable.

The crew is performing step 19 of EP/ES-1.2 to shutdown one NV Pump. The normal sources of determining subcooling value are not available.

The TSC directs you to utilize Enclosure 13.9 (Subcooling Data Sheet) of PT/1/A/4600/009 (Loss of Operator Aid Computer) to determine the current value of subcooling.

The following plant parameters are noted:

- Containment Pressure is 0.5 PSIG and decreasing from a high of 4 PSIG.
- Loop B Hot Leg W/R Pressure = 670 PSIG
- Loop C Hot Leg W/R Pressure = 670 PSIG
- NC Hot Leg L/R Pressure = 650 PSIG
- Loop A W/R Thot = 475 deg F
- Loop B W/R Thot = 475 deg F
- Loop A W/R Tcold = 465 deg F
- Loop B W/R Tcold = 465 deg F

START TIME: _____

EXAMINER NOTE: Required references for this JPM are PT/1/A/4600/009 (Loss of Operator Aid Computer) Enclosure 13.9 and Data Book Figure 58 Reactor Coolant Saturation Curve, Narrow Range.	
<u>Enclosure 13.9:</u> Determine lowest indicated NC System Pressure <u>STANDARD:</u> Candidate determines lowest indication of NC System Pressure to be the NC Hot Leg L/R Pressure at 650 PSIG. <u>COMMENTS:</u>	Critical Step ___ SAT ___ UNSAT
<u>Enclosure 13.9:</u> Using NC pressure, determine saturation temperature from the Unit One Revised Data Book Figure 57 or Figure 58. <u>STANDARD:</u> Candidate determines the saturation temperature to be 460 deg F to 470 deg F <u>COMMENTS:</u>	Critical Step ___ SAT ___ UNSAT
<u>Enclosure 13.9:</u> Determine the highest NC Temperature. <u>STANDARD:</u> Candidate determines the highest NC Temperature to be Loop A (B) W/R Thot = 475 deg F <u>COMMENTS:</u>	Critical Step ___ SAT ___ UNSAT
<u>Enclosure 13.9:</u> °F Subcooled - Calculate by subtracting "HIGHEST NC TEMP" from "T-SAT". <u>STANDARD:</u> Candidate determines: 460 deg F – 475 deg F = negative 15 deg F subcooling. 470 deg F – 475 deg F = negative 5 deg F subcooling Subcooling is negative 5 deg F to negative 15 deg F. <u>COMMENTS:</u>	Critical Step ___ SAT ___ UNSAT
This JPM is complete.	

STOP TIME: _____

CANDIDATE CUE SHEET

(To Be Returned To Examiner Upon Completion of Task)

INITIATING CUE:

Unit 1 has had a medium sized LOCA and is currently cooling down per EP/1/A/5000/ES-1.2 (Post LOCA Cooldown and Depressurization). The OAC is out of service. Both trains of Inadequate Core Cooling Plasma Display Monitors are inoperable.

The crew is performing step 19 of EP/ES-1.2 to shutdown one NV Pump. The normal sources of determining subcooling value are not available.

The TSC directs you to utilize Enclosure 13.9 (Subcooling Data Sheet) of PT/1/A/4600/009 (Loss of Operator Aid Computer) to determine the current value of subcooling.

The following plant parameters are noted:

- Containment Pressure is 0.5 PSIG and decreasing from a high of 4 PSIG.
- Loop B Hot Leg W/R Pressure = 670 PSIG
- Loop C Hot Leg W/R Pressure = 670 PSIG
- NC Hot Leg L/R Pressure = 650 PSIG
- Loop A W/R Thot = 475 deg F
- Loop B W/R Thot = 475 deg F
- Loop A W/R Tcold = 465 deg F
- Loop B W/R Tcold = 465 deg F

Enclosure 13.9

Subcooling Data Sheet

PT/**1**/A/4600/009

Page 1 of 1

CALCULATION SHEET FOR NC SYSTEM DEGREES SUBCOOLED

[illegible]

ACCEPTANCE CRITERIA:

Subcool limit is 10°F while at power.

30°F while shutdown.

INFORMATION:

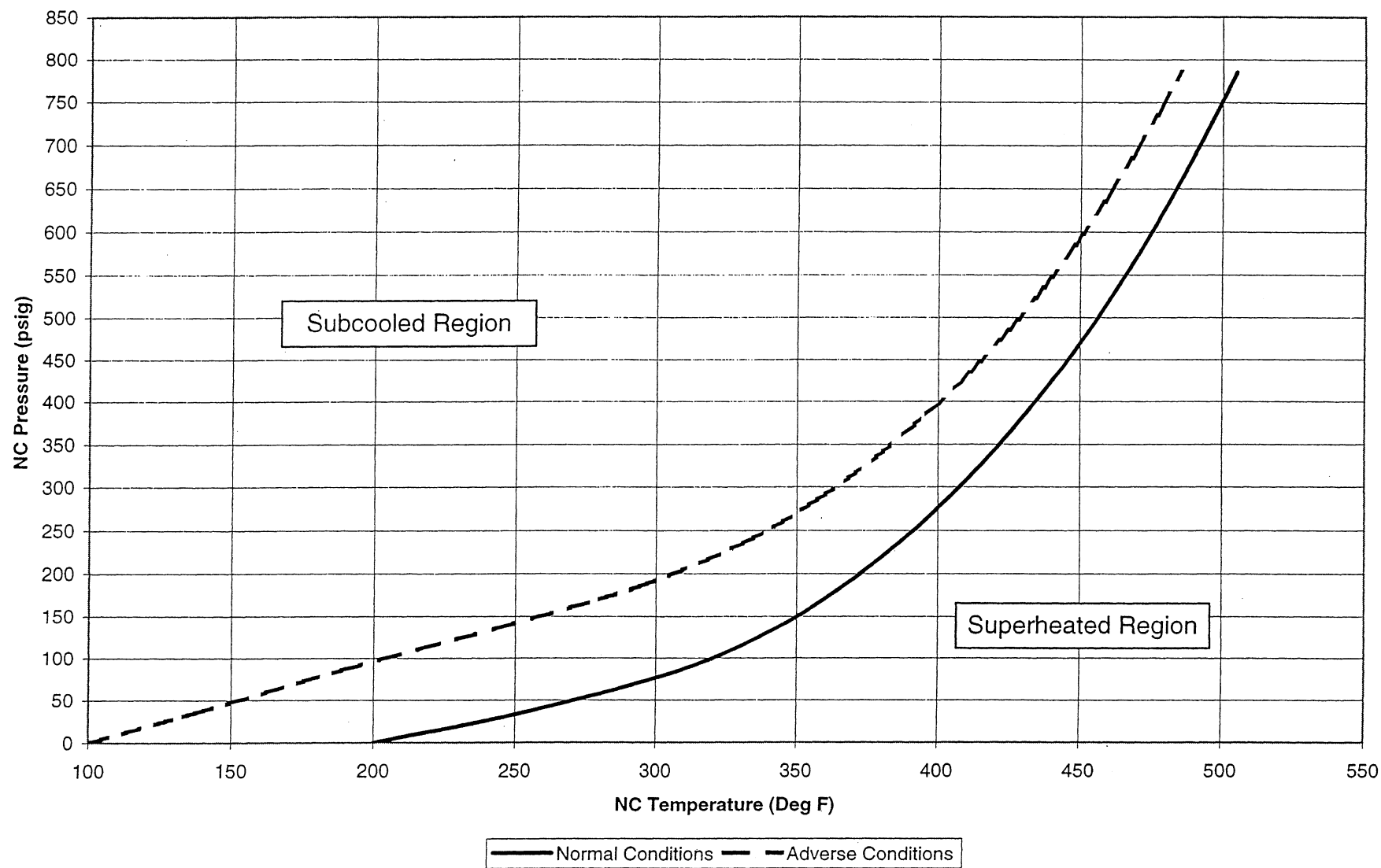
NC Pressure - Record lowest indicated system pressure.

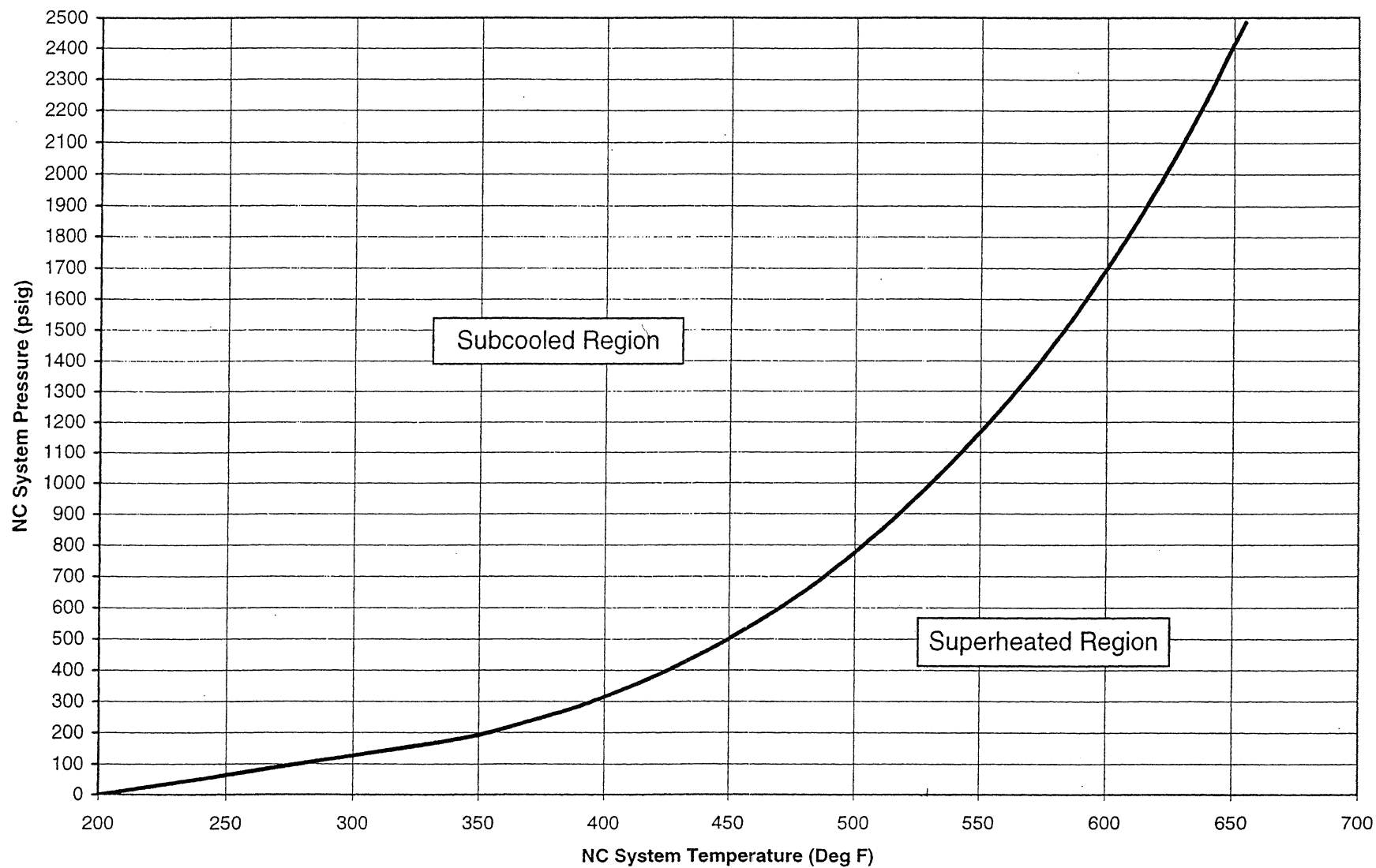
T-SAT - Using NC pressure, determine saturation temperature from the Unit One Revised Data Book Figure 57 or Figure 58.

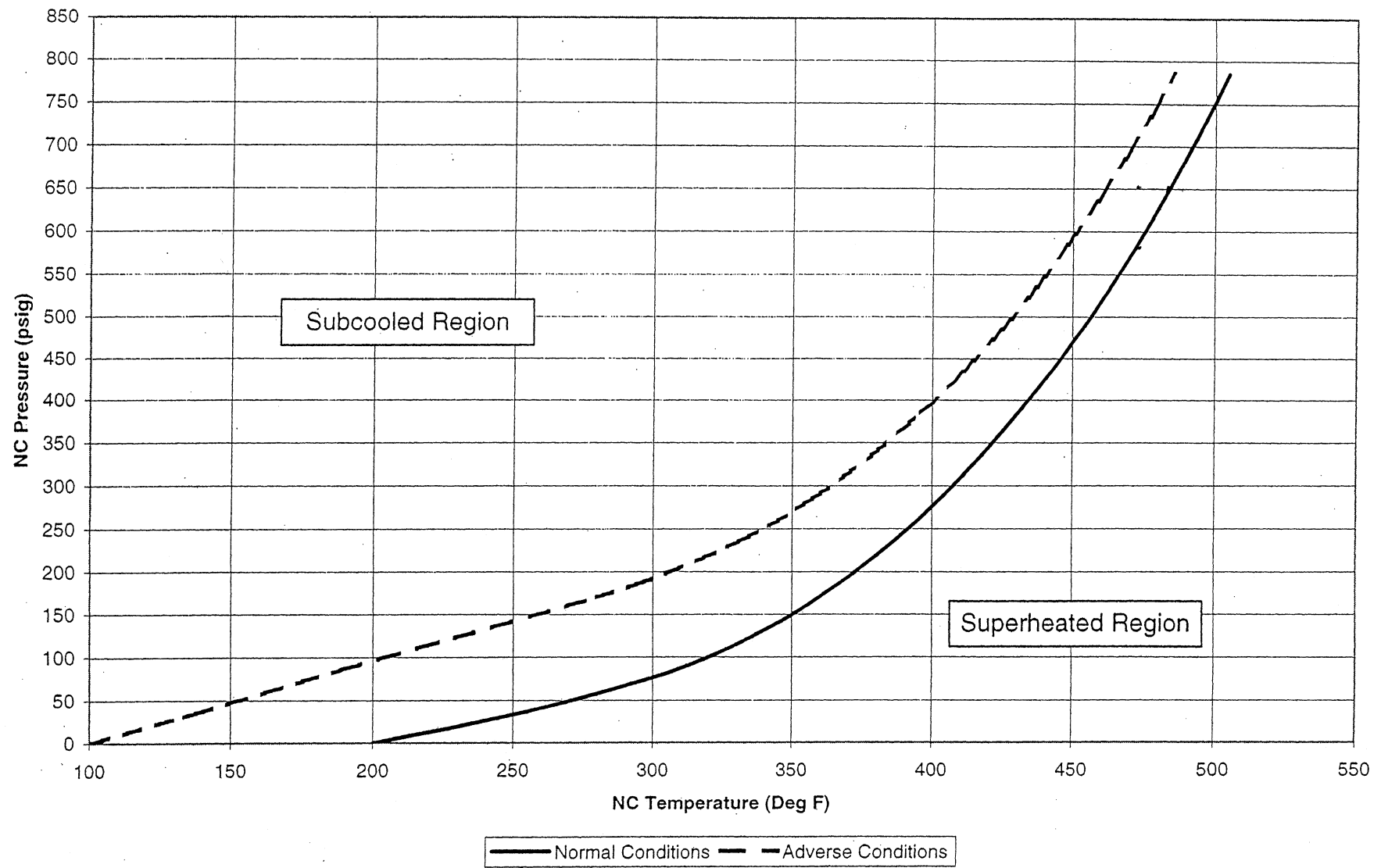
Highest NC Temp - Determine the highest NC Temp:

- In Modes 1 and 2, use Loop T_{HOT}.
- In Modes 3-6:
 - Compare the average of the 5 highest reading operable core exit T/Cs to Loop T_{HOT}.
OR
 - Use the operating train(s) of ND inlet temperature, Loop T_{HOT} and/or the operable core exit T/Cs.

°F Subcooled - Calculate by subtracting "HIGHEST NC TEMP" from "T-SAT".







**Catawba
2007
Initial License Examination
Job Performance Measure**

ADMIN

RO2 / SRO2

CANDIDATE: _____

EXAMINER: _____

Catawba
Initial License Examination
Job Performance Measure

Task: Determine the Radiation Protection requirements required to be met to perform work in the Unit 1 auxiliary pipe chase.

Alternate Path: No

Facility JPM #: New

K/A Rating(s): Generic: 2.3.4 (2.5/3.1) Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.

Task Standard: Determine which individuals are available to perform work in the Unit 1 auxiliary building pipe chase.

Preferred Evaluation Location:

Control Room X In-Plant

Preferred Evaluation Method:

Perform Simulate X

Procedure References:

NSD 507 (Radiation Protection)

Validation Time: 15 Minutes

Time Critical: No

Candidate: _____
NAME

Time Start: _____

Time Finish: _____

Performance Ratings:

SAT UNSAT Question Grade Performance Time:

Examiner: _____
NAME SIGNATURE DATE

=====

COMMENTS

Tools/Equipment/Procedures Needed:

List of employee names and their current year to date dose (attached to initiating cue).

READ TO OPERATOR**DIRECTION TO TRAINEE:**

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

Initiating Cue:

The NI pump suction piping must be vented at valve 1NI-509 (ND Supply To 1B NI Pump Vent).

The time estimated to install and remove the vent rig and complete venting is 35 minutes. Transit time to the valve is estimated to be 5 minutes.

Dose rate at the valve is 120 mR/hr

Average dose rate during transit is 72 mR/hr

Determine which of the following individuals, if any, are available to perform the task without exceeding the allowable Duke Power annual dose limit. Radiation Protection has waived all Electronic Dose Capture "Alert" and "Exclude" flags for workers listed below.

Name	Total Year to Date Dose	Dose received during the current quarter	Other Information
Seth Lake	1920	0	None
Jane Weaver	1900	50	In first trimester of pregnancy. She has NOT declared her pregnancy.
Ron Trey	1743	175	None
Mike Rose	1674	250	None

START TIME: _____

EXAMINER NOTE: Provide the initiating cue,	
Operator answers the following questions. Which individuals can perform the task without exceeding without exceeding the Duke Power Administrative Dose Limits (no exclude or alert limit). <u>ANSWER:</u> Total dose for venting task: $(35 \div 60) \times 120 \text{mR/hr} = 70 \text{mR}$ Total dose for transit: $(5 \div 60) \times 72 \text{mR/hr} \times 2 = 12 \text{mR}$ Total dose for task: 82mR Seth Lake – $1920 + 82 = 2002 \text{ mR}$ Jane Weaver - $1900 + 82 = 1982 \text{ mR}$ Ron Trey – $1743 + 82 = 1825 \text{ mR}$ Mike Rose - $1674 + 82 = 1756 \text{ mR}$ <u>STANDARD:</u> Determines that Jane, Ron, & Mike can perform the task. <u>COMMENTS:</u>	CRITICAL STEP ___ SAT ___ UNSAT
This JPM is complete.	

STOP TIME: _____

CANDIDATE CUE SHEET

(To Be Returned To Examiner Upon Completion Of Task)

Initiating Cue:

The NI pump suction piping must be vented at valve 1NI-509 (ND Supply To 1B NI Pump Vent).

The time estimated to install and remove the vent rig and complete venting is 35 minutes.
Transit time to the valve is estimated to be 5 minutes.

Dose rate at the valve is 120 mR/hr
Average dose rate during transit is 72 mR/hr

Determine which of the following individuals, if any, are available to perform the task without exceeding the allowable Duke Power annual dose limit. Radiation Protection has waived all Electronic Dose Capture "Alert" and "Exclude" flags for workers listed below.

Name	Total Year to Date Dose	Dose received during the current quarter	Other Information
Seth Lake	1920	0	None
Jane Weaver	1900	50	In first trimester of pregnancy. She has NOT declared her pregnancy.
Ron Trey	1743	175	None
Mike Rose	1674	250	None

**Catawba 2007
Initial License Examination
Job Performance Measure**

**ADMIN JPM
R1S1**

CANDIDATE: _____

EXAMINER: _____

**Catawba 2007
Initial License Examination
Administrative
Job Performance Measure**

Task: Determine if required shift manning is met.

Alternate Path: No

Facility JPM #: New

K/A Rating(s): 2.1.4 Knowledge of shift staffing requirements.

Administrative Topic: Conduct of Ops

Task Standard: Determine shift manning is NOT met. Need one additional RO and one additional one 100% NLO.

Preferred Evaluation Location:

Control Room X In-Plant

Preferred Evaluation Method:

Perform X Simulate

Procedure References:

OMP 1-10 (Shift Manning and Overtime Requirements)

Validation Time: 25 Minutes

Time Critical: No

Candidate: _____
NAME

Time Start: _____

Time Finish: _____

Performance Ratings:

SAT _____ UNSAT _____ Question Grade _____ Performance Time: _____

Examiner: _____
NAME SIGNATURE DATE

=====

COMMENTS

Tools / Equipment / Procedures Needed:

OMP 1-10 (Shift Manning and Overtime Requirements)

READ TO OPERATOR**DIRECTION TO CANDIDATE:**

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIATING CUE: NOTE: Use the following page to document your answer.

With both Units at 100 RTP, the following operators are available at the beginning of shift. No SPOC members are available for fire brigade duty. (Assume all individuals are clean shaven.)

Less than 100% qualified NLOs may NOT be used as one of the 3 required "Safe Shutdown NLOS".

Based on the given conditions, can all administrative required positions be filled? If not, what additional resources (by position) are required?

Qualifications and/or License held

Operator	Fire Brigade	Fire Brigade Captain	100% NLO	50% NLO	OSM	RO	SRO	STA
Auten, T	√		√					
Bailes, J	√		√					
Blair, H		√					√	
Burroughs, P				√				
Ellingwood, R		√					√	√
Grant, R	√			√				
Harbin, G							√	√
Hindman, T			√					
Horton, R	√			√				
Hunnicut, W		√			√		√	
Huskey, H		√				√		
Jenkins, G	√			√				
Johnson, D							√	
Jones, T	√		√					
Larsen, D	√			√				
Lechner, R	√		√					
Odoms, T		√				√		
Rhyne, G		√				√		

START TIME: _____

EXAMINER NOTE: Required reference for this JPM is OMP 1-10 (Shift Manning and Overtime Requirements).	
Operator should answer the following questions: QUESTION: Can all administrative requirements per OMP 1-10 be met? ANSWER: No QUESTION: If not, what additional resources (by position) are required? ANSWER: Determine shift manning is NOT met. Need one additional RO and one 100% NLO. <u>COMMENTS:</u>	CRITICAL STEP ___ SAT ___ UNSAT
This JPM is complete.	

STOP TIME: _____

CANDIDATE CUE SHEET

(To Be Returned To Examiner Upon Completion of Task)

INITIATING CUE:

With both Units at 100 RTP, the following operators are available at the beginning of shift. No SPOC members are available for fire brigade duty. (Assume all individuals are clean shaven.)

Less than 100% qualified NLOs may not be used as one of the 3 required "Safe Shutdown NLOS"

Based on the given conditions, can all administrative required positions be filled? If not, what additional resources (by position) are required?

Qualifications and/or License held

Operator	Fire Brigade	Fire Brigade Captain	100% NLO	50% NLO	OSM	RO	SRO	STA
Auten, T	√		√					
Bailes, J	√		√					
Blair, H		√					√	
Burroughs, P				√				
Ellingwood, R		√					√	√
Grant, R	√			√				
Harbin, G							√	√
Hindman, T			√					
Horton, R	√			√				
Hunnicutt, W		√			√		√	
Huskey, H		√				√		
Jenkins, G	√			√				
Johnson, D							√	
Jones, T	√		√					
Larsen, D	√			√				
Lechner, R	√		√					
Odoms, T		√				√		
Rhyne, G		√				√		

<p>Duke Energy Catawba Nuclear Station</p> <p>Shift Manning and Overtime Requirements</p> <p>Information Use</p>	<p>Procedure No.</p> <p>OMP 1-10</p>
	<p>Revision No.</p> <p>030</p>
	<p>Electronic Reference No.</p> <p>CP0094HX</p>

***** UNCONTROLLED FOR PRINT *****

ISSUED

Operations Management Procedure 1-10 (SOM)

Approval _____

Rev 30 Date _____

DUKE POWER COMPANY

CATAWBA NUCLEAR STATION

SHIFT MANNING AND OVERTIME REQUIREMENTS

1. Purpose

To provide guidance for shift manning requirements to ensure compliance with regulations and enhance the safe operation of Catawba Nuclear Station.

2. References

- 2.1. 10CFR50.54 (m), 10CFR55
- 2.2. ANSI/ANS-3.4-1983 (Medical Certification and Monitoring of Personnel Requiring Operator License for Nuclear Plants)
- 2.3. UFSAR 1.8 (Response to TMI Concerns)
- 2.4. Technical Specifications, Section 5.2.2 (Unit Staff)
- 2.5. SLC 16.13-1 (Fire Brigade)
- 2.6. SLC 16.13-4 (Minimum Station Staffing Requirements)
- 2.7. NSD 112 (Fire Brigade Organization, Training and Responsibilities)
- 2.8. NSD 117 (Emergency Response Organization, Staffing, Training, and Responsibilities)
- 2.9. NSD 200 (Overtime Control)
- 2.10. OMP 2-22 (Shift Turnover)
- 2.11. CNS Emergency Plan

3. Description

- 3.1. This procedure identifies the:
- Administrative Shift Manning Requirements
 - Fire Brigade Manning Requirements
- 3.2. This procedure states the Operations overtime policy.

4. Responsibilities

- 4.1. The Operations Shift Manager (OSM) shall ensure the administrative shift manning requirements are met.
- 4.2. The Shift Operations Manager (SOM)/Operations Shift Manager (OSM) shall be responsible for scheduling relief for shift personnel.

5. Reporting Requirements

- 5.1. Inability to meet the shift manning requirements per Step 6.1 and 6.3 shall be documented in a PIP for tracking purposes. The PIP should describe the reason for not being able to meet the responsibilities.
- 5.2. Inability to meet the shift manning requirements per Tech Spec 5.2.2. (Unit Staff), SLC 16.13-1 (Fire Brigade), or SLC 16.13-4 (Minimum Station Staffing Requirements) shall be reported to:
- A. SOM or his designee, and
 - B. Regulatory Compliance Group

6. Guidelines

- | |
|--|
| <p>NOTE:</p> <ol style="list-style-type: none">1. Any deviation from the provisions of this procedure may result in a violation of Tech Specs and SLCs. Tech Specs and SLCs shall be reviewed prior to any deviation from this procedure.2. In some cases, the OSM may elect to allow the shift manning to fall below the administrative minimum shift manning requirements established by this procedure provided that the requirements of T.S. 5.2.2 (Unit Staff), SLC 16.13-1 (Fire Brigade) and SLC 16.13-4 (Minimum Station Staffing Requirements) are satisfied provided the OSM has personnel on call and available if needed. Planned deviations from the requirements of this procedure do <u>not</u> require documentation in PIP as described in Section 5.1. |
|--|

6.1. Shift Manning During Normal Operations

- A. The on duty shift should be comprised of the administrative shift manning requirements listed in Enclosure 7.1. These numbers include the requirements of Tech Spec 5.2.2 (Unit Staff), SLC 16.13-1 (Fire Brigade), and 16.13-4 (Minimum Station Staffing Requirements) plus an extra SRO, RO, and NLO. This establishes administrative minimums.
- B. A Nuclear Shift Supervisor may serve as an OSM in the event the OSM becomes incapacitated and an ETQS qualified OSM is unavailable providing immediate action is taken to call in a relief OSM.
- C. The OSM will not serve as the CR Supervisor, except in emergency relief situations (sickness, restroom breaks not to exceed 15 minutes, etc.). When these situations arise, relief will be called in to remove the OSM from this assignment as soon as practical.
- D. During startup, scheduled shutdown or recovery from a reactor trip, two (2) NCOs shall be in the Control Room for the affected unit.

- E. During activities which have a high risk of causing a plant transient, the following conditions apply:
- Four (4) NCOs shall be in the Control Room. (PIP C-03-00541)
 - The OSM should be in the Control Room. (PIP C-03-05279)
 - The OSM should consider having the STA and/or an additional SRO in the Control Room if deemed necessary. (PIP C-03-05279)

6.2. Shift Manning During Emergency Operations

- A. Refer to NSD 117 (Emergency Response Organization, Training, and Responsibilities).
- B. Refer to CNS Emergency Plan.
- The Offsite Communicator shall respond to the Control Room to ensure required notifications are completed.
 - The Offsite Communicator shall not be concurrently assigned as Primary Fire Brigade Member.

6.3. Fire Brigade Manning Requirements

- A. Fire Brigade member minimum requirements are derived from NSD 112 (Fire Brigade Organization, Training and Responsibilities).
- B. Five (5) Fire Brigade qualified individuals shall be designated as first responders. These five shall include the Fire Brigade Leader, who shall be an Operations person, and two individuals from Operations. The other two members may be from SPOC.
- C. First responders shall be able to respond within a reasonable time to a fire event. Fire Brigade members can be assigned other duties, but shall not be assigned work that would prevent them from responding in a timely manner.
- D. Fire Brigade first responders shall not be part of the minimum shift crew necessary for safe shutdown.

- E. Three (3) additional Fire Brigade qualified individuals shall be designated as supplemental brigade members. These members are a requirement of NSD 112 (Fire Brigade Organization, Training and Responsibilities). Two of the members should be from Operations and the third from SPOC.
- F. The supplemental Fire Brigade members can have other duties that would preclude them from being able to respond with the first responders. They shall respond as quickly and safely as possible.
- G. It is acceptable to use any combination of OPS/SPOC, provided the Fire Brigade Leader and two other members from Operations are designated as the required first responders.
- H. Each Fire Brigade member will be logged on the Shift Assignment Sheet per OMP 2-22 (Shift Turnover).
- I. All Fire Brigade members shall wear a Fire Brigade beeper at all times. If for any reason the beeper can not be worn, an alternative means of contacting the member must exist.

6.4. Fire Brigade Drills

- A. All Fire Brigade members are expected to respond as if it were a real event meeting the criteria of Step 6.3.
- B. All members shall report to the fire scene fully dressed in their fire brigade uniform. If for any reason a fire brigade member can not respond, they should notify the Control Room immediately. A replacement decision will be made by the Control Room staff.

6.5. Overtime Policy

Operations overtime policy is seniority. This seniority is defined as time with Duke Energy Company. The OSM, at his discretion, may elect to mandate overtime to a more experienced operator due to plant conditions. Experience is defined as time in position.

7. Enclosures

7.1. Shift Manning Requirements

Enclosure 7.1
Administrative Shift Manning Requirements

Position	Both Units in Modes 1, 2, 3, 4 (Number Required)	One Unit in Mode 1-4 <u>AND</u> One Unit in Mode 5, 6 (Number Required))	Both Units in Modes 5, 6 (Number Required)
Operations Shift Manager (SRO) *+	1	1	1
Nuclear Shift Supervisor (SRO) * +	3	3	2
NCO (RO) * +	4(a)	4(a)	3(a)
NLO - 100% Qualified	6(a)	6(a)	5(a)
STA +	1	1	1
Fuel Handling Supv. (SRO) +	0	##	##
Fire Brigade Member +	8(b)	8(b)	8(b)

* One of these individuals must assume the Control Room Command Function.

One required for each unit in Mode 6 during Core Alterations. This individual shall have no other concurrent responsibilities, possess an Active SRO License and be present in the Reactor Building to supervise fuel handling activities.

(a) At least one of the required individuals must be assigned to the designated position for each unit.

+ Shall be clean shaven with respiratory and SCBA qualifications up-to-date.

(b) The three NLOs assigned to safe shutdown positions shall not be included as Fire Brigade first responders.

FINAL
INPLANT JPMS

CATAWBA
2007-301

**Catawba 2007
Initial License Examination
Job Performance Measure**

JPM



Plant

CANDIDATE:

EXAMINER:

Catawba 2007
Initial License Examination
Job Performance Measure

Task: Manually Load Shed ETA

Alternate Path: No

Facility JPM #: OP-CN-DG-EQB-002

K/A Rating(s): 064 A4.10 (3.3/3.4)

SAFETY FUNCTION: 6

Task Standard: The Train 'A' 4KV essential bus is manually load shed per AP/1/A/5500/007 (Loss of Normal Power), Enclosure 8.

Preferred Evaluation Location:

Preferred Evaluation Method:

Control Room _____ In-Plant X

Perform _____ Simulate X

Procedure References:

AP/1/A/5500/007 (Loss of Normal Power), Enclosure 8 (Manual Load Shed Of 1ETA)

Validation Time: 15 Minutes

Time Critical: No

=====

Candidate: _____
NAME

Time Start: _____

Time Finish: _____

Performance Ratings:

SAT _____ UNSAT _____ Question Grade _____ Performance Time: _____

Examiner: _____ / _____
NAME SIGNATURE DATE

=====

COMMENTS

Tools / Equipment / Procedures Needed:

AP/1/A/5500/007 (Loss of Normal Power), Enclosure 8 (Manual Load Shed Of 1ETA)

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIATING CUE:

Unit 1 is at 100% RTP with electrical systems in normal alignment. A blackout has occurred on 1ETA, but the B/O Sequencer 1A has not actuated. The Control Room Supervisor instructs you to manually load shed 1ETA per AP/1/A/5500/007 (Loss of Normal Power), Enclosure 8 (Manual Load Shed Of 1ETA)

START TIME: _____

<p><u>EXAMINER NOTES:</u></p> <ol style="list-style-type: none"> 1. Pistol grips on the 1ETA breaker cubicle face only function when breaker is in "TEST" position. If pistol grip is used for a breaker which is racked in, the breaker position will not change. Pistol grips for the 1ELXA and 1ELXC breakers do function and are normally used to operate these breakers. 2. To open any breaker on ETA under the conditions of this JPM, the operator will have to depress the green open P/B on the breaker face. The operator may use the "breaker stick" located in ETA room for safety when performing this task. 3. There are 2 indications for each breaker available. A set of red (closed) and green (open) lights on the breaker cubicle face and a color coded mechanical "flag" on the breaker face which can be seen via the small door at the bottom of the breaker cubicle. 4. This JPM assumes the 1A NV Pump and the A VC\YC Train were in service at the time of the Blackout and as such those breakers would be closed. 5. 1ETA-04 (Alternate Incoming Feeder From Xfmr SATA) would be open and racked out for a normal alignment. 	
<p><u>STEP 1:</u> Load shed 1ETA as follows:</p> <p>a. Open the following breakers:</p> <ul style="list-style-type: none"> • 1EDE-F01F (Diesel Generator Load Sequencer Panel 1DGLSA) (AB-577, BB-46, Rm 496) <p><u>STANDARD:</u> Examinee opens 1EDE-F01F.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 1:</u> Load shed 1ETA as follows:</p> <p>a. Open the following breakers:</p> <ul style="list-style-type: none"> • 1ELXA-4B (Normal Incoming Breaker Fed From Xfmr 1ETXA) (AB-577, AA-47, Rm 496) <p><u>STANDARD:</u> Examinee opens 1ELXA-4B</p> <p><u>EXAMINER CUE:</u> Green light lit or green flag visible</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>

<p>STEP 1: Load shed 1ETA as follows:</p> <p>a. Open the following breakers:</p> <ul style="list-style-type: none"> 1ELXC-4B (Normal Incoming Breaker Fed From Xfmr 1ETXC) (AB-577, AA-46, Rm 496). <p>STANDARD: Examinee opens 1ELXC-4B</p> <p>EXAMINER CUE: Green light lit or green flag visible</p> <p>COMMENTS:</p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 1 b: Open the following breakers on 1ETA:</p> <ul style="list-style-type: none"> 1ETA-02 (Alternate Feeder to 4160 VAC Blackout Switchgear 1FTA) <p>STANDARD: Examinee ensures the breaker is open.</p> <p>EXAMINER CUE: Green light lit or green flag visible.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 1 b: Open the following breakers on 1ETA:</p> <ul style="list-style-type: none"> 1ETA-03 (Normal Incoming Feeder From Xfmr 1ATC) <p>STANDARD: For this JPM this breaker is closed. This is evidenced by the red light lit on the breaker cubicle face and a red mechanical flag visible through the small door in the lower cubicle face. To open this breaker the operator must depress the green open P/B on the breaker face.</p> <p>EXAMINER CUE: Green light lit or green flag visible.</p> <p>COMMENTS:</p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>

<p>STEP 1 b: Open the following breakers on 1ETA:</p> <ul style="list-style-type: none"> • 1ETA-04 (Alternate Incoming Feeder From Xfmr SATA) <p>STANDARD: Examinee ensures the breaker is open</p> <p>EXAMINER NOTE: This breaker is normally open and racked out. The symptoms for racked out are: No red or green lights on the breaker cubicle face, the breaker is much closer to the breaker cubicle lower door. The mechanical flag on the breaker face will be visible through the small door in the lower breaker cubicle.</p> <p>EXAMINER CUE: Green light lit or green flag visible.</p> <p>COMMENTS:</p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 1 b: Open the following breakers on 1ETA:</p> <ul style="list-style-type: none"> • 1ETA-06 (1A1 KC Pump Motor) <p>STANDARD: Examinee ensures the breaker is open.</p> <p>EXAMINER CUE: Green light lit or green flag visible.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 1 b: Open the following breakers on 1ETA:</p> <ul style="list-style-type: none"> • 1ETA-07 (1A2 KC Pump Motor) <p>STANDARD: Examinee ensures the breaker is open.</p> <p>EXAMINER CUE: Green light lit or green flag visible.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>

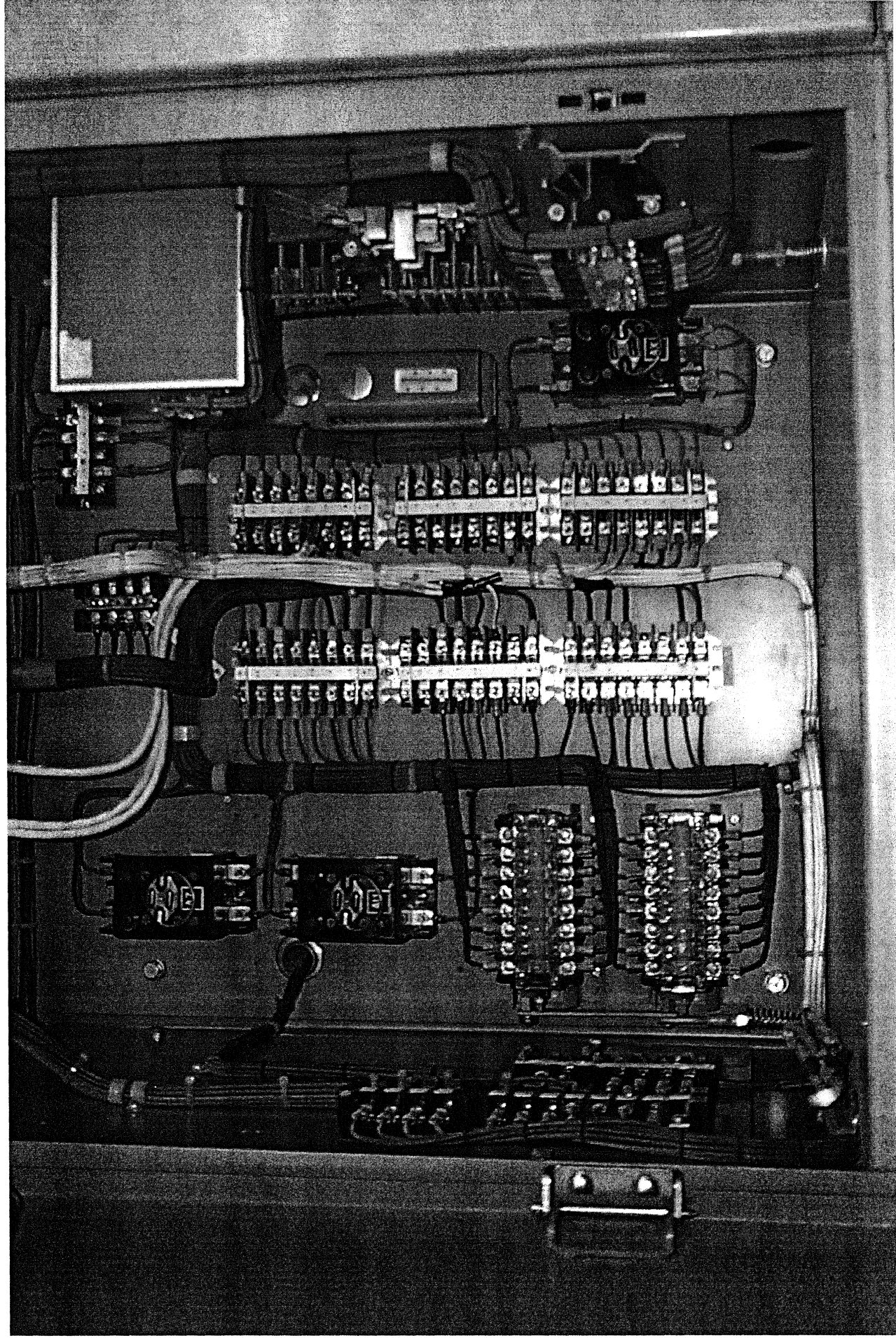
<p><u>STEP 1 b:</u> Open the following breakers on 1ETA:</p> <ul style="list-style-type: none"> • 1ETA-08 (1A NS Pump Motor) <p><u>STANDARD:</u> Examinee ensures the breaker is open.</p> <p><u>EXAMINER CUE:</u> Green light lit or green flag visible.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 1 b:</u> Open the following breakers on 1ETA:</p> <ul style="list-style-type: none"> • 1ETA-09 (1A ND Pump Motor) <p><u>STANDARD:</u> Examinee ensures the breaker is open</p> <p><u>EXAMINER CUE:</u> Green light lit or green flag visible.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 1 b:</u> Open the following breakers on 1ETA:</p> <ul style="list-style-type: none"> • 1ETA-11 (1A NI Pump Motor) <p><u>STANDARD:</u> Examinee ensures the breaker is open</p> <p><u>EXAMINER CUE:</u> Green light lit or green flag visible.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 1 b:</u> Open the following breakers on 1ETA:</p> <ul style="list-style-type: none"> • 1ETA-12 (1A NV Pump Motor) <p><u>STANDARD:</u> Examinee ensures the breaker is open</p> <p><u>EXAMINER NOTE:</u> For this JPM this breaker is closed. This is evidenced by the red light lit on the breaker cubicle face and a red mechanical flag visible through the small door in the lower cubicle face. To open this breaker the operator must depress the green open P/B on the breaker face.</p> <p><u>EXAMINER CUE:</u> Green light lit or green flag visible.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 1 b:</u> Open the following breakers on 1ETA:</p> <ul style="list-style-type: none"> • 1ETA-13 (1A CA Pump Motor) <p><u>STANDARD:</u> Examinee ensures the breaker is open</p> <p><u>EXAMINER CUE:</u> Green light lit or green flag visible.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 1 b:</u> Open the following breakers on 1ETA:</p> <ul style="list-style-type: none"> • 1ETA-14 (1A RN Pump Motor) <p><u>STANDARD:</u> Examinee ensures the breaker is open</p> <p><u>EXAMINER CUE:</u> Green light lit or green flag visible.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

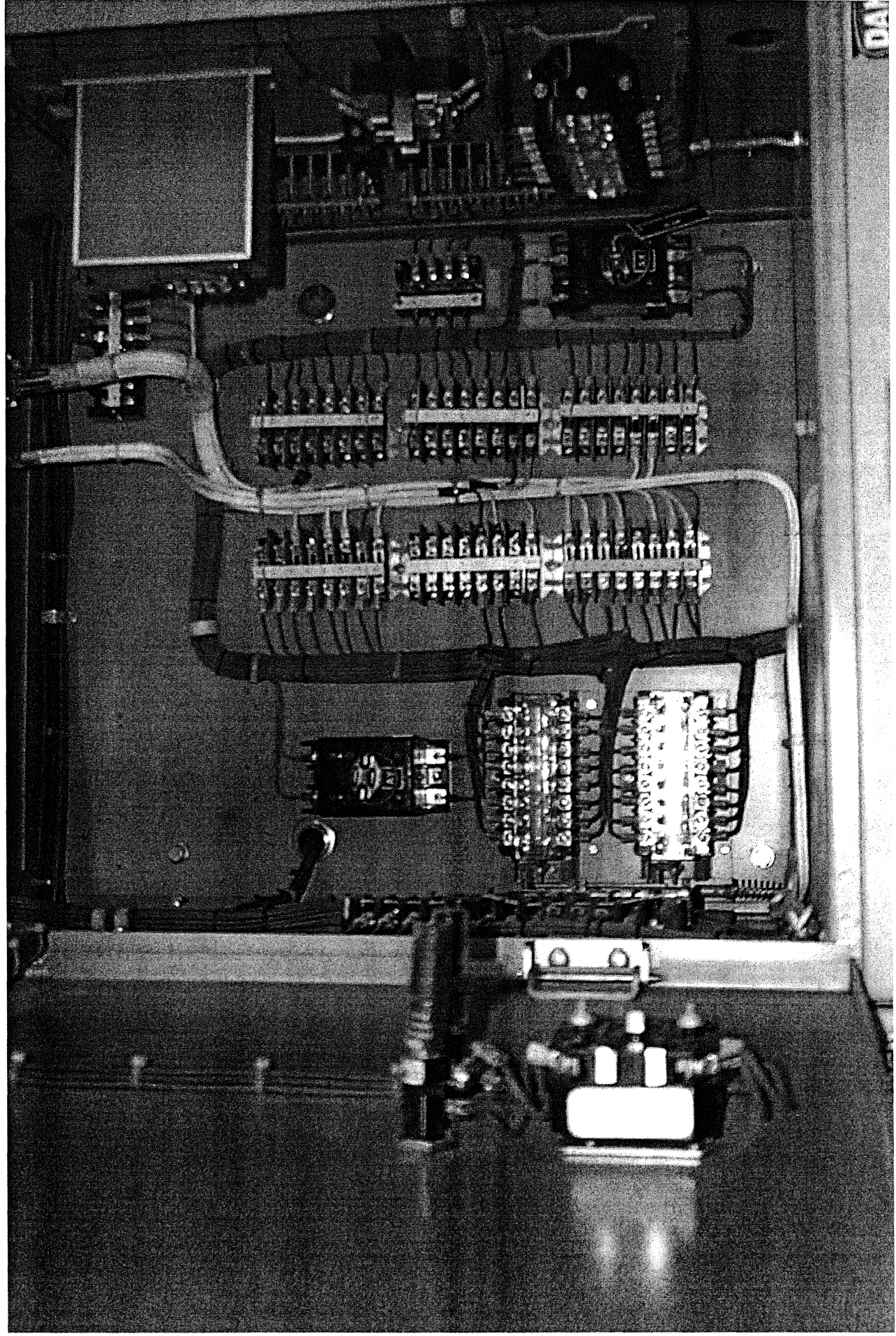
<p><u>STEP 1 b:</u> Open the following breakers on 1ETA:</p> <ul style="list-style-type: none"> • 1ETA-15 (1A KF Pump Motor) • <p><u>STANDARD:</u> Examinee ensures the breaker is open</p> <p><u>EXAMINER CUE:</u> Green light lit or green flag visible.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 1 b:</u> Open the following breakers on 1ETA:</p> <ul style="list-style-type: none"> • 1ETA-17 (A VC Compressor Unit 1 Supply) <p><u>STANDARD:</u> Examinee ensures the breaker is open</p> <p><u>EXAMINER NOTE:</u> For this JPM this breaker is closed. This is evidenced by the red light lit on the breaker cubicle face and a red mechanical flag visible through the small door in the lower cubicle face. To open this breaker the operator must depress the green open P/B on the breaker face.</p> <p><u>EXAMINER CUE:</u> Green light lit or green flag visible.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 1 b:</u> Open the following breakers on 1ETA:</p> <ul style="list-style-type: none"> • 1ETA-18 (1A Diesel Generator) • <p><u>STANDARD:</u> Examinee ensures the breaker is open</p> <p><u>EXAMINER CUE:</u> Green light lit or green flag visible.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 1 c:</u> Verify the following 1ETA lockout targets - DARK:</p> <ul style="list-style-type: none"> • 86N (1ETA-03 Cubicle) • 86B (1ETA-03 Cubicle) • 86S (1ETA-04 Cubicle) • 86D (1ETA-19 Cubicle). <p><u>STANDARD:</u> Examinee locates each lockout and verifies targets dark.</p> <p>EXAMINER CUE: Lockout target is dark.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 1d:</u> Remove the following control power fuses from 1ETA-13 (1A CA Pump Motor):</p> <ul style="list-style-type: none"> • AU • AX • AZ. <p><u>STANDARD:</u> The operator should explain that he will open the upper portion of the switchgear cubicles to access the fuses.</p> <p>Opens upper cabinet door of breaker 1ETA-13 and simulates pulling out the following fuses:</p> <ul style="list-style-type: none"> • AU • AX • AZ <p><u>EXAMINER NOTE:</u> As each cabinet is located, provide the photograph attached by simply holding it up against the cubicle. (Page 12)</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>

1ETA -13



1ETA -08



CANDIDATE CUE SHEET

(To Be Returned To Examiner Upon Completion of Task)

INITIATING CUE:

Unit 1 is at 100% RTP with electrical systems in normal alignment. A blackout has occurred on 1ETA, but the B/O Sequencer 1A has not actuated. The Control Room Supervisor instructs you to manually load shed 1ETA per AP/1/A/5500/007 (Loss of Normal Power), Enclosure 8 (Manual Load Shed Of 1ETA)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

1. **Load shed 1ETA as follows:**

a. Open the following breakers:

- ___ • 1EDE-F01F (Diesel Generator Load Sequencer Panel 1DGLSA) (AB-577, BB-46, Rm 496)
- ___ • 1ELXA-4B (Normal Incoming Breaker Fed From Xfmr 1ETXA) (AB-577, AA-47, Rm 496)
- ___ • 1ELXC-4B (Normal Incoming Breaker Fed From Xfmr 1ETXC) (AB-577, AA-46, Rm 496).

b. Open the following breakers on 1ETA:

- ___ • 1ETA-02 (Alternate Feeder to 4160 VAC Blackout Switchgear 1FTA)
- ___ • 1ETA-03 (Normal Incoming Feeder From Xfmr 1ATC)
- ___ • 1ETA-04 (Alternate Incoming Feeder From Xfmr SATA)
- ___ • 1ETA-06 (1A1 KC Pump Motor)
- ___ • 1ETA-07 (1A2 KC Pump Motor)
- ___ • 1ETA-08 (1A NS Pump Motor)
- ___ • 1ETA-09 (1A ND Pump Motor)
- ___ • 1ETA-11 (1A NI Pump Motor)
- ___ • 1ETA-12 (1A NV Pump Motor)
- ___ • 1ETA-13 (1A CA Pump Motor)
- ___ • 1ETA-14 (1A RN Pump Motor)
- ___ • 1ETA-15 (1A KF Pump Motor)
- ___ • 1ETA-17 (A VC Compressor Unit 1 Supply)
- ___ • 1ETA-18 (1A Diesel Generator).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

1. (Continued)

- c. Verify the following 1ETA lockout targets - DARK:

- ☐ • 86N (1ETA-03 Cubicle)
- ☐ • 86B (1ETA-03 Cubicle)
- ☐ • 86S (1ETA-04 Cubicle)
- ☐ • 86D (1ETA-19 Cubicle).

- d. Remove the following control power fuses from 1ETA-13 (1A CA Pump Motor):

- ☐ • AU
- ☐ • AX
- ☐ • AZ.

- e. Remove the following control power fuses from 1ETA-08 (1A NS Pump Motor):

- ☐ • AY
- ☐ • AX.

- ☐ c. Request Control Room Supervisor to notify IAE to assist in clearing essential bus lockout relays.

2. **Notify Control Room Supervisor of status of the following for 1ETA:**

- ☐ • Load shed
- ☐ • Lockout relays
- ☐ • Fuses.

**Catawba 2007
Initial License Examination
Job Performance Measure**

JPM J

Plant

CANDIDATE: _____

EXAMINER: _____

- Catawba 2007
Initial License Examination
Job Performance Measure

Task: Containment Hydrogen Control Systems

Alternate Path: No

Facility JPM #: OP-CN-CNT-VX-024

K/A Rating(s): 028 A4.03 (3.1/3.3)

SAFETY FUNCTION: 5

Task Standard: Hydrogen Analyzer Train 2A in Service monitoring upper containment.

Preferred Evaluation Location:

Preferred Evaluation Method:

Control Room _____ In-Plant X

Perform _____ Simulate X

Procedure References:

- EP/2/A/5000/E-1 (Loss of Reactor or Secondary Coolant)
- OP/2/A/6450/010 (Containment Hydrogen Control Systems Enclosure 4.9)

Validation Time: 10 Minutes

Time Critical: No

Candidate: _____
NAME

Time Start: _____

Time Finish: _____

Performance Ratings:

SAT _____ UNSAT _____ Question Grade _____ Performance Time: _____

Examiner: _____
NAME SIGNATURE / DATE

=====

COMMENTS

Tools / Equipment / Procedures Needed:

- OP/2/A/6450/010 (Containment Hydrogen Control Systems Enclosure 4.9)

READ TO OPERATOR**DIRECTION TO CANDIDATE:**

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIATING CUE:

A large break LOCA has occurred on Unit 2. The procedure currently in use is EP/2/A/5000/E-1 (Loss of Reactor or Secondary Coolant). Per EP/E-1 the SRO directs you to place Containment Hydrogen Analyzer 2A in service to Position "1" for sampling Upper Containment per OP/2/A/6450/010 (Containment Hydrogen Control Systems, Enclosure 4.9). Hydrogen concentration will be monitored from the control room. All initial conditions are complete. Containment Hydrogen Analyzer 2B is tagged for maintenance.

START TIME: _____

<p><u>STEP 2.1:</u> Place Hydrogen Analyzer Train A OR Train B in service.</p> <p>2.1.1 IF aligning Hydrogen Analyzer Train A, proceed as follows:</p> <p>2.1.1.1 Obtain Hydrogen Analyzer Control Panel Train A (2ELCP0251) key (Key #225) from WCC.</p> <p><u>STANDARD:</u> Candidate indicates he would obtain the key.</p> <p>EXAMINER CUE: Key has been obtained.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2.1.1.2 NOTE:</u> Steps 2.1.1.2 - 2.1.1.5 will be performed at Hydrogen Analyzer Control Panel Train 2A HACP-2A (2ELCP0251) (AB-579, DD-613).</p> <p><u>STANDARD:</u> Candidate acknowledges note.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2.1.1.2:</u> Select the desired sample location by positioning the "HYDROGEN ANALYZER SAMPLE VALVES PORTS" switch:</p> <ul style="list-style-type: none">• Position "1" (for sampling Upper Containment)• Position "2" (for sampling operating level)• Position "3" (for sampling Steam Generator 2B cavity)• Position "ALL" for sampling ALL 3 locations) <p><u>STANDARD:</u> Per initiating cue, sample location selected by positioning "Hydrogen Analyzer Sample Valve Ports" switch to position 1.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 2.1.1.3:</u> Verify the "POS 1 H2 ANALYZER POS 2 POST ACCIDENT SAMPLE PANEL" switch is in "POS 1".</p> <p><u>STANDARD:</u> Verifies the "POS 1 H2 ANALYZER POS 2 POST ACCIDENT SAMPLE PANEL" switch is in "POS 1"</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2.1.1.4:</u> Insert key in "HYDROGEN ANALYZER CONT ISOLATION VALVES" key switch and turn to "OPEN" position.</p> <p><u>STANDARD:</u> Key inserted and turned to "OPEN" position.</p> <p><u>COMMENTS:</u></p>	<p>Critical Step</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2.1.1.5:</u> Verify the following indicating lights are lit:</p> <ul style="list-style-type: none"> • "H2 SAMPLE CONT. ISOLATION VALVES OPEN" • Sample location(s) selected in Step 2.1.1.2. <p><u>STANDARD:</u> Verifies Red OPEN light is lit for H₂ Sample Containment Isolation Valves.</p> <p>Verifies Red light is lit for Upper Containment Sampling (Position 1)</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2.1.1.6 NOTE:</u> Steps 2.1.1.6 - 2.1.1.7 will be performed inside A Train Hydrogen Analyzer Control Unit (PAMS) 2MIMT5320A (AB-579, DD-61).</p> <p><u>STANDARD:</u> Candidate acknowledges note.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p>STEP 2.1.1.6: Verify the "STANDBY/OFF" switch is in the "STANDBY" position.</p> <p>STANDARD: Verifies switch is in "Standby" position</p> <p>If required, EXAMINER CUE: Orange "Standby" light is lit.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 2.1.1.7: Place the "ON/OFF" switch in the "ON" position.</p> <p>STANDARD: The "ON/OFF" switch on the Hydrogen Analyzer Control Unit (2MIMT5320A) is moved up to the "ON" position.</p> <p>If required, EXAMINER CUE: Green "ON" light is lit.</p> <p>COMMENTS:</p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 2.1.1.8: Monitor H2 concentration at either of the following locations:\</p> <ul style="list-style-type: none"> • "Hydrogen Analyzer Control Unit "2MIMT5320A" (AB-579, DD-61) • "CONTAINMENT TRN A H2 ANAL" meter (2MIP5320) located on 2MC7. <p>STANDARD: Per initiating cue, H2 concentration will be monitored in the control room.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 2.1.1.9: Verify Chart Recorder 2MICR5340 Position "2" "CONT. H2 ANALYSIS TRN A (%)" recording H2 concentration (2MC7).</p> <p>STANDARD: Candidate calls the control room to determine the status of the chart recorder.</p> <p>EXAMINER CUE: Control room personnel will monitor the Hydrogen Concentration chart recorder.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 2.1.2:</u> IF aligning Hydrogen Analyzer Train B, ...</p> <p><u>STANDARD:</u> Step will be N/A'ed, per initiating cue B is tagged out.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2.2 NOTE:</u> It is NOT necessary for the hydrogen analyzer control unit (2MIMT5320A or 2MIMT5330B) to be operable for PACS alignment.</p> <p><u>STANDARD:</u> Candidate acknowledges note.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2.2:</u> IF available AND requested by Radiation Protection per HP/2/B/1009/017 (Post-Accident Containment Air Sampling System), align the available Hydrogen Analyzer Train as follows:</p> <p><u>STANDARD:</u> Per initiating cue, no train of H2 analyzer is available and step should be N/A'ed.</p> <p>EXAMINER CUE: Radiation Protection has not requested this alignment.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>This JPM is complete.</p>	

STOP TIME: _____

CANDIDATE CUE SHEET

(To Be Returned To Examiner Upon Completion of Task)

INITIATING CUE:

A large break LOCA has occurred on Unit 2. The procedure currently in use is EP/2/A/5000/E-1 (Loss of Reactor or Secondary Coolant). Per EP/E-1 the SRO directs you to place Containment Hydrogen Analyzer 2A in service to Position "1" for sampling Upper Containment per OP/2/A/6450/010 (Containment Hydrogen Control Systems, Enclosure 4.9). Hydrogen concentration will be monitored from the control room. All initial conditions are complete. Containment Hydrogen Analyzer 2B is tagged for maintenance.

Duke Power Company
Catawba Nuclear Station
Containment Hydrogen Control Systems

Procedure No.

OP/2/A/6450/010

Revision No.

023

Electronic Reference No.

CN005FQT

Continuous Use

PERFORMANCE

***** UNCONTROLLED FOR PRINT *****

(ISSUED) - PDF Format

Containment Hydrogen Control Systems

1. Purpose

To define the procedure for operation of the following Containment Hydrogen Control Systems:

- Hydrogen Skimmer System
- Containment Air Return System
- Containment Hydrogen Purge System
- Emergency Hydrogen Mitigation System (Glow Plugs)
- Containment Hydrogen Analyzers
- Hydrogen Recombiners

2. Limits and Precautions

- 2.1 Hydrogen concentrations greater than 3.5% are combustible.
- 2.2 Do **NOT** use the Containment Hydrogen Purge System when H₂ concentration is below 3.0%, to prevent overloading the annulus ventilation filters.
- 2.3 Inadvertent operation of the Containment Air return fans may open the Ice Condenser inlet doors and cause containment pressure to fall below allowable limits.
- 2.4 After manual operation, maintenance, or packing adjustment of any safety related valve, it shall be cycled electrically to ensure reliable automatic operation.
- 2.5 When manually operating any motor operated valve, minimize the torque applied to the handwheel.
- 2.6 At no time should the heater temperature of the electric hydrogen recombiners be allowed to exceed 1400°F.
- 2.7 To prevent suction pump damage, the Hydrogen Analyzer Control Unit should never be in the "ON" position when either of following conditions exists:
 - "HYDROGEN ANALYZER CONT ISOLATION VALVES" are in the "CLOSE" position.
 - "POS. 1: H2 ANALYZER POS. 2: POST ACCIDENT SAMPLE PANEL" switch is in "POS. 2".
- 2.8 The requirements of applicable Radiation Work Permits (RWP) should be adhered to during the performance of this procedure.

Enclosure 4.9
Operation of the Containment Hydrogen
Analyzers Following a LOCA

OP/2/A/6450/010
Page 1 of 7

1. Initial Conditions

- 1.1 Review the Limits and Precautions.
- 1.2 Verify operation of the Containment Hydrogen Analyzers is required per appropriate emergency procedures.

2. Procedure

2.1 Place Hydrogen Analyzer Train A OR Train B in service.

—— 2.1.1 **IF** aligning Hydrogen Analyzer Train A, proceed as follows:

- ☐ 2.1.1.1 Obtain Hydrogen Analyzer Control Panel Train A (2ELCP0251) key (Key #225) from WCC.

NOTE: Steps 2.1.1.2 - 2.1.1.5 will be performed at Hydrogen Analyzer Control Panel 2A HACP-2A 2ELCP0251 (AB-579, DD-61).

2.1.1.2 Select the desired sample location by positioning the "HYDROGEN ANALYZER SAMPLE VALVES PORTS" switch:

- ☐ Position "1" (for sampling Upper Containment)
- ☐ Position "2" (for sampling operating level)
- ☐ Position "3" (for sampling Steam Generator 2B cavity)
- ☐ Position "ALL" (for sampling ALL 3 locations)

- ☐ 2.1.1.3 Verify the "POS. 1: H2 ANALYZER POS. 2: POST ACCIDENT SAMPLE PANEL" switch is in "POS. 1".

- ☐ 2.1.1.4 Insert key in "HYDROGEN ANALYZER CONT ISOLATION VALVES" key switch and turn to "OPEN" position.

- ☐ 2.1.1.5 Verify the following indicating lights are lit:

- "H2 SAMPLE CONT. ISOLATION VALVES OPEN"
- Sample location(s) selected in Step 2.1.1.2.

Enclosure 4.9
Operation of the Containment Hydrogen
Analyzers Following a LOCA

OP/2/A/6450/010

Page 2 of 7

NOTE: Steps 2.1.1.6 - 2.1.1.7 will be performed inside A Train Hydrogen Analyzer Control Unit (PAMS) 2MIMT5320A (AB-579, DD-61).

- ☐ 2.1.1.6 Verify the "STANDBY/OFF" switch is in the "STANDBY" position.
- ☐ 2.1.1.7 Place the "ON/OFF" switch in the "ON" position.
- 2.1.1.8 Monitor H₂ concentration at either of the following locations:
 - A Train "Hydrogen Analyzer Control Unit (PAMS) "2MIMT5320A" (AB-579, DD-61)
 - "CONTAINMENT TRN A H2 ANAL" meter (2MIP5320) located on 2MC-7.
- ☐ 2.1.1.9 Verify Chart Recorder 2MICR5340 Position "2" "CONT. H2 ANALYSIS TRN A (%)" recording H2 concentration (2MC7).

—— 2.1.2 **IF** aligning Hydrogen Analyzer Train B, proceed as follows:

- ☐ 2.1.2.1 Obtain Hydrogen Analyzer Control Panel Train B (2ELCP0252) key (Key #226) from WCC.

NOTE: Steps 2.1.2.2 - 2.1.2.5 will be performed at Hydrogen Analyzer Control Panel 2B HACP-2B 2ELCP0252 (AB-562, DD-61).

- 2.1.2.2 Select desired sample location by positioning the "HYDROGEN ANALYZER SAMPLE VALVES PORTS" switch:
 - ☐ Position "1" (for sampling Upper Containment)
 - ☐ Position "2" (for sampling operating level)
 - ☐ Position "3" (for sampling Steam Generator 2B cavity)
 - ☐ Position "ALL" (for sampling ALL 3 locations)
- ☐ 2.1.2.3 Verify the "POS. 1: H2 ANALYZER POS. 2: POST ACCIDENT SAMPLE PANEL" switch is in "POS. 1".
- ☐ 2.1.2.4 Insert key in "HYDROGEN ANALYZER CONT ISOLATION VALVES" key switch and turn to "OPEN" position.

**Operation of the Containment Hydrogen
Analyzers Following a LOCA**

- ☐ 2.1.2.5 Verify the following indicating lights are lit:
- "H2 SAMPLE CONT. ISOLATION VALVES OPEN"
 - Sample location(s) selected in Step 2.1.2.2.

NOTE: Steps 2.1.2.6 - 2.1.2.7 will be performed inside B Train Hydrogen Analyzer Control Unit (PAMS) 2MIMT5330B (AB-562, DD-61).

- ☐ 2.1.2.6 Verify the "STANDBY/OFF" switch is in the "STANDBY" position.
- ☐ 2.1.2.7 Place the "ON/OFF" switch to the "ON" position.
- 2.1.2.8 Monitor H₂ concentration at either of the following locations:
- B Train Hydrogen Analyzer Control Unit (PAMS)
"2MIMT5330B" (AB-562, DD-61)
 - "CONTAINMENT TRAIN B H2 ANAL" meter (2MIP5330)
on 2MC-7.
- ☐ 2.1.2.9 Verify Chart Recorder 2MICR5350 Position "2" "CONT.
H2 ANALYSIS TRN B (%)" recording H₂ concentration
(2MC7).

Enclosure 4.9
Operation of the Containment Hydrogen
Analyzers Following a LOCA

OP/2/A/6450/010
Page 4 of 7

NOTE: It is **NOT** necessary for the hydrogen analyzer control unit (2MIMT5320A or 2MIMT5330B) to be operable for PACS alignment.

- _____ 2.2 **IF** available **AND** requested by Radiation Protection per HP/2/B/1009/017 (Post-Accident Containment Air Sampling System), align the available Hydrogen Analyzer Train as follows:
- _____ 2.2.1 **IF** aligning Train A to PACS, perform the following at Hydrogen Analyzer Control Panel 2A HACP-2A 2ELCP0251 (AB-579, DD-61):
- ☐ 2.2.1.1 Obtain Hydrogen Analyzer Control Panel Train A (2ELCP0251) key (Key #225) from WCC.
 - ☐ 2.2.1.2 Place the "HYDROGEN ANALYZER SAMPLE VALVES PORTS" switch to position "2".
 - ☐ 2.2.1.3 Place the "POS. 1: H2 ANALYZER POS. 2: POST ACCIDENT SAMPLE PANEL" switch in "POS. 2".
 - ☐ 2.2.1.4 Insert key in "HYDROGEN ANALYZER CONT ISOLATION VALVES" key switch and turn to "OPEN" position.
 - ☐ 2.2.1.5 Verify the following indicating lights are lit:
 - "H2 SAMPLE CONT. ISOLATION VALVES OPEN"
 - "OPERATION LEVEL SAMPLE SELECTED"
 - ☐ 2.2.1.6 Notify Radiation Protection that the Post Accident Containment Sampling System is operable.
Person notified _____

**Operation of the Containment Hydrogen
Analyzers Following a LOCA**

- 2.2.2 **IF** aligning Train B to PACS, perform the following at Hydrogen Analyzer Control Panel 2B HACP-2B 2ELCP0252 (AB-562, DD-61):
- ☐ 2.2.2.1 Obtain Hydrogen Analyzer Control Panel Train B (2ELCP0252) key (Key #226) from WCC.
 - ☐ 2.2.2.2 Place the "HYDROGEN ANALYZER SAMPLE VALVES PORTS" switch to position "2".
 - ☐ 2.2.2.3 Place the "POS. 1: H2 ANALYZER POS. 2: POST ACCIDENT SAMPLE PANEL" switch in "POS. 2".
 - ☐ 2.2.2.4 Insert key in "HYDROGEN ANALYZER CONT ISOLATION VALVES" key switch and turn to "OPEN" position.
 - ☐ 2.2.2.5 Verify the following indicating lights are lit:
 - "H2 SAMPLE CONT. ISOLATION VALVES OPEN"
 - "OPERATION LEVEL SAMPLE SELECTED"
 - ☐ 2.2.2.6 Notify Radiation Protection that the Post Accident Containment Sampling System is operable.
Person notified _____

Enclosure 4.9
Operation of the Containment Hydrogen
Analyzers Following a LOCA

OP/2/A/6450/010

Page 6 of 7

2.3 For containment Hydrogen Analyzer shutdown, proceed as follows:

- 2.3.1 **IF** a hydrogen analyzer train is aligned to PACS, notify Radiation Protection of the intent to shutdown.
Person notified _____
- 2.3.2 **IF** shutting down Hydrogen Analyzer Train A, perform the following:

NOTE: Steps 2.3.2.1 and 2.3.2.2 will be performed inside the Train A Hydrogen Analyzer Control Unit (PAMS) 2MIMT5320A (AB-579, DD-61).

- ☐ 2.3.2.1 Ensure the "ON/OFF" switch is in the "OFF" position.
- ☐ 2.3.2.2 Verify the "STANDBY/OFF" switch is in the "STANDBY" position.

NOTE: Steps 2.3.2.3 - 2.3.2.5 will be performed at Hydrogen Analyzer Control Panel 2A HACP-2A 2ELCP0251 (AB-579, DD-61).

- ☐ 2.3.2.3 Place the "HYDROGEN ANALYZER CONT ISOLATION VALVES" key switch in the "CLOSE" position.
- ☐ 2.3.2.4 Ensure the "POS. 1: H2 ANALYZER POS. 2: POST ACCIDENT SAMPLE PANEL" switch is in "POS. 1".
- ☐ 2.3.2.5 Ensure the "HYDROGEN ANALYZER SAMPLE VALVES PORTS" switch is in the "ALL" position.
- ☐ 2.3.2.6 Return Hydrogen Analyzer Control Panel 2A key to WCC.

Enclosure 4.9
Operation of the Containment Hydrogen
Analyzers Following a LOCA

OP/2/A/6450/010

Page 7 of 7

—— 2.3.3 **IF** shutting down Hydrogen Analyzer Train B, perform the following:

NOTE: Steps 2.3.3.1 and 2.3.3.2 will be performed inside the Train B Hydrogen Analyzer Control Unit (PAMS) 2MIMT5330B (AB-562, DD-61).

- ☐ 2.3.3.1 Ensure the "ON/OFF" switch is in the "OFF" position.
- ☐ 2.3.3.2 Verify the "STANDBY/OFF" switch is in the "STANDBY" position.

NOTE: Steps 2.3.3.3 - 2.3.3.5 will be performed at Hydrogen Analyzer Control Panel 2B HACP-2B 2ELCP0252 (AB-562, DD-61).

- ☐ 2.3.3.3 Place the "HYDROGEN ANALYZER CONT ISOLATION VALVES" key switch in the "CLOSE" position.
- ☐ 2.3.3.4 Ensure the "POS. 1: H2 ANALYZER POS. 2: POST ACCIDENT SAMPLE PANEL" switch is in "POS. 1".
- ☐ 2.3.3.5 Ensure the "HYDROGEN ANALYZER SAMPLE VALVES PORTS" switch is in the "ALL" position.
- ☐ 2.3.3.6 Return Hydrogen Analyzer Control Panel 2B key to WCC.

2.4 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

**Catawba 2007
Initial License Examination
Job Performance Measure**

JPM K

Plant

CANDIDATE: _____

EXAMINER: _____

**Catawba 2007
Initial License Examination
Job Performance Measure**

Task: Perform Enclosure 2 of EP/1/A/5000/E-3

Alternate Path: No

Facility JPM #: OP-CN-EP-EP4-001

K/A Rating(s): EPE 038 EA1.32 (4.6 4.7)

SAFETY FUNCTION: 4 (P)

Task Standard: All ruptured Steam Generators are isolated by performance of EP/1/A/5000/E-3 Enclosure 2.

Preferred Evaluation Location:

Control Room _____ In-Plant X

Preferred Evaluation Method:

Perform _____ Simulate X

Procedure References:

- EP/1/A/5000/E-3 (Steam Generator Tube Rupture) Enclosure 2.

Validation Time: 10 Minutes

Time Critical: No

Candidate: _____
NAME

Time Start: _____

Time Finish: _____

Performance Ratings:

SAT _____ UNSAT _____ Question Grade _____ Performance Time: _____

Examiner: _____ / _____
NAME SIGNATURE DATE

=====

COMMENTS

Tools / Equipment / Procedures Needed:

- EP/1/A/5000/E-3 (Steam Generator Tube Rupture) Enclosure 2.

READ TO OPERATOR**DIRECTION TO CANDIDATE:**

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIATING CUE:

A steam generator tube rupture has occurred on 1A steam generator. Main Steam Isolation Valve (1SM-7) will not close. The SRO has directed you to isolate steam flow from all ruptured S/Gs per Enclosure 2 of EP/1/A/5000/E-3.

START TIME: _____

<p><u>STEP 1:</u> Close 1SA-22 (Main Steam To CSAE) (TB1-594, 1M-32).</p> <p><u>STANDARD:</u> 1SA-22 located at TB-594, 1M-32 and turned clockwise to close.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2:</u> Close the following valves:</p> <ul style="list-style-type: none">• 1SM-166 (Main Turb S/V #1 Continuous Drn Orif 0-34 Inlet) (TB-594, 1H-32) <p><u>STANDARD:</u> 1SM-166 located at TB-594, 1H-32 and turned clockwise to close.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2:</u> Close the following valves:</p> <ul style="list-style-type: none">• 1SM-168 (Main Turb S/V #2 Continuous Drn Orif 0-35 Inlet) (TB-594, 1H-32) <p><u>STANDARD:</u> 1SM-168 located at TB-594, 1H-32 and turned clockwise to close:</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2:</u> Close the following valves:</p> <ul style="list-style-type: none">• 1SM-170 (Main Turb S/V #3 Continuous Drn Orif 0-36 Inlet) (TB-594, 1H-32) <p><u>STANDARD:</u> 1SM-170 located at TB-594, 1H-32 and turned clockwise to close:</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 2:</u> Close the following valves:</p> <ul style="list-style-type: none"> 1SM-172 (Main Turb S/V #4 Continuous Drn Orif 0-37 Inlet) (TB-594, 1H-32) <p><u>STANDARD:</u> 1SM-172 located at TB-594, 1H-32 and turned clockwise to close:</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2:</u> Close the following valves:</p> <ul style="list-style-type: none"> 1SM-154 (Main Turb S/V #1 Auto Drn Vlv Inlet Isol) (TB-594, 1H-32) <p><u>STANDARD:</u> 1SM-154 located at TB-594, 1H-32 and turned clockwise to close:</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2:</u> Close the following valves:</p> <ul style="list-style-type: none"> 1SM-157 (Main Turb S/V #2 Auto Drn Vlv Inlet Isol) (TB-594, 1H-32) <p><u>STANDARD:</u> 1SM-157 located at TB-594, 1H-32 and turned clockwise to close:</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2:</u> Close the following valves:</p> <ul style="list-style-type: none"> 1SM-160 (Main Turb S/V #3 Auto Drn Vlv Inlet Isol) (TB-594, 1H-32) <p><u>STANDARD:</u> 1SM-160 located at TB-594, 1H-32 and turned clockwise to close:</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 2:</u> Close the following valves:</p> <ul style="list-style-type: none"> • 1SM-163 (Main Turb S/V #4 Auto Drn Vlv Inlet Isol) (TB-594, 1H-32) <p><u>STANDARD:</u> 1SM-163 located at TB-594, 1H-32 and turned clockwise to close:</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2:</u> Close the following valves:</p> <ul style="list-style-type: none"> • 1SM-130 (SM Equalization Hdr Trap T-05 Inlet Isol) (TB-594, 1H-32) <p><u>STANDARD:</u> 1SM-130 located at TB-594, 1H-32 and turned clockwise to close:</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2:</u> Close the following valves:</p> <ul style="list-style-type: none"> • 1SM-137 (SM Equalization Hdr To Trap T-06 Inlet Isol) (TB-594, 1H-32) <p><u>STANDARD:</u> 1SM-137 located at TB-594, 1H-32 and turned clockwise to close:</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 2:</u> Close the following valves:</p> <ul style="list-style-type: none"> • 1SB-32 (Main Steam Bypass To Condenser Header Steam Trap Inlet) (TB1-594, 1G-29). <p><u>STANDARD:</u> 1SB-32 located at TB-594, 1G-29 and turned clockwise to close:</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>

<p><u>STEP 3:</u> Close 1SP-34 (SM To 1A & 1B CFPT) (TB1-603, 1G-32).</p> <p><u>STANDARD:</u> 1SP-34 located at TB-603, 1G-32 turned clockwise to close.</p> <p><u>COMMENTS:</u></p>	<p>CRITICAL STEP</p> <p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 4:</u> Notify control room personnel of status.</p> <p><u>STANDARD:</u> Notifies control room that Enclosure 2 of EP/E-3 is complete.</p> <p>EXAMINER CUE: This is John the OSM. I understand that Enclosure 2 of EP/1/A/5000/E-3 is complete.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>This JPM is complete.</p>	

STOP TIME: _____

CANDIDATE CUE SHEET

(To Be Returned To Examiner Upon Completion of Task)

INITIATING CUE:

A steam generator tube rupture has occurred on 1A steam generator. Main Steam Isolation Valve (1SM-7) will not close. The SRO has directed you to isolate steam flow from all ruptured S/Gs per Enclosure 2 of EP/1/A/5000/E-3.

- ___ 1. **Close 1SA-22 (Main Steam To CSAE) (TB1-594, 1M-32).**
- ___ 2. **Close the following valves:**
 - ___ • 1SM-166 (Main Turb S/V #1 Continuous Drn Orif 0-34 Inlet) (TB-594, 1H-32)
 - ___ • 1SM-168 (Main Turb S/V #2 Continuous Drn Orif 0-35 Inlet) (TB-594, 1H-32)
 - ___ • 1SM-170 (Main Turb S/V #3 Continuous Drn Orif 0-36 Inlet) (TB-594, 1H-32)
 - ___ • 1SM-172 (Main Turb S/V #4 Continuous Drn Orif 0-37 Inlet) (TB-594, 1H-32)
 - ___ • 1SM-154 (Main Turb S/V #1 Auto Drn Vlv Inlet Isol) (TB-594, 1H-32)
 - ___ • 1SM-157 (Main Turb S/V #2 Auto Drn Vlv Inlet Isol) (TB-594, 1H-32)
 - ___ • 1SM-160 (Main Turb S/V #3 Auto Drn Vlv Inlet Isol) (TB-594, 1H-32)
 - ___ • 1SM-163 (Main Turb S/V #4 Auto Drn Vlv Inlet Isol) (TB-594, 1H-32)
 - ___ • 1SM-130 (SM Equalization Hdr Trap T-05 Inlet Isol) (TB-594, 1H-32)
 - ___ • 1SM-137 (SM Equalization Hdr To Trap T-06 Inlet Isol) (TB-594, 1H-32)
 - ___ • 1SB-32 (Main Steam Bypass To Condenser Header Steam Trap Inlet) (TB1-594, 1G-29).
- ___ 3. **Close 1SP-34 (SM To 1A & 1B CFPT) (TB1-603, 1G-32).**
- ___ 4. **Notify control room personnel of status.**