PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION

JOB PERFORMANCE MEASURE
SYSTEMS

JPM A

LESSON TITLE: Shutdown HPCI, Aux Oil Pump Does Not Auto Start

LESSON NUMBER: LOT-SIM-JP-019-A12

REVISION NO: 01

RECOMMENDED BY: Curt Robert
Instructor/Developer DATE

CONCURRENCE BY: _____
Line Superintendent/Supervisor DATE

APPROVED BY: _____
Superintendent/Supervisor Training DATE

SIMULATOR SETUP:

A. Initial Conditions:

1. Recommended Initial Conditions

IC 11 Unit 2
Rx. Pwr. 100% of rated thermal power
Core Age BOC

2. Required Plant Conditions

B. B. Malfunctions

Event	System	Tag	Title	Value (ramp rate)	Activate Time (sec)	Deactivate Time (sec)
			None			

C. Overrides

Event	Panel or System	Tag	Title	Value (ramp rate)	Activate Time (sec)	Deactivate Time (sec)
NA	P601	K1126A	Aux Oil PMP Auto	OFF	00	NA

D. Remote Function

System	Tag	Title	Value (ramp rate)
		None	

Special Instructions

1. Insert a manual scram.
2. Perform Operator immediate actions.
3. Place RCIC or RFPs in service to control reactor level. Reactor level must not drop to the LL2 HPCI initiation setpoint (105 inches) during the performance of this JPM.
4. Place HPCI in pressure control mode at minimum speed in automatic control using the Hard Card.
5. Override HPCI Aux Oil Pump Control Switch "Auto" position to "OFF" (K1126A).
6. If desired, place RHR in Torus Cooling.

SAFETY CONSIDERATIONS:

None

EVALUATOR NOTES: (Do not read to performer)

1. The applicable procedure section **WILL** be provided to the performer, once it is demonstrated he/she knows the correct procedure.

2. If this is the first JPM of the JPM set, read the JPM briefing contained in NUREG 1021, Appendix E, or similar to the performer.

Read the following to the JPM performer.

TASK CONDITIONS:

1. Unit 2 has scrammed.
2. MSIVs closed following the scram but have been re-opened per 2OP-025, MAIN STEAM SYSTEM OPERATING PROCEDURE.
3. HPCI was placed in pressure control mode but is no longer needed.
4. Another Operator is available to secure the SBGT system and perform PT-02.3.1, SUPPRESSION CHAMBER TO DRYWELL VACUUM BREAKERS OPERABILITY TEST.

INITIATING CUE:

You are directed by the Unit SCO to shutdown HPCI using 2OP-19, HIGH PRESSURE COOLANT INJECTION SYSTEM OPERATING PROCEDURE. Inform the Unit SCO when HPCI has been shutdown per the procedure.

PERFORMANCE CHECKLIST

NOTE: Sequence is assumed unless denoted in the **Comments**.

Step 1 - **IF** the HPCI System was started by an automatic initiation signal, **THEN PLACE** *VACUUM PUMP* control switch in *START*.

Marks step N/A..

SAT/UNSAT*

Step 2 – **IF** the HPCI System was started by an automatic initiation signal, **THEN DEPRESS** *INITIATION SIGNAL/RESET* push button.

Marks step N/A..

SAT/UNSAT*

NOTE: Operation of the HPCI System under minimum flow conditions should be minimized. Steps 7.1.2.3 through 7.1.2.10 should be performed as expeditiously as possible.

Step 3 - **IF** open, **THEN CLOSE** *HPCI INJECTION VLV, E41-F006.*

Marks step N/A..

SAT/UNSAT*

Step 4 - **IF** open, **THEN CLOSE** *BYPASS TO CST VLV, E41-F008.*

CLOSES E41-F008.

SAT/UNSAT*

Step 5 – **IF** open **AND NOT** being used for RCIC operation, **THEN CLOSE** *REDUNDANT ISOL TO CST VLV, E41-F011.*

CLOSES E41-F011..

SAT/UNSAT*

Step 6 – ENSURE E41-F012, MIN FLOW BYPASS TO TORUS VLV, OPENS.

E41-F012 is verified open.

SAT/UNSAT*

Step 7 – **CLOSE** *TURBINE STEAM SUPPLY VLV, E41-F001,* **AND IMMEDIATELY DEPRESS AND HOLD** *TURBINE TRIP* push button until *E41-F001* is fully closed.

E41-F001 is closed and the Turbine Trip push button is immediately pressed until E41-F001 is fully closed.

****CRITICAL STEP****SAT/UNSAT***

Step 8 – ENSURE E41-V8, TURBINE STOP VALVE, CLOSES.

Verifies E41-V8 is closed.

SAT/UNSAT*

ALTERNATE PATH STARTS HERE

NOTE: With the HPCI Aux Oil Pump control switch AUTO position overridden OFF, the pump will not automatically start but can be started by placing the control switch to START.

Event	Panel or System	Tag	Title	Value (ramp rate)	Activate Time (sec)	Deactivate Time (sec)
NA	P601	K1126A	Aux Oil PMP Auto	OFF	00	NA

Step 9 – ENSURE AUXILIARY OIL PUMP auto starts as the turbine speed decreases.

Performer recognizes the failure of the Aux Oil Pump to auto start and manually starts the pump.

****CRITICAL STEP**SAT/UNSAT***

PROMPT: Respond as necessary as the UNIT SCO to reports of the HPCI Aux Oil Pump failure. Notify the Performer that I&C will investigate.

Step 10 – ENSURE E41-F012, MIN FLOW BYPASS TO TORUS VLV, CLOSES.

Verifies E41-F012 is closed.

SAT/UNSAT*

NOTE: The Performer may take the controller to MANUAL and then depress the 'PF' push button. This is an acceptable means of returning the controller to 4300 gpm.

Step 11 – **IF** HPCI *FLOW CONTROL, E41-FIC-R600*, is in manual (*M*), **THEN PLACE** it in automatic (*A*).

Verifies Flow controller is in AUTOMATIC.

SAT/UNSAT*

Step 12 - **ADJUST** HPCI *FLOW CONTROL* setpoint to 4300 gpm.

Verifies Flow control setpoint at 4300 gpm.

SAT/UNSAT*

PROMPT: Notify the Performer that another Operator will perform PT-02.3.1b, Suppression Pool to Drywell Vacuum Breaker Position Indication Check.

Step 13- **WITHIN** 6 hours after any discharge of steam to the Suppression Chamber, **PERFORM** 0PT-02.3.1b, Suppression Pool to Drywell Vacuum Breaker Position Indication Check.

Acknowledges prompt that PT-02.3.1b will be performed by another operator.

SAT/UNSAT*

PROMPT: Notify the Performer that 15 minutes has elapsed.

Step 14– **WHEN** 15 minutes have elapsed after tripping the HPCI turbine, **THEN STOP** *VACUUM PUMP*.

The Vacuum Pump control switch is placed in STOP.

SAT/UNSAT*

Step 15– PLACE the VACUUM PUMP control switch in AUTO.

The Vacuum Pump control switch is verified in AUTO.

SAT/UNSAT*

PROMPT: After examinee checks HPCI turbine bearing temperatures on E41-TR-R605 in the back panel notify the examinee that bearing differential temperature is 0 degrees Fahrenheit.

Step 16 - **WHEN** differential temperature across the HPCI turbine bearings decreases to approximately 0°F, as indicated on *E41-TR-R605*, **THEN STOP** *AUXILIARY OIL PUMP.*

The Aux Oil Pump control switch is placed in STOP.

SAT/UNSAT*

Step 17– PLACE the AUXILIARY OIL PUMP control switch in AUTO.

The Aux Oil Pump control switch is verified in AUTO.

SAT/UNSAT*

Step 18– PLACE the BAROMETRIC CNDSR CONDENSATE PUMP control switch in AUTO.

The Barometric Condenser Condensate Pump control switch is verified in AUTO.

SAT/UNSAT*

Step 19– CLOSE E41-F059, COOLING WATER SUPPLY VLV.

E41-F059 is closed.

SAT/UNSAT*

Step 20 - **IF** closed, **THEN OPEN** *COND PUMP DISCH OTBD DRAIN VLV, E41-F025.*

Verifies E41-F025 is closed.

SAT/UNSAT*

PROMPT: Notify the Performer that another Operator will perform steps 21 through 23. (Secure SBGT, Standby lineup checklist, and PT-2.3.1)

Step 21– Notify the Unit SCO that HPCI has been shutdown per 2OP-19.

Unit SCO is notified.

SAT/UNSAT*

TERMINATING CUE: When HPCI is shutdown and the Unit SCO is notified, this JPM is complete.

TIME COMPLETED _____

LIST OF REFERENCES

RELATED TASKS:

206007B101

Shutdown the HPCI System per OP-19.

K/A REFERENCE AND IMPORTANCE RATING:

206000 A4

Ability to manually operate and/or monitor in the control room:

A4.04	Major System Valves	3.7/3.7
A4.10	System Pumps	3.7/3.5
A4.12	Turbine Trip Controls	4.0/3.9

REFERENCES:

2OP-019, HIGH PRESSURE COOLANT INJECTION SYSTEM OPERATING PROCEDURE

TOOLS AND EQUIPMENT:

None

SAFETY FUNCTION (from NUREG 1123, Rev 2.):

Safety Function Group 4, Heat Removal from Reactor Core

REASON FOR REVISION:

Minor format revision.

Time Required for Completion: 15 Minutes (approximate).

Time Taken: ____

APPLICABLE METHOD OF TESTING

Performance: Simulate ___ Actual ✓ Unit: ____

Setting: Control Room ✓ Simulator ___ (Not applicable to In-Plant JPMs)

Time Critical: Yes ___ No ✓ Time Limit N/A

Alternate Path: Yes ✓ No ___

EVALUATION

Performer:_____ SSN: _____

JPM: Pass _____ Fail _____

Remedial Training Required: Yes _____ No _____

Did Performer Verify Procedure? Yes _____ No _____
(Each Student should verify one JPM per evaluation set)

Comments: _____

_____

_____

_____

_____

Comments reviewed with Student

Evaluator Signature: _____ Date:_____

TASK CONDITIONS:

1. Unit 2 has scrammed.
2. MSIVs closed following the scram but have been re-opened per 2OP-025, MAIN STEAM SYSTEM OPERATING PROCEDURE.
3. HPCI was placed in pressure control mode but is no longer needed.
4. Another Operator is available to secure the SBGT system and perform PT-02.3.1, SUPPRESSION CHAMBER TO DRYWELL VACUUM BREAKERS OPERABILITY TEST.

INITIATING CUE:

You are directed by the Unit SCO to shutdown HPCI using 2OP-19, HIGH PRESSURE COOLANT INJECTION SYSTEM OPERATING PROCEDURE. Inform the Unit SCO when HPCI has been shutdown per the procedure.

7.0 SHUTDOWN

R
Reference
Use

7.1 HPCI System Shutdown

7.1.1 Initial Conditions

1. The HPCI System has automatically initiated **AND:** N/A

   a. The system is no longer required to maintain reactor water level,

   OR

   b. The automatic initiation signal is **NOT** valid.

   OR

2. The HPCI System was manually started and is no longer required to maintain reactor water level. N/A

   OR

3. The HPCI System was manually started and is no longer required to maintain reactor pressure. CR

7.1.2 Procedural Steps

CAUTION

After an automatic initiation, an ECCS subsystem shall NOT be shut down OR placed in manual until at least two independent indications are verified for one of the following conditions:

1. **Adequate core cooling is ensured.**
2. **The initiation signal was NOT valid.**
3. **The system is NOT functioning properly in the automatic mode.**

1. **IF** the HPCI System was started by an automatic initiation signal, **THEN PLACE** *VACUUM PUMP* control switch in *START*. ☐

2. **IF** the HPCI System was started by an automatic initiation signal, **THEN DEPRESS** *INITIATION SIGNAL/ RESET* push button. ☐

7.1.2 Procedural Steps

R18

NOTE: Operation of the HPCI System under minimum flow conditions should be minimized. Steps 7.1.2.3 through 7.1.2.10 should be performed as expeditiously as possible.

3. **IF** open, **THEN CLOSE** *HPCI INJECTION VLV, E41-F006.* ☐

4. **IF** open, **THEN CLOSE** *BYPASS TO CST VLV, E41-F008.* ☐

5. **IF** open **AND NOT** being used for RCIC operation, **THEN CLOSE** *REDUNDANT ISOL TO CST VLV, E41-F011.* ☐

6. **ENSURE** *MIN FLOW BYPASS TO TORUS VLV, E41-F012*, opens. ☐

NOTE: **IF** *TURBINE TRIP* push button is released before *TURBINE STEAM SUPPLY VLV, E41-F001*, is fully closed, **THEN** the turbine will attempt to restart.

7. **CLOSE** *TURBINE STEAM SUPPLY VLV, E41-F001,* **AND IMMEDIATELY DEPRESS AND HOLD** *TURBINE TRIP* push button until *E41-F001* is fully closed. ☐

NOTE: *TURBINE STOP VALVE, E41-V8,* closes while the *TURBINE TRIP* pushbutton is depressed. However, when the *TURBINE TRIP* pushbutton is released, *E41-V8* will reopen until the HPCI oil pressure source is removed which will allow spring pressure to close the valve.

8. **ENSURE** *TURBINE STOP VALVE, E41-V8*, closes. ☐

9. **ENSURE** *AUXILIARY OIL PUMP* auto starts as the turbine speed decreases. ☐

10. **ENSURE** *MIN FLOW BYPASS TO TORUS VLV, E41-F012*, closes. ☐

7.1.2 Procedural Steps

11. **IF** HPCI *FLOW CONTROL, E41-FIC-R600,* is in manual (*M*), **THEN PLACE** it in automatic (*A*). ☐

12. **ADJUST** HPCI *FLOW CONTROL* setpoint to 4300 gpm. ☐

R1 13. **WITHIN** 6 hours after any discharge of steam to the Suppression Chamber, **PERFORM** 0PT-02.3.1b, Suppression Pool to Drywell Vacuum Breaker Position Indication Check. ☐

14. **WHEN** 15 minutes have elapsed after tripping the HPCI turbine, **THEN STOP** *VACUUM PUMP.* ☐

15. **PLACE** *VACUUM PUMP* control switch in *AUTO.* ☐

16. **WHEN** differential temperature across the HPCI turbine bearings decreases to approximately 0°F, as indicated on *E41-TR-R605,* **THEN STOP** *AUXILIARY OIL PUMP.* ☐

17. **PLACE** *AUXILIARY OIL PUMP* control switch in *AUTO.* ☐

18. **PLACE** *BAROMETRIC CNDSR CONDENSATE PUMP* control switch in *AUTO.* ☐

19. **CLOSE** *COOLING WATER SUPPLY VLV, E41-F059.* ☐

20. **IF** closed, **THEN OPEN** *COND PUMP DISCH OTBD DRAIN VLV, E41-F025.* ☐

21. **SHUT DOWN** Standby Gas Treatment System in accordance with 2OP-10 **AND RETURN TO** Step 7.1.2.22. ☐

22. **COMPLETE** Section 5.1 to return the system to standby. ☐

R1 23. **WITHIN** 12 hours after any discharge of steam to the Suppression Chamber, **PERFORM** 0PT-02.3.1, Suppression Chamber to Drywell Vacuum Breakers Operability Test. ☐

PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION

JOB PERFORMANCE MEASURE
SYSTEMS

JPM B

LESSON TITLE: **Reenergizing Trip Calibration Cabinet, AQ6, ECCS Division I (CB-XU-63)**

LESSON NUMBER: **JPM-B**

REVISION NO: **00**

RECOMMENDED BY: Curt Robert _____
Instructor/Developer DATE

CONCURRENCE BY: _____
Line Superintendent/Supervisor DATE

APPROVED BY: _____
Superintendent/Supervisor Training DATE

SAFETY CONSIDERATIONS:

1. Operating equipment and energized electrical equipment hazards.

EVALUATOR NOTES: (Do not read to performer)

1. The applicable procedure section **WILL** be provided to the performer, once it is demonstrated he/she knows the correct procedure.

2. If this is the first JPM of the JPM set, read the JPM briefing contained in NUREG 1021, Appendix E, or similar to the performer.

Read the following to the JPM performer.

TASK CONDITIONS:

1. Unit One (1) is currently operating at maximum power.
2. All power to the trip units in Trip Calibration Cabinet, AQ6, ECCS Division I (CB-XU-63) has been lost and it is desired to reenergize them.
3. Power is available from 125/250 Vdc Switchboard 1A.
4. All applicable prerequisites as listed in Section 4.0 of 1OP-01 are met.
5. This JPM will be performed on Unit One (1).
6. Assume that any required independent verification has been performed.

INITIATING CUE:

You are directed by the Unit SCO to reenergize Trip Calibration Cabinet, AQ6, ECCS Division I (CB-XU-63) and inform when you are complete.

PERFORMANCE CHECKLIST

NOTE: Sequence is assumed unless denoted in the **Comments**.

Step 1 – Obtain current revision of 1OP-01.

Obtains current revision of 1OP-01.

SAT/UNSAT*

TIME START _____

NOTE: Step 2 and 3 - Toggle switches are located behind guard on the associated power supplies.

PROMPT: OFF

Step 2 – **PLACE** the control switch for *POWER SUPPLY NUMBER 1* on CB-XU-63 in *OFF*.

PLACES POWER SUPPLY NUMBER 1 on CB-XU-63 in *OFF*.

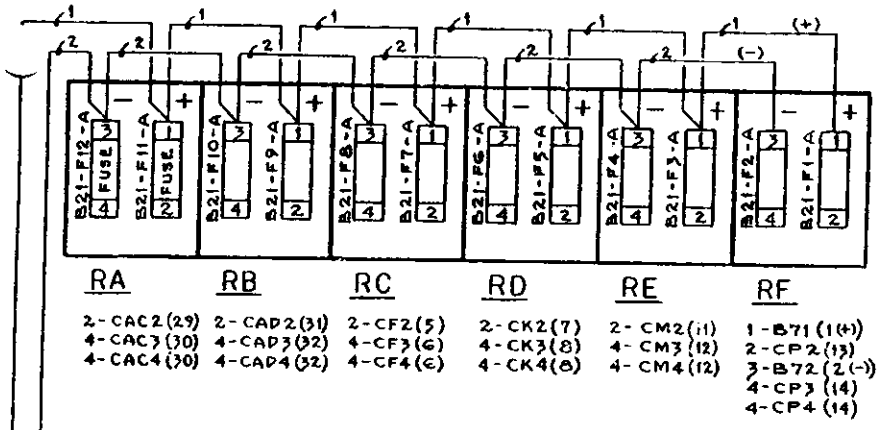
****CRITICAL STEP****SAT/UNSAT***

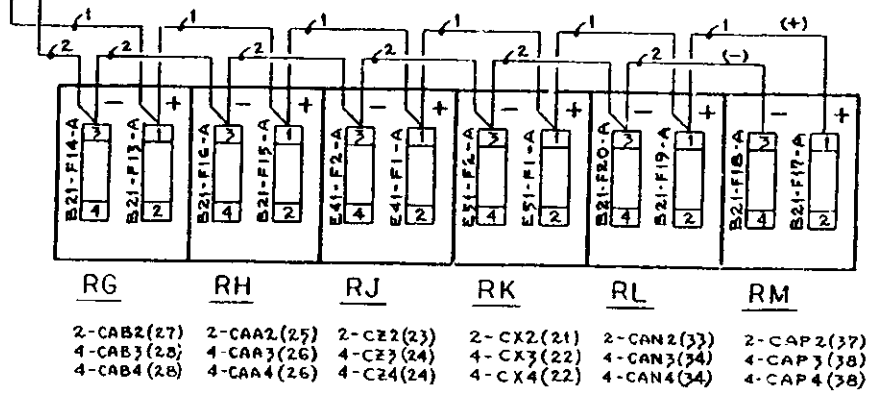
PROMPT: OFF

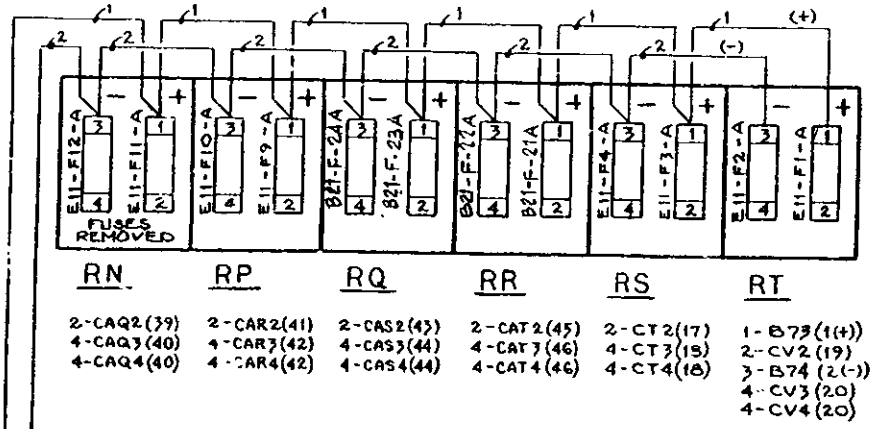
Step 3 – **PLACE** the control switch for *POWER SUPPLY NUMBER 2* on CB-XU-63 in *OFF*.

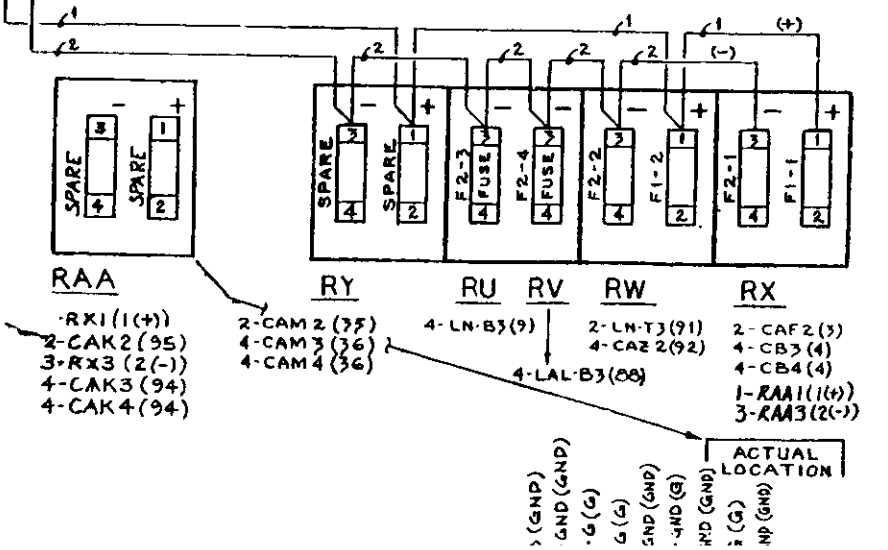
PLACES POWER SUPPLY NUMBER 2 on CB-XU-63 in *OFF*.

****CRITICAL STEP****SAT/UNSAT***

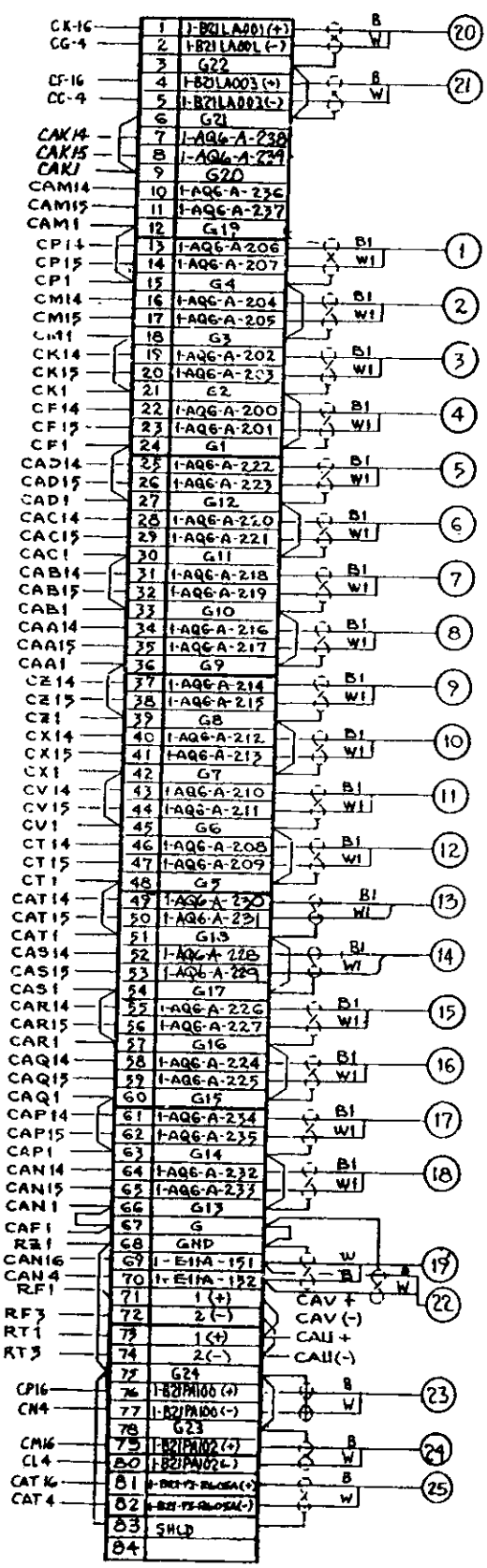

RA
RB
RC
RD
RE
RF
2-CAC2(29) 2-CAD2(31) 2-CF2(5) 2-CK2(7) 2-CM2(11) 1-B71(1(+))
4-CAC3(30) 4-CAD3(32) 4-CF3(6) 4-CK3(8) 4-CM3(12) 2-CP2(13)
4-CAC4(30) 4-CAD4(32) 4-CF4(6) 4-CK4(8) 4-CM4(12) 3-B72(2(-))
4-CP3(14)
4-CP4(14)


RG
RH
RJ
RK
RL
RM
2-CAB2(27) 2-CAA2(25) 2-CZ2(23) 2-CX2(21) 2-CAN2(33) 2-CAP2(37)
4-CAB3(28) 4-CAA3(26) 4-CZ3(24) 4-CX3(22) 4-CAN3(34) 4-CAP3(38)
4-CAB4(28) 4-CAA4(26) 4-CZ4(24) 4-CX4(22) 4-CAN4(34) 4-CAP4(38)


FUSES REMOVED
RN
RP
RQ
RR
RS
RT
2-CAQ2(39) 2-CAR2(41) 2-CAS2(43) 2-CAT2(45) 2-CT2(17) 1-B73(1(+))
4-CAQ3(40) 4-CAR3(42) 4-CAS3(44) 4-CAT3(46) 4-CT3(15) 2-CV2(19)
4-CAQ4(40) 4-CAR4(42) 4-CAS4(44) 4-CAT4(46) 4-CT4(18) 3-B74(2(-))
4-CV3(20)
4-CV4(20)


RAA
RY
RU
RV
RW
RX
·RX1(1(+))
2-CAK2(95)
3-RX3(2(-))
4-CAK3(94)
4-CAK4(94)
2-CAM2(35)
4-CAM3(36)
4-CAM4(36)
4-LN-B3(88)
2-LN-T3(91)
4-CAZ2(92)
4-LAL-B3(88)
2-CAF2(3)
4-CB3(4)
4-CB4(4)
1-RAA1(1(+))
3-RAA3(2(-))
ACTUAL LOCATION

TB-B


CK-16
CG-4
CF-16
CC-4
CAK14
CAK15
CAK1
CAM14
CAM15
CAM1
CP14
CP15
CP1
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CM15
CM1
CK14
CK15
CK1
CF14
CF15
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CAD14
CAD15
CAD1
CAC14
CAC15
CAC1
CAB14
CAB15
CAB1
CAA14
CAA15
CAA1
CZ14
CZ15
CZ1
CX14
CX15
CX1
CV14
CV15
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CT1
CAT14
CAT15
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CAS14
CAS15
CAS1
CAR14
CAR15
CAR1
CAQ14
CAQ15
CAQ1
CAP14
CAP15
CAP1
CAN14
CAN15
CAN1
CAF1
RZ1
CAN16
CAN4
RF1
RF3
RT1
RT3
CP16
CM4
CM16
CL4
CAT16
CAT4
1-B21LA001(+)
1-B21LA001(-)
G22
1-B21LA003(+)
1-B21LA003(-)
G21
1-AQ6-A-238
1-AQ6-A-239
G20
1-AQ6-A-236
1-AQ6-A-237
G19
1-AQ6-A-206
1-AQ6-A-207
G4
1-AQ6-A-204
1-AQ6-A-205
G3
1-AQ6-A-202
1-AQ6-A-203
G2
1-AQ6-A-200
1-AQ6-A-201
G1
1-AQ6-A-222
1-AQ6-A-223
G12
1-AQ6-A-220
1-AQ6-A-221
G11
1-AQ6-A-218
1-AQ6-A-219
G10
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G9
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G8
1-AQ6-A-212
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G7
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G6
1-AQ6-A-208
1-AQ6-A-209
G5
1-AQ6-A-230
1-AQ6-A-231
G13
1-AQ6-A-228
1-AQ6-A-229
G17
1-AQ6-A-226
1-AQ6-A-227
G16
1-AQ6-A-224
1-AQ6-A-225
G15
1-AQ6-A-234
1-AQ6-A-235
G14
1-AQ6-A-232
1-AQ6-A-233
G13
G
GND
1-E11A-151
1-E11A-152
1(+)
2(-)
1(+)
2(-)
G24
1-B21PA100(+)
1-B21PA100(-)
G23
1-B21PA102(+)
1-B21PA102(-)
SHLD
CAV+
CAV(-)
CAU+
CAU(-)
B
W
B1
W1

NOTE: All fuses are located in the upper right hand side of the cabinet.
B21-F5A is in the Top Row fifth fuse in counting from right to left.
B21-F7A is in the Top Row seventh fuse in counting from right to left.
B21-F13A is in the Middle Row second fuse in counting from left to right.
B21-F15A is in the Middle Row fourth fuse in counting from left to right.

Step 4 – **REMOVE** the following fuses inside Panel CB-XU-63 to prevent the designated master trip units and their associated slave trip units from energizing and tripping:

a. B21-F5-A (B21-LTM-N031A-1)

b. B21-F7-A (B21-LTM-N031C-1)

c. B21-F13-A (B21-LTM-N024A-2)

d. B21-F15-A (B21-LTM-N025A-2)

Removes four fuses with fuse pullers as follows:
B21-F5A is in the Top Row fifth fuse in counting from right to left.
B21-F7A is in the Top Row seventh fuse in counting from right to left.
B21-F13A is in the Middle Row second fuse in counting from left to right.
B21-F15A is in the Middle Row fourth fuse in counting from left to right.

****CRITICAL STEP**SAT/UNSAT***

NOTE: Currently, Circuit 19 on 125 Vdc Distribution Panel 3A is OPEN (to the left).

PROMPT: Circuit 19 on 125 Vdc Distribution Panel 3A remains CLOSED (to the right).

Step 5 – **ENSURE** the breaker for Circuit 19 on 125 Vdc Distribution Panel 3A is closed.

Places Circuit 19 on 125 Vdc Distribution Panel 3A to closed.

****CRITICAL STEP**SAT/UNSAT***

NOTE: Currently, Circuit 1 on 125 Vdc Distribution Panel 11A is OPEN (to the left).

PROMPT: Circuit 1 on 125 Vdc Distribution Panel 11A remains CLOSED (to the right).

Step 6 – **ENSURE** the breaker for Circuit 1 on 125 Vdc Distribution Panel 11A is closed.

Places Circuit 1 on 125 Vdc Distribution Panel 11A to closed.

****CRITICAL STEP**SAT/UNSAT***

PROMPT: Inverter Number 1 red indicating light on. Inverter Number 2 red indicating light on.

Step 7 – **ENSURE** at least one of the following Inverter red indicating lights is on at Panel CB-XU-63:

a. Inverter Number 1 red indicating light on.

b. Inverter Number 2 red indicating light on.

Verifies that Inverter Number 1and 2 red POWER ON indicating lights are on.

SAT/UNSAT

NOTE: Step 7 of 1OP-01 Section 8.1 is N/A.

NOTE: If fuses were not pulled correctly to maintain B21-LTM-N031A-1, B21-LTM-N031C-1, B21-LTM-N024A-2, and B21-LTM-N025A-2 deenergized ATWS/ARI will initiate due to momentary trips on certain trip units if the correct combination of instruments are energized. The trip unit outputs trip before the transmitter can power up and stabilize above the trip setpoint.

PROMPT: When control switch for *POWER SUPPLY NUMBER 1* on CB-XU-63 is placed to *ON POWER SUPPLY NUMBER 1* red AC **AND** DC indicating lights on all instruments indicate as you see them.

Step 8 – **IF** Inverter Number 1 is operating, **THEN PERFORM** the following:

a. **PLACE** the control switch for *POWER SUPPLY NUMBER 1* on CB-XU-63 in *ON*.

b. **ENSURE** *POWER SUPPLY NUMBER 1* red AC **AND** DC indicating lights are on.

c. **ENSURE** the master trip units on Panel CB-XU-63 which did **NOT** have their fuses removed above now have power **AND** are indicating correctly for the current plant conditions.

d. **RESET** any trips or alarms as applicable.

PLACES *the control switch for POWER SUPPLY NUMBER 1 on CB-XU-63 in ON, Verifies POWER SUPPLY NUMBER 1 red AC* ***AND*** *DC indicating lights are on, master trip units on Panel CB-XU-63 which did* ***NOT*** *have their fuses removed above now have power* ***AND*** *are indicating correctly for the current plant conditions.*

****CRITICAL STEP**SAT/UNSAT***

NOTE: If fuses were not pulled correctly to maintain B21-LTM-N031A-1, B21-LTM-N031C-1, B21-LTM-N024A-2, and B21-LTM-N025A-2 deenergized ATWS/ARI will initiate due to momentary trips on certain trip units if the correct combination of instruments are energized. The trip unit outputs trip before the transmitter can power up and stabilize above the trip setpoint.

PROMPT: **When** control switch for *POWER SUPPLY NUMBER 1* on CB-XU-63 is placed to *ON POWER SUPPLY NUMBER 1* red AC **AND** DC indicating lights on all instruments indicate as you see them.

Step 9 – **IF** Inverter Number 2 is operating, **THEN PERFORM** the following:

a. **PLACE** the control switch for *POWER SUPPLY NUMBER 2* on CB-XU-63 in *ON*.

b. **ENSURE** *POWER SUPPLY NUMBER 2* red AC **AND** DC indicating lights are on.

c. **ENSURE** the master trip units on Panel CB-XU-63 which did **NOT** have their fuses removed above now have power **AND** are indicating correctly for the current plant conditions.

d. **RESET** any trips or alarms as applicable.

PLACES *the control switch for POWER SUPPLY NUMBER 2 on CB-XU-63 in ON, Verifies POWER SUPPLY NUMBER 2 red AC* ***AND*** *DC indicating lights are on, master trip units on Panel CB-XU-63 which did* ***NOT*** *have their fuses removed above now have power* ***AND*** *are indicating correctly for the current plant conditions.*

****CRITICAL STEP**SAT/UNSAT***

PROMPT: Fuse B21-F5A is inserted as you see it.

Step 10 – **REPLACE** Fuse B21-F5-A, in Panel CB-XU-63, to energize master trip unit B21-LTM-N031A-1 and its associated circuitry.

REPLACES *Fuse B21-F5-A, in Panel CB-XU-63. B21-F5A is in the Top Row fifth fuse in counting from right to left.*

****CRITICAL STEP**SAT/UNSAT***

PROMPT: B21-LTM-N031A-1 is indicating properly and RED trip light is ON. When trip reset pushbutton is depressed the RED light extingushes.

Step 11 – **ENSURE** master trip unit B21-LTM-N031A-1 is indicating properly **AND RESET** any applicable trips or alarms.

Verifies master trip unit B21-LTM-N031A-1 is indicating properly ***AND RESETS*** *trip by depressing the trip reset pushbutton.*

SAT/UNSAT

PROMPT: Fuse B21-F7A is inserted as you see it.

Step 12 – **REPLACE** Fuse B21-F7-A, in Panel CB-XU-63, to energize master trip unit B21-LTM-N031C-1 and its associated circuitry.

REPLACES *Fuse B21-F7-A, in Panel CB-XU-63. B21-F7A is in the Top Row seventh fuse in counting from right to left.*

****CRITICAL STEP**SAT/UNSAT***

PROMPT: B21-LTM-N031C-1 is indicating properly and RED trip light is ON. When trip reset pushbutton is depressed the RED light extingushes.

Step 13 – **ENSURE** master trip unit B21-LTM-N031C-1 is indicating properly **AND RESET** any applicable trips or alarms.

Verifies master trip unit B21-LTM-N031C-1 is indicating properly ***AND RESETS*** *trip by depressing the trip reset pushbutton.*

SAT/UNSAT

PROMPT: Fuse B21-F13A is inserted as you see it.

Step 14 – **REPLACE** Fuse B21-F13-A, in Panel CB-XU-63, to energize master trip unit B21-LTM-N024A-2 and its associated circuitry.

REPLACES *Fuse B21-F13-A, in Panel CB-XU-63. B21-F13A is in the Middle Row second fuse in counting from left to right.*

****CRITICAL STEP**SAT/UNSAT***

PROMPT: B21-LTM-N024A-2 is indicating properly and RED trip light is ON. When trip reset pushbutton is depressed the RED light extingushes.

Step 15 – **ENSURE** master trip unit B21-LTM-N024A-2 is indicating properly **AND RESET** any applicable trips or alarms.

Verifies master trip unit B21-LTM-N024A-2 is indicating properly ***AND RESETS*** *trip by depressing the trip reset pushbutton.*

SAT/UNSAT

PROMPT: Fuse B21-F15A is inserted as you see it.

Step 16 – **REPLACE** Fuse B21-F15-A, in Panel CB-XU-63, to energize master trip unit B21-LTM-N025A-2 and its associated circuitry.

REPLACES *Fuse B21-F15-A, in Panel CB-XU-63. B21-F15A is in the Middle Row fourth fuse in counting from left to right.*

****CRITICAL STEP**SAT/UNSAT***

PROMPT: B21-LTM-N025A-2 is indicating properly and RED trip light is ON. When trip reset pushbutton is depressed the RED light extinguishes.

Step 17 – **ENSURE** master trip unit B21-LTM-N025A-2 is indicating properly **AND RESET** any applicable trips or alarms.

Verifies master trip unit B21-LTM-N025A-2 is indicating properly ***AND RESETS*** *trip by depressing the trip reset pushbutton.*

SAT/UNSAT

TERMINATING CUE: When Panel CB-XU-63 is energized and the Unit SCO is notified, this JPM is complete.

TIME COMPLETED _____

LIST OF REFERENCES

RELATED TASKS: 299012B301

K/A REFERENCE AND IMPORTANCE RATING:

216000 A102 2.9/3.1
Ability to predict and/or monitor changes in parameters associated with operating the Nuclear Boiler System controls including returning a sensor to service.

216000 A206 2.9/3.1
Ability to predict the impacts of a loss of DC power on the nuclear boiler instrumentation and based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations.

REFERENCES:

1OP-01, NUCLEAR BOILER SYSTEM

TOOLS AND EQUIPMENT:

Fuse Pullers.

SAFETY FUNCTION (from NUREG 1123, Rev 2.):

Safety Function 7: Instrumentation

REASON FOR REVISION:
New JPM for NRC 2004.

Time Required for Completion: 15 Minutes (approximate).

Time Taken: ____

APPLICABLE METHOD OF TESTING

Performance: Simulate ✓ Actual ___ Unit: 1

Setting: Control Room ✓ Simulator ___ (Not applicable to In-Plant JPMs)

Time Critical: Yes ___ No ✓ Time Limit N/A

Alternate Path: Yes ___ No ✓

EVALUATION

Performer:_____ SSN: _____

JPM: Pass _____ Fail _____

Remedial Training Required: Yes _____ No _____

Did Performer Verify Procedure? Yes _____ No _____
(Each Student should verify one JPM per evaluation set)

Comments: _____

_____

_____

_____

_____

Comments reviewed with Student

Evaluator Signature: _____ Date:_____

TASK CONDITIONS:

1. Unit One (1) is currently operating at maximum power.
2. All power to the trip units in Trip Calibration Cabinet, AQ6, ECCS Division I (CB-XU-63) has been lost and it is desired to reenergize them.
3. Power is available from 125/250 Vdc Switchboard 1A.
4. All applicable prerequisites as listed in Section 4.0 of 1OP-01 are met.
5. This JPM will be performed on Unit One (1).
6. Assume that any required independent verification has been performed.

INITIATING CUE:

You are directed by the Unit SCO to reenergize Trip Calibration Cabinet, AQ6, ECCS Division I (CB-XU-63) and inform when you are complete.

8.0 INFREQUENT OPERATIONS

C
Continuous
Use

8.1 Reenergizing Trip Calibration Cabinet, AQ6, ECCS Division I (CB-XU-63)

NOTE: **IF** both power supplies to Trip Calibration Cabinet, AQ6, ECCS Division I (CB-XU-63) are deenergized and later reenergized, ECCS Systems and ATWS/ARI will initiate due to momentary trips on certain trip units. The trip unit outputs trip before the transmitter can power up and stabilize above the trip setpoint. The steps in this section prevent this from occurring by preventing both trip units in the same logic from tripping at the same time.

8.1.1 Initial Conditions

Date/Time Started_____

Initials

1. All applicable prerequisites as listed in Section 4.0 are met. _____

2. All power to the trip units in Trip Calibration Cabinet, AQ6, ECCS Division I (CB-XU-63) has been lost and it is desired to reenergize them. _____

3. Power is available from 125/250 Vdc Switchboard 1A. _____

8.1.2 Procedural Steps

1. **PLACE** the control switch for *POWER SUPPLY NUMBER 1* on CB-XU-63 in *OFF*. _____

2. **PLACE** the control switch for *POWER SUPPLY NUMBER 2* on CB-XU-63 in *OFF*. _____

8.1.2 Procedural Steps

3. **REMOVE** the following fuses inside Panel CB-XU-63 to prevent the designated master trip units and their associated slave trip units from energizing and tripping:

   a. B21-F5-A (B21-LTM-N031A-1) _____

   b. B21-F7-A (B21-LTM-N031C-1) _____

   c. B21-F13-A (B21-LTM-N024A-2) _____

   d. B21-F15-A (B21-LTM-N025A-2) _____

4. **ENSURE** the breaker for Circuit 19 on 125 Vdc Distribution Panel 3A is closed. __/__ Ind.Ver.

5. **ENSURE** the breaker for Circuit 1 on 125 Vdc Distribution Panel 11A is closed. __/__ Ind.Ver.

6. **ENSURE** at least one of the following Inverter red indicating lights is on at Panel CB-XU-63:

   a. Inverter Number 1 red indicating light on. __/__ Ind.Ver.

   b. Inverter Number 2 red indicating light on. __/__ Ind.Ver.

7. **IF** only one Inverter red indicating light is on, **THEN CONTINUE** this procedure **AND** investigate the problem or lack of power later. _____

8. **IF** Inverter Number 1 is operating, **THEN PERFORM** the following:

   a. **PLACE** the control switch for *POWER SUPPLY NUMBER 1* on CB-XU-63 in *ON*. __/__ Ind.Ver.

   b. **ENSURE** *POWER SUPPLY NUMBER 1* red AC **AND** DC indicating lights are on. __/__ Ind.Ver.

8.1.2 Procedural Steps

c. **ENSURE** the master trip units on Panel CB-XU-63 which did **NOT** have their fuses removed above now have power **AND** are indicating correctly for the current plant conditions. ___/___ Ind.Ver.

d. **RESET** any trips or alarms as applicable. ___/___ Ind.Ver.

9. **IF** Inverter Number 2 is operating, **THEN PERFORM** the following:

a. **PLACE** the control switch for *POWER SUPPLY NUMBER 2* on CB-XU-63 in *ON*. ___/___ Ind.Ver.

b. **ENSURE** *POWER SUPPLY NUMBER 2* red AC **AND** DC indicating lights are on. ___/___ Ind.Ver.

c. **ENSURE** the master trip units on Panel CB-XU-63 which did **NOT** have their fuses removed above now have power **AND** are indicating correctly for the current plant conditions. ___/___ Ind.Ver.

d. **RESET** any trips or alarms as applicable. ___/___ Ind.Ver.

10. **REPLACE** Fuse B21-F5-A, in Panel CB-XU-63, to energize master trip unit B21-LTM-N031A-1 and its associated circuitry. ___/___ Ind.Ver.

11. **ENSURE** master trip unit B21-LTM-N031A-1 is indicating properly **AND RESET** any applicable trips or alarms. ___/___ Ind.Ver.

12. **REPLACE** Fuse B21-F7-A, in Panel CB-XU-63, to energize master trip unit B21-LTM-N031C-1 and its associated circuitry. ___/___ Ind.Ver.

13. **ENSURE** master trip unit B21-LTM-N031C-1 is indicating properly **AND RESET** any applicable trips or alarms. ___/___ Ind.Ver.

8.1.2 Procedural Steps

14. **REPLACE** Fuse B21-F13-A, in Panel CB-XU-63, to energize master trip unit B21-LTM-N024A-2 and its associated circuitry. ___/___ Ind.Ver.

15. **ENSURE** master trip unit B21-LTM-N024A-2 is indicating properly **AND RESET** any applicable trips or alarms. ___/___ Ind.Ver.

16. **REPLACE** Fuse B21-F15-A, in Panel CB-XU-63, to energize master trip unit B21-LTM-N025A-2 and its associated circuitry. ___/___ Ind.Ver.

17. **ENSURE** master trip unit B21-LTM-N025A-2 is indicating properly **AND RESET** any applicable trips or alarms. ___/___ Ind.Ver.

Date/Time Completed _____

Performed By (Print)	Initials
_____	_____
_____	_____
_____	_____
_____	_____
Reviewed By: _____ Shift Supervisor	_____

PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION

JOB PERFORMANCE MEASURE
SYSTEMS

JPM C

LESSON TITLE: SEP-04 – Restart RB HVAC with Failure to Isolate

LESSON NUMBER: LOT-SIM-JP-300-K11

REVISION NO: 1

RECOMMENDED BY: Curt Robert _____
Instructor/Developer DATE

CONCURRENCE BY_____
Line Superintendent/Supervisor DATE

APPROVED BY:_____
Superintendent/Supervisor Training DATE

SIMULATOR SETUP:

A. Initial Conditions:

1. Recommended Initial Conditions

IC 11
Rx. Pwr. 100%
Core Age BOC

B. Required Plant Conditions

A Secondary Containment leak that results in tripping the D12-R609A/B monitors on high radiation, which isolates RB HVAC. RPV water level is below LL2 or DW pressure is >1.7 psig and the Rx Bldg Rad Monitors are tripped.

C. Malfunctions

Event	System	Tag	Title	Value (ramp rate)	Activate Time (sec)	Deactivate Time (sec)
A	RW	RH013F	RWCU Break in Triangle Room	100%/4 mins	00	NA
A	NB	NB006F	MSL D Break before flow restrictor	1%/0 mins	00	NA

D. Overrides

Event	Panel	Tag	Title	Value (ramp rate)	Activate Time (sec)	Deactivate Time (sec)
E1	XU3	ZUA362	Rx Bldg Vent Temp Hi	ON	00	NA

E1: G6B30G3G (RB Vent Flow Indicator on XU-51) >0.25 (of full scale)

E. Special Instructions

1. Place simulator in RUN and activate malfunctions.

2. When drywell pressure rises to cause a reactor scram, carry out the RO immediate actions.

SAFETY CONSIDERATIONS:

NONE.

EVALUATOR NOTES: (Do not read to examinee)

1. The applicable procedure section **WILL NOT** be provided to the examinee.
2. If this is the first JPM of the JPM set, read the JPM briefing contained NUREG 1021, Appendix E, or similar to the examinee.

Read the following to trainee.

TASK CONDITIONS:

1. EOP-03-SCCP has been entered.
2. A high-radiation condition sensed by the RB Vent Radiation Monitors (D12-R609A/B) resulted in the isolation of Reactor Building HVAC.
3. The condition is now cleared and EOP-03-SCCP directs restoring RB HVAC.

INITIATING CUE:

The Unit SCO directs you to restart Reactor Building HVAC per SEP-04 and inform him when your actions are complete.

PERFORMANCE CHECKLIST

NOTE: Sequence is assumed unless denoted in the **Comments**.

PROMPT: If requested indicate by pointing peak radiation levels on D12-RR-R605 at 4mr/hr.
If asked inform examinee that UA-03, 6-2 has not alarmed.

Step 1 - IF the Reactor Building ventilation radiation monitors have been off scale high as indicated on D12-RR-R605 OR the Reactor Building Exhaust temperature has exceeded 135°F (UA-03, 6-2) THEN EXIT this procedure.

May check D12-RR-R605 to verify that it did not ink off scale high. Should continue as ordered by SCO

SAT/UNSAT*

NOTE: When requested, install jumpers by modifying Remote Function **EP_IAEOPJP6** to **ON** and inform the examinee that jumpers have been installed to bypass reactor low water level and Drywell high pressure isolation interlocks.

Step 2 – INSTALL jumpers to bypass the reactor low waterclevel and Drywell high pressure interlocks.

Requests *jumpers be installed to bypass the interlocks.*

SAT/UNSAT*

Step 3 - PLACE the affected unit's CAC PURGE VENT ISOL OVRD, CAC-CS-5519, switch to "OVERRIDE".

Places *CAC-CS-5519 switch in OVERRIDE.*

**** CRITICAL STEP ** SAT/UNSAT***

Step 4 - IF necessary, RESET the following Reactor Building Ventilation Radiation Monitors at Panel H12-P606:

a. PROCESS REACTOR BLDG VENTILATION RADIATION MONITOR "A", D12-RM-K609A
b. PROCESS REACTOR BLDG VENTILATION RADIATION MONITOR "B", D12-RM-K609B.

Resets *D12-RM-K609A and D12-RM-K609Bt at Panel H12-P606.*

**** CRITICAL STEP ** SAT/UNSAT***

Step 5 - RESET the Group 6 isolation from the RTGB.

PCIS Group 6 Isolation reset by depressing pushbuttons S32 and S33 on P601.

**** CRITICAL STEP ** SAT/UNSAT***

PROMPT: If asked, inform examinee that instrument air pressure to the Reactor Building ventilation isolation valve latch actuators was never lost, **OR:**

PROMPT: If requested, inform the examinee as Reactor Building Auxiliary Operator that the latches for the Reactor Building Ventilation Isolation Dampers are in the unlatched position.

Step 6 - IF instrument air pressure to the latch actuators for the Reactor Building ventilation isolation valves has been lost and restored, THEN DISPATCH an AO to ensure that the latches for the BFIVs are in the unlatched position prior to performing Step C.7.

Determines step is not necessary or dispatches AO to check latches

*** SAT/UNSAT***

Step 7 - Open RB Vent Isol Vlvs:

a. C-BFIV-RB and A-BFIV-RB
OPENS *C-BFIV-RB and A-BFIV-RB.*

**** CRITICAL STEP ** SAT/UNSAT***

b. D-BFIV-RB and B-BFIV-RB
OPENS *D-BFIV-RB and B-BFIV-RB.*

**** CRITICAL STEP ** SAT/UNSAT***

NOTE: When second set of RB HVAC Supply and Exhaust Fans have been started causing RB Vent Flow to increase >50K scfm, verify Event Trigger E1 to activates to cause annunciator UA-03, 6-2 RX BLDG VENT TEMP HI to alarm.

Step 8 - Start as many Reactor Building Exhaust and Supply Fans as possible to provide maximum ventilation. (OP-37.1)

Starts a*t least one Reactor Building Supply and Exhaust Fan. May reference OP-37.1.*

**** CRITICAL STEP ** SAT/UNSAT***

ALTERNATE PATH STARTS HERE

Step 9 - IF PROCESS RX BLDG VENT RAD HI-HI annunciator (UA-03 3-5) (alarm setpoint at 4 mR/hr) or RX BLDG VENT TEMP HIGH annunciator (UA-03 6-2) (alarm setpoint at 135°F) is received, THEN:

a. VERIFY or manually STOP the Reactor Building exhaust and supply fans.

b. ENSURE CLOSED the following valves:

(1) RB VENT INBD ISOL VALVES, EXHAUST C-BFIV-RB, SUPPLY A-BFIV-RB.

(2) RB VENT OTBD ISOL VALVES, EXHAUST D-BFIV-RB, SUPPLY B-BFIV-RB.

c. ENSURE INITIATED the SBGT System (OP-10).

Stops *All Reactor Building Supply and Exhaust Fans.*
Closes Supply and Exhaust BFIVs

NOTE: Closing the BFIV-RBs will cause the Reactor Building Vent and Supply fans to automatically trip. This is an acceptable method to perform the above step.

**** CRITICAL STEP ** SAT/UNSAT***

Step 10 - Ensure initiated SBGT system.

Both SBGT trains are operating.

SAT/UNSAT*

Step 11 – Unit SCO informed that SEP-04, RB HVAC Restart procedure cannot be performed at this time.

Unit SCO informed.

SAT/UNSAT*

TERMINATING CUE: RB HVAC has been isolated and SBGT has been verified running.

*** Comments required for any step evaluated as UNSAT.**

LIST OF REFERENCES

RELATED TASKS:

288205B501
Restart Reactor Building HVAC per EOP-01-SEP-04

K/A REFERENCE AND IMPORTANCE RATING:

288000 A3.01 3.8, 3.8
Ability to monitor Plant Ventilation System automatic isolation/initiation signals in the control room

REFERENCES:

0EOP-SEP-04 Rev. 11

TOOLS AND EQUIPMENT:

Plant Page

SAFETY FUNCTION (from NUREG 1123, Rev 2):

9 – Radioactivity Release

REASON FOR REVISION:

Minor changes.

Time Required for Completion: 10 Minutes (approximate).

APPLICABLE METHOD OF TESTING

Performance: Simulate ___ Actual ✓ Unit: 2

Setting: Control Room ___ Simulator ✓ (Not applicable to In-Plant JPMs)

Time Critical: Yes ___ No ✓ Time Limit N/A

Alternate Path: Yes ✓ No ____

EVALUATION

Trainee:_____ SSN: _____

JPM: Pass _____ Fail _____

Remedial Training Required: Yes _____ No _____

Did Trainee Verify Procedure as Authorized Copy?: Yes _____ No _____
(Each Student should verify one JPM per evaluation set)

Comments: _____

_____

_____

_____

_____

Comments reviewed with Student

Evaluator Signature: _____ Date:_____

TASK CONDITIONS:

1. EOP-03-SCCP has been entered.

2. A high-radiation condition sensed by the RB Vent Radiation Monitors (D12-R609A/B) resulted in the isolation of Reactor Building HVAC.
3. The condition is now cleared and EOP-03-SCCP directs restoring RB HVAC.

INITIATING CUE:

The Unit SCO directs you to restart Reactor Building HVAC per SEP-04 and inform him when your actions are complete.

CP&L

CAROLINA POWER & LIGHT COMPANY
BRUNSWICK NUCLEAR PLANT

PLANT OPERATING MANUAL

VOLUME VI

EMERGENCY OPERATING PROCEDURE

UNIT
0

0EOP-01-SEP-04

REACTOR BUILDING HVAC RESTART PROCEDURE

REVISION 11

EFFECTIVE DATE

12/15/98

Sponsor Signature and Date on File _____ Date

Approval Signature and Date on File _____ Date
Manager - Operations

REVISION SUMMARY

This revision incorporates changes required to support implementation of Severe Accident Management Guidelines. Entry conditions have been revised to reflect possible entry from Containment and Radioactivity Release Control, 0SAMG-02. Allowances to restart ventilation when 135°F has been exceeded have been deleted due to Reactor Building EQ concerns.

LIST OF EFFECTIVE PAGES

0EOP-01-SEP-04

Page(s)	Revision
1-6	11

A. TITLE - Reactor Building HVAC Restart Procedure

B. ENTRY CONDITIONS

1. As directed by the "Secondary Containment Control Procedure" (EOP-03-SCCP), OR

2. As directed by "Containment and Radioactivity Release Control", (SAMG-02).

C. OPERATOR ACTIONS

NOTE

Manpower required: 1 Control Operator
1 Auxiliary Operator
Special equipment: 2 Jumpers (10 and 11)

CO: ___ 1. IF the Reactor Building ventilation radiation monitors have been off scale high as indicated on D12-RR-R605 OR the Reactor Building Exhaust temperature has exceeded 135°F (UA-03, 6-2) THEN EXIT this procedure.

****

CAUTION

Installation of the following jumpers will also inhibit the automatic start of SBGT on reactor low water level and on high drywell pressure.

****

2. INSTALL the following jumpers to bypass the reactor low water level and Drywell high pressure interlocks:

CO: ___ a. Jumper 10 in Panel XU-27, Terminal Board E, from the right side of Terminal 28 to the right side of Terminal 30.

CO: ___ b. Jumper 11 in Panel XU-28, Terminal Board E, from the right side of Terminal 28 to the right side of Terminal 30.

CO: ___ 3. PLACE the affected unit's CAC PURGE VENT ISOL OVRD, CAC-CS-5519, switch to "OVERRIDE".

4. IF necessary, RESET the following Reactor Building Ventilation Radiation Monitors at Panel H12-P606:

CO: ___ a. PROCESS REACTOR BLDG VENTILATION RADIATION MONITOR "A", D12-RM-K609A

CO: ___ b. PROCESS REACTOR BLDG VENTILATION RADIATION MONITOR "B", D12-RM-K609B.

CO: ___ 5. RESET the Group 6 isolation from the RTGB.

****

CAUTION

Attempting to open the Reactor Building ventilation isolation valves when the latches are engaged, will damage the latch/damper assemblies.

****

NOTE

If the green indicator tab is against the yellow bar, the valve is unlatched and valve operation is permitted.

6. IF instrument air pressure to the latch actuators for the Reactor Building ventilation isolation valves has been lost and restored, THEN DISPATCH an AO to ensure that the latches for the following valves are in the unlatched position prior to performing Step C.7.

AO: ___ a. RB VENT INBD SUPPLY ISOL VLV, A-BFIV-RB.

AO: ___ b. RB VENT OTBD SUPPLY ISOL VLV, B-BFIV-RB.

AO: ___ c. RB VENT INBD EXHAUST ISOL VLV, C-BFIV-RB.

AO: ___ d. RB VENT OTBD EXHAUST ISOL VLV, D-BFIV-RB.

7. OPEN the following valves:

CO: ___ a. RB VENT INBD ISOL VALVES, EXHAUST C-BFIV-RB, SUPPLY A-BFIV-RB.

CO: ___ b. RB VENT OTBD ISOL VALVES, EXHAUST D-BFIV-RB, SUPPLY B-BFIV-RB.

NOTE

In order to start a Reactor Building supply or exhaust fan, the control switch should be held in the "START" position until the discharge damper is full open.

CO: ___ 8. START as many Reactor Building exhaust and supply fans as possible to provide maximum ventilation (OP-37.1).

9. IF PROCESS RX BLDG VENT RAD HI-HI annunciator (UA-03 3-5) (alarm setpoint at 4 mR/hr) or RX BLDG VENT TEMP HIGH annunciator (UA-03 6-2) (alarm setpoint at 135°F) is received, THEN:

CO: ___ a. VERIFY or manually STOP the Reactor Building exhaust and supply fans.

b. ENSURE CLOSED the following valves:

CO: ___ (1) RB VENT INBD ISOL VALVES, EXHAUST C-BFIV-RB, SUPPLY A-BFIV-RB.

CO: ___ (2) RB VENT OTBD ISOL VALVES, EXHAUST D-BFIV-RB, SUPPLY B-BFIV-RB.

CO: ___ c. ENSURE INITIATED the SBGT System (OP-10).

Initials

10. WHEN the reactor low water level and Drywell high pressure conditions have cleared, THEN REMOVE the following jumpers:

a. Jumper 10 in Panel XU-27, Terminal Board E, from the right side of Terminals 28 and 30. ___/___ Ind.Ver

b. Jumper 11 in Panel XU-28, Terminal Board E, from the right side of Terminals 28 and 30. ___/___ Ind.Ver

11. WHEN PROCESS OG VENT PIPE RAD HI-HI annunciator (UA-03 5-4) clears, THEN PLACE the CAC PURGE VENT ISOL OVRD, CAC-CS-5519, switch to "OFF". ___/___ Ind.Ver

12. OPERATE the Reactor Building Ventilation System and the SBGT System as directed by the Unit SCO (OP-37.1 and OP-10). _____

Initials

13. EXIT this procedure and CONTINUE in the procedure(s) in effect. _____

Date/Time Completed _____

Performed By (Print)	Initials
_____	_____
_____	_____
_____	_____
_____	_____

Reviewed By: _____

Unit SCO

PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION

JOB PERFORMANCE MEASURE SYSTEMS

JPM D

LESSON TITLE: Establish a UAT Backfeed.

LESSON NUMBER: LOT-SIM-JP-050-B03

REVISION NO: 2

RECOMMENDED BY: Curt Robert
Instructor/Developer DATE

CONCURRENCE BY: _____
Line Superintendent/Supervisor DATE

APPROVED BY: _____
Superintendent/Supervisor Training DATE

SIMULATOR SETUP

IC-11 BOC

Rx Pwr 100%

Core Age BOC

Triggers

None

Malfunctions

Active - EE020F (Unit 2 SAT Relay Failure)

Overrides

None

Remote Functions

1. Active - EGZMGDIS (UAT Backfeed Logic & No Load Disconnect), ENABLE
2. RESET – EG_86BAC, Main Generator Backup Lockout Relay

Special Instructions

Ensure Malfunctions and Remote Functions are ACTIVE.

Scram the reactor and perform scram immediate actions

SAFETY CONSIDERATIONS:

None.

EVALUATOR NOTES: (Do not read to trainee)

1. The applicable procedure section **WILL** be provided to the trainee.
2. If this is the first JPM of the JPM set, read the JPM briefing contained NUREG 1021, Appendix E, or similar to the trainee.
3. A copy of 2OP-50, Section 8.13, signed off through step 13 should be provided to the examinee.

Read the following to trainee.

TASK CONDITIONS:

1. The Unit 2 Startup Auxiliary Transformer has tripped and locked out, requiring a manual reactor scram and resulting in a Loss Of Off-Site Power.
2. 230 KV Bus 2B is energized. 230 KV Bus 2A is locked out due to the SAT lock out.
3. Diesel Generators 3 and 4 are tied to 4KV Buses E3 and E4.
4. Unit 2 is in process of establishing a UAT backfeed per AOP-36.1 and 2OP-50 to re-energize BOP Buses.
5. 2OP-50 Section 8.13, has been completed through step 13.
6. If independent verification is required assume that it has been completed.

INITIATING CUE:

You are directed by the Unit SCO to complete the steps for UAT backfeed from 230 KV Bus 2B and inform the Unit SCO when **ALL** BOP buses are energized.

PERFORMANCE CHECKLIST

NOTE: Sequence is assumed unless denoted in the **Comments**.

Step 14 - Place the Synchroscope for Generator PCB 29B to the ON position.
Synchroscope switch placed to ON for PCB 29B.

**** CRITICAL STEP ** SAT/UNSAT***

Step 15 – Confirm running voltage (230 KV Bus Voltage) is approx. 120 volts.
Running voltage verified to be approx. 120 volts.

SAT/UNSAT*

Step 16 - Close generator PCB 29B.
Generator PCB 29B switch placed to CLOSE.

**** CRITICAL STEP ** SAT/UNSAT***

Step 17 – Confirm incoming voltage increases to approximately 120 volts.
Incoming voltage verified at approximately 120 volts.

SAT/UNSAT*

Step 18 - Place Synchroscope switch for PCB 29B to OFF.
Synchroscope for 29B is placed to OFF.

SAT/UNSAT*

NOTE: Steps 19 through 23 for the remaining PCB are N/A. The sequence of BOP Bus energization is not critical. The generator lockouts are reset due to being an initial condition of the procedure.

PROMPT: If requested, as Unit SCO direct examinee to NA steps for remaining PCB.

Step 24 – Place the CW ISOL VALVES MODE SELECTOR switch to position A.
CW ISOL VALVES MODE SELECTOR switch is in position A.

**** CRITICAL STEP ** SAT/UNSAT***

Step 25a – Ensure the mode control switches in MAN for the following:

Condensate Booster Pump 2C
Condensate Booster Pump 2C in MAN.

**** CRITICAL STEP ** SAT/UNSAT***

Condensate Booster Pump 2A
Condensate Booster Pump 2B in MAN.

SAT/UNSAT*

Condensate Pump 2B
Condensate Pump 2B in MAN.

SAT/UNSAT*

Step 25b - Place Synchroscope for UAT to Bus 2C to ON.
Synchroscope for UAT to Bus 2C breaker placed to ON.

**** CRITICAL STEP ** SAT/UNSAT***

NOTE: Synchroscope will not be at 12 O'clock position since Bus 2C is de-energized.

Step 25c - **CONFIRM** synchroscope is in the "12 o'clock" position **AND CLOSE** *UAT TO BUS 2C BREAKER, AC4.*
Places UAT to Bus 2C breaker control switch to closed.

**** CRITICAL STEP ** SAT/UNSAT***

Step 25d – Confirm UAT to Bus 2C breaker is closed.
UAT to Bus 2C breaker verified to be closed.

SAT/UNSAT*

Step 25e - **CONFIRM** *SAT TO BUS 2C BREAKER, AC6,* is open.
SAT to Bus 2C breaker verified to be open.

SAT/UNSAT*

Step 25f - Place Synchroscope switch for UAT to 2C breaker to OFF.
Synchroscope switch for UAT to 2C breaker is placed to OFF.

SAT/UNSAT*

NOTE: Examinee should determine step 26 to energize E4 from 2C is NA.

Step 27a – Ensure the mode control switches in MAN for the following:

Condensate Pump 2C
Condensate Pump 2C in MAN.

*** SAT/UNSAT***

Condensate Pump 2A
Condensate Pump 2A in MAN.

SAT/UNSAT*

Condensate Booster Pump 2B
Condensate Booster Pump 2B in MAN.

SAT/UNSAT*

NOTE: Synchroscope will not be at 12 O'clock position since Bus 2D is de-energized.

Step 27b - Place Synchroscope for UAT to Bus 2D to ON.
Synchroscope for UAT to Bus 2D breaker placed to ON.

**** CRITICAL STEP ** SAT/UNSAT***

Step 27c - **CONFIRM** synchroscope is at the "12 o'clock" position **AND CLOSE** *UAT TO BUS 2D BREAKER, AD6.*
Places UAT to Bus 2D breaker to closed.

**** CRITICAL STEP ** SAT/UNSAT***

Step 27d – Confirm UAT to Bus 2D breaker is closed.
UAT to Bus 2D breaker verified to be closed.

SAT/UNSAT*

Step 27e - **CONFIRM** *SAT TO BUS 2D BREAKER, AD4,* is open.
SAT to Bus 2D breaker verified to be open.

SAT/UNSAT*

Step 27f - Place Synchroscope switch for UAT to 2D breaker to OFF.
Synchroscope switch for UAT to 2D breaker is placed to OFF.

SAT/UNSAT*

NOTE: Examinee should determine step 28 to energize E3 from 2D is NA.

NOTE: Synchroscope will not be at 12 O'clock position since Bus 2B is de-energized.

Step 29a - Place Synchroscope for UAT to Bus 2B to ON.
Synchroscope for UAT to Bus 2B breaker placed to ON.

** CRITICAL STEP ** SAT/UNSAT***

Step 29b - Close **CONFIRM** synchroscope is at the "12 o'clock" position **AND CLOSE** *UAT TO BUS 2B BREAKER, AB0.*

Places UAT to Bus 2B breaker to closed.

** CRITICAL STEP ** SAT/UNSAT***

Step 29c – **CONFIRM** UAT to Bus 2B breaker is closed.
UAT to Bus 2B breaker verified to be closed.

SAT/UNSAT*

Step 29d – **CONFIRM** *SAT TO BUS 2B BREAKER, AB2,* is open.

SAT to Bus 2B breaker verified to be open.

SAT/UNSAT*

Step 29e - Place Synchroscope switch for UAT to 2B breaker to OFF.
Synchroscope switch for UAT to 2B breaker is placed to OFF.

SAT/UNSAT*

Step 30 – **CONFIRM** *ISOPHASE BUS GROUND FAULT UAT BACKFEED MODE,* (UA-13 3-6), is clear.

UA-13 3-6 verified to be clear.

SAT/UNSAT*

PROMPT: Inform examinee that the SAT will not be deenergized and it is not necessary to transfer E Bus power to the normal feeder at this time. The Generator Isolated Phase Bus system engineer will be notified of UAT Backfeed by another operator.

Step ~~23~~ 31 inform the Unit SCO when all BOP buses are energized.

Unit SCO informed all BOP buses are energized.

SAT/UNSAT*

TERMINATING CUE: All BOP Buses have been energized from the UAT.

*** Comments required for any step evaluated as UNSAT.**

RELATED TASKS:

245601B101, Place the Auxiliary Transformer in Backfeed Operation per OP-50.

K/A REFERENCE AND IMPORTANCE RATING:

226001 A2.03 3.9/4.3

Use procedures to mitigate consequences of loss of off-site power.

REFERENCES:

AOP-36.1
2OP-50 Rev. 87

TOOLS AND EQUIPMENT:

None.

SAFETY FUNCTION (from NUREG 1123, Rev 2.):

6 - Electrical (AC Electrical Distribution)

REASON FOR REVISION:

Periodic review to ensure current procedure is reflected.

Time Required for Completion: 18 Minutes (approximate).

APPLICABLE METHOD OF TESTING

Performance: Simulate ___ Actual ✔ Unit: 2

Setting: Control Room ___ Simulator ✔ (Not applicable to In-Plant JPMs)

Time Critical: Yes ___ No ✔ Time Limit N/A

Alternate Path: Yes ___ No ✔

EVALUATION

Trainee:_____ SSN: _____

JPM: Pass _____ Fail _____

Remedial Training Required: Yes _____ No _____

Did Trainee Verify Procedure as Authorized Copy?: Yes _____ No _____
(Each Student should verify one JPM per evaluation set.)

Comments: _____

_____

_____

_____

_____

Comments reviewed with Student

Evaluator Signature: _____ Date:_____

TASK CONDITIONS:

1. The Unit 2 Startup Auxiliary Transformer has tripped and locked out, requiring a manual reactor scram and resulting in a Loss Of Off-Site Power.
2. 230 KV Bus 2B is energized. 230 KV Bus 2A is locked out due to the SAT lock out.
3. Diesel Generators 3 and 4 are tied to 4KV Buses E3 and E4.
4. Unit 2 is in process of establishing a UAT backfeed per AOP-36.1 and 2OP-50 to re-energize BOP Buses.
5. 2OP-50 Section 8.13, has been completed through step 13.
6. If independent verification is required assume that it has been completed.

INITIATING CUE:

You are directed by the Unit SCO to complete the steps for UAT backfeed from 230 KV Bus 2B and inform the Unit SCO when **ALL** BOP buses are energized.

R48
R49

8.13 Unit Auxiliary Transformer Backfeed

C
Continuous
Use

8.13.1 Initial Conditions

Date/Time Started TODAY / 0001

Initials

1. All applicable prerequisites as listed in Section 4.0 are met. CR

2. The switchyard is energized in accordance with Section 5.1. CR

3. Generator Primary, Backup and Differential Lockout relays are reset. CR

4. Plant is in Mode 3, 4, or 5. CR

5. Unit SCO's permission granted to implement this procedure; refer to Tech Specifications 3.8.1, 3.8.2, 3.8.7, and 3.8.8. CR

8.13.2 Procedural Steps

NOTE: UAT Backfeed keys will be required for performance of this section. UAT Backfeed keys are located in the Main Control Room keylocker (keys 43 and 44) and the WCC keylocker (keys 206 and 207). Only ONE set of keys is required to perform UAT Backfeed. One CO key will be required to unlock the No-load Disconnect Switch.

1. **ENSURE** generator side disconnect for Generator PCB 29A is locked closed. CR / RC
Ind.Ver.

2. **ENSURE** generator side disconnect for Generator PCB 29B is locked closed. CR / RC
Ind.Ver.

3. **ENSURE** bus side disconnect for Generator PCB 29A is locked closed. CR / RC
Ind.Ver.

4. **ENSURE** bus side disconnect for Generator PCB 29B is locked closed. CR / RC
Ind.Ver.

8.13.2 Procedural Steps

NOTE: The following step:

a. Disables EDG auto starts from SAT undervoltage and allows the Diesel Generators to be shut down if the SAT is deenergized,

b. Disables trip of 4 KV Bus 2C Breaker AC8 and trip of 4 KV Bus E4 Breaker AJ9 if a LOCA signal is initiated concurrent with a loss of the SAT,

c. Disables synchronization check between SAT and UAT 4 KV breakers.

5. **IF** SAT is deenergized **OR** it will be deenergized by means other than Section 7.4 after UAT backfeed is established, **THEN PLACE** *2C-AC5-SS-43BF* switch, at 4KV Switchgear 2C Compt. AC5, in *BACKFEED*.

CR / RC
Ind.Ver.

NOTE: The following step:

a. Disables EDG auto starts from SAT undervoltage and allows the Diesel Generators to be shut down if the SAT is deenergized,

b. Disables trip of 4 KV Bus 2D Breaker AD1 and trip of 4 KV Bus E3 Breaker AI2 if a LOCA signal is initiated concurrent with loss of the SAT.

6. **IF** SAT is deenergized **OR** it will be deenergized by means other than Section 7.4 after UAT backfeed is established, **THEN PLACE** *2D-AD5-SS-43BF* switch, at 4 KV Switchgear 2D Compt. AD5, in *BACKFEED*.

CR / RC
Ind.Ver.

NOTE: Before operating the No-load Disconnect Switch the two silver padlock pins located under the operator gearbox should be observed to ensure both pins are in the *UP DETENTE* position to prevent damaging the padlock pins when opening the No-load Disconnect Switch. To prevent overtravel past stops the stops under the operator gearbox should be observed while operating the No-load Disconnect Switch.

7. **PERFORM** the following on the 38' elevation of the Turbine Building:

   a. **IF** installed, **THEN REMOVE** the temporary metal covers installed over the No-Load Disconnect viewing windows.

CR

8.13.2 Procedural Steps

b. **OPEN** *NO-LOAD DISCONNECT SWITCH, 2-ISO-GEN-MPT-DISC-SW.* — CR / RC Ind.Ver.

c. **CONFIRM** correct position of *NO-LOAD DISCONNECT SWITCH, 2-ISO-GEN-MPT-DISC-SW* main contacts. — CR / RC Ind.Ver.

d. **LOCK** *NO-LOAD DISCONNECT SWITCH, 2-ISO-GEN-MPT-DISC-SW* in *OPEN.* — CR / RC Ind.Ver.

NOTE: The following step provides permissives to close PCBs 29A and 29B **AND** allows auto start of the Main Transformer Cooling Fans with the Generator Field Breaker open.

8. **PLACE** switch *GEN-SS-43BF*, at Generator Excitation Cabinet on the 70' elevation of the Turbine Building, in *BACKFEED.* — CR / RC Ind.Ver.

NOTE: The following step prevents tripping PCBs 29A and 29B with turbine valves closed, activates ground fault alarm relay (59BF) for isophase bus when in backfeed position, and allows operation of the turbine turning gear motor with the generator output breakers closed.

R45

9. **PLACE** switch *ISOPH-SS-43BF*, on Generator and UAT Relay Panel XU-8 (HJ6), in *BACKFEED.* — CR / RC Ind.Ver.

NOTE: The following step eliminates the possibility of tripping the Reverse Power Relay (32-2) while in *BACKFEED.* Tripping the Reverse Power Relay initiates a primary generator lockout which starts all EDGs and trips the generator breakers, 29A and 29B. Relay plugs on protection relays are removed by removing cover on relay and pulling relay plugs completely out.

10. **REMOVE** the bottom and **THEN** the top relay plugs (Generator Reverse Power Device AH 32-2) on Generator Protection relays at Generator and Main Transformer Relay Panel XU-8. — CR / RC Ind.Ver.

8.13.2 Procedural Steps

NOTE: The following step prevents the automatic selection of 1800 rpm main turbine speed if the main turbine is reset while in UAT *BACKFEED* mode. Auto selection of 1800 rpm opens the stop valves initiating a Group 1 isolation.

11. **PLACE** *UAT BACKFEED* switch *EHC-SS-43BF*, on EHC Panel P644 Bay A rear panel door, in *BACKFEED.* — CR / RE Ind.Ver.

12. **CONFIRM** Generator PCB trip signals, (2-UA-13 2-7 and 2-UA-13 2-8), are clear. — CR

13. **NOTIFY** the Dispatcher of impending circuit breaker operations. — CR

NOTE: The first generator PCB selected to be closed should be from the 230 KV Bus that is **NOT** feeding the Startup Auxiliary Transformer. The other PCB will be closed later.

CAUTION

All synchronizing switches on the RTGB should be in *OFF* prior to placing any synchroscope keylock switch in *ON.*

14. **PLACE** synchroscope switch in *ON* for the selected Generator PCB. — _____

15. **CONFIRM** running voltage is approximately 120 volts (230 KV Bus Voltage). — _____

NOTE: The synchroscope will **NOT** be in the "12 o'clock" position **AND** there will be no incoming voltage.

16. **CLOSE** the selected Generator PCB. — / Ind.Ver.

17. **CONFIRM** incoming voltage increases to approximately 120 volts. — _____

8.13.2 Procedural Steps

18. **PLACE** synchroscope switch to *OFF*. _____

19. **PLACE** synchroscope switch to *ON* for the remaining Generator PCB. _____

20. **CONFIRM** synchroscope is at the "12 o'clock" position. _____

21. **CONFIRM** running and incoming voltages are approximately 120 Volts. _____

22. **CLOSE** the remaining Generator PCB. ___/___ Ind.Ver.

23. **PLACE** synchroscope switch to *OFF*. _____

NOTE:	UAT to 2C, 2D and 2B feeder breakers will **NOT** close if Generator Primary, Backup and Differential Lockout Relays are tripped.

24. **IF** 4 KV Bus 2C or 2D is de-energized, **THEN PLACE** the *CW ISOL VALVES MODE SELECTOR* switch to position *A*, to defeat the auto start of the Circulating Water Pumps. _____

25. **PERFORM** the following steps to reenergize or transfer power to 4 KV Bus 2C:

    a. **IF** 4 KV Bus 2C is de-energized, **THEN ENSURE** mode control switches for the following pumps are in *MAN*:

       Condensate Booster Pump 2C. _____

       Condensate Booster Pump 2A. _____

       Condensate Pump 2B. _____

    b. **PLACE** *UAT TO BUS 2C SYNCHRONIZING SWITCH* to *ON*. _____

8.13.2 Procedural Steps

NOTE: **IF** 4 KV Bus 2C is deenergized, the synchroscope will **NOT** be in the "12 o'clock" position.

c. **CONFIRM** synchroscope is in the "12 o'clock" position **AND CLOSE** *UAT TO BUS 2C BREAKER, AC4.* _____

d. **CONFIRM** *UAT TO BUS 2C BREAKER, AC4,* has closed. ___/___ Ind.Ver.

e. **CONFIRM** *SAT TO BUS 2C BREAKER, AC6,* is open. ___/___ Ind.Ver.

f. **PLACE** *UAT TO BUS 2C SYNCHRONIZING SWITCH* to *OFF.* _____

26. **IF** 4 KV Bus E4 is deenergized **AND** is to be reenergized from 4 KV Bus 2C, **THEN PERFORM** the following:

NOTE: **WHEN** reenergizing the E-bus from its normal power supply (BOP-Bus), the Diesel Generator must be in the *AUTO* Mode to close the master/slave breakers.

a. **ENSURE** Diesel Generator 4 is in *AUTO* mode on Panel XU-2. _____

b. **PLACE** *BUS 2C TO BUS E4 SYNCHRONIZING SWITCH* to *ON.* _____

c. **PLACE AND HOLD** breaker control switch for *BUS 2C TO BUS E4* in *CLOSED* until both Master (*2-AC8*) **AND** Slave (*AJ9*) breakers indicate closed. _____

d. **CONFIRM** Master breaker (*2-AC8*) has closed. ___/___ Ind.Ver.

8.13.2 **Procedural Steps**

e. **CONFIRM** Slave breaker (*AJ9*) has closed. ___/___ Ind.Ver.

f. **PLACE** *BUS 2C TO BUS E4 SYNCHRONIZING SWITCH* to *OFF*. _____

27. **PERFORM** the following steps to reenergize or transfer power for 4 KV Bus 2D:

a. **IF** 4 KV Bus 2D is de-energized, **THEN ENSURE** mode control switches for the following pumps are in *MAN*:

- Condensate Pump 2C. _____
- Condensate Pump 2A. _____
- Condensate Booster Pump 2B. _____

b. **PLACE** *UAT TO BUS 2D SYNCHRONIZING SWITCH* to *ON*. _____

NOTE: **IF** 4 KV Bus 2D is deenergized, the synchroscope will **NOT** be in the "12 o'clock" position.

c. **CONFIRM** synchroscope is at the "12 o'clock" position **AND CLOSE** *UAT TO BUS 2D BREAKER, AD6*. _____

d. **CONFIRM** *UAT TO BUS 2D BREAKER, AD6,* has closed. ___/___ Ind.Ver.

e. **CONFIRM** *SAT TO BUS 2D BREAKER, AD4,* is open. ___/___ Ind.Ver.

f. **PLACE** *UAT TO BUS 2D SYNCHRONIZING SWITCH* to *OFF*. _____

8.13.2 Procedural Steps

28. **IF** 4 KV Bus E3 is deenergized **AND** is to be reenergized from 4 KV Bus 2D, **THEN PERFORM** the following:

> **NOTE:** **WHEN** reenergizing the E-bus from its normal power supply (BOP-Bus), the Diesel Generator must be in the *AUTO* Mode to close the master/slave breakers.

a. **ENSURE** Diesel Generator 3 is in *AUTO* mode on Panel XU-2. ____

b. **PLACE** *BUS 2D TO BUS E3 SYNCHRONIZING SWITCH* to *ON*. ____

c. **PLACE AND HOLD** breaker control switch for *BUS 2D TO BUS E3* in *CLOSED* until both Master (*2-AD1*) **AND** Slave (*AI2*) breakers indicate closed. ____

d. **CONFIRM** Master breaker (*2-AD1*) has closed. ___/___ Ind.Ver.

e. **CONFIRM** Slave breaker (*AI2*) has closed. ___/___ Ind.Ver.

f. **PLACE** *BUS 2D TO BUS E3 SYNCHRONIZING* to *OFF*. ____

29. **PERFORM** the following steps to reenergize or transfer power for 4 KV Bus 2B:

a. **PLACE** *UAT TO BUS 2B SYNCHROSCOPE SWITCH* to *ON*. ____

8.13.2 Procedural Steps

NOTE:	**IF** 4 KV Bus 2B is deenergized, the synchroscope will **NOT** be at the "12 o'clock" position.

b. **CONFIRM** synchroscope is at the "12 o'clock" position **AND CLOSE** *UAT TO BUS 2B BREAKER, AB0.* _____

c. **CONFIRM** *UAT TO BUS 2B BREAKER, AB0,* has closed. _____

d. **CONFIRM** *SAT TO BUS 2B BREAKER, AB2,* is open. _____

e. **PLACE** *UAT TO BUS 2B SYNCHROSCOPE SWITCH* to *OFF.* _____

30. **CONFIRM** *ISOPHASE BUS GROUND FAULT UAT BACKFEED MODE,* (UA-13 3-6), is clear. _____

31. **IF** the SAT is to be deenergized, **THEN DEENERGIZE** in accordance with Section 7.4. _____

32. **REFER** to 0OP-50.1 for transfer of emergency power supply from Diesel Generator to Normal Feeder. _____

33. **NOTIFY** Generator Isolated Phase Bus System Engineer that UAT Backfeed is in service on Unit 2. _____

Date/Time Completed _____

Performed By (Print)	Initials
_____	_____
_____	_____
_____	_____
_____	_____

Reviewed By: _____
Unit SCO

PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION

JOB PERFORMANCE MEASURE
SYSTEMS

JPM E

LESSON TITLE: Startup the Second Reactor Feed Pump per 2OP-32 - DFCS Control Signal Failure.

LESSON NUMBER: LOT-SIM-JP-32-06

REVISION NO: 01

RECOMMENDED BY: Curt Robert
Instructor/Developer DATE

CONCURRENCE BY: _____
Line Superintendent/Supervisor DATE

APPROVED BY: _____
Superintendent/Supervisor Training DATE

SIMULATOR SETUP:

A. Initial Conditions:

1. Recommended Initial Conditions

IC	9 (Unit 2)
Rx. Pwr.	52%
Core Age	BOC

2. Required Plant Conditions

B. Malfunctions

RFPT B MAN/DFCS switch to DFCS to trigger 1 (K3202DFC(DFCS)==(equal to) True) Malfunction MCF059F (Multiple ID RFPT B), DFCS Speed Demand Signal Failure to activate (Tied to Trigger 1, placing the DFCS control switch to DFCS) then to automatically delete the malfunction after 5 seconds.

C. Overrides

None

D. Remote Function

None

E. Special Instructions

None.

SAFETY CONSIDERATIONS:

NONE

EVALUATOR NOTES: (Do not read to performer)

1. The applicable procedure section **WILL** be provided to the performer, once it is demonstrated he/she knows the correct procedure.
2. If this is the first JPM of the JPM set, read the JPM briefing contained in NUREG 1021, Appendix E, or similar to the performer.
3. Provide marked copy of OP-32 Section 5.7.2.

Read the following to the JPM performer.

TASK CONDITIONS:

1. All applicable Prerequisites listed in Section 4.0 of the operating procedure are met.
2. All applicable Initial Conditions listed in Section 5.7.1 of the operating procedure are met.
3. An AO is standing by at the 2B RFP.
4. The 2B Reactor Feed Pump is currently idled per 2OP-32 Section 7.1.2.
5. Radwaste has been notified to place additional demineralizers in service as necessary.

INITIATING CUE:

You are directed to place the second Reactor Feed Pump in service per OP-32 section 5.7. Notify the Unit SCO when the second Reactor Feed Pump is in service with the Recirculation Valve in Automatic.

PERFORMANCE CHECKLIST

NOTE: Sequence is assumed unless denoted in the **Comments**.

Step 1 - Obtain current revision of 2OP-32, Section 5.7 and verify revision if applicable. Performer starts at step 5.7.2.2.

Current revision of 2OP-32, Section 5.7 obtained, performer goes to step 5.7.2.2.

SAT/UNSAT*

TIME START _____

Step 2 – Ensure RFP B(A) LP SUPPLY VLV RHS-V1(RHS-V2) is OPEN

RHS-V1 is verified OPEN.

SAT/UNSAT*

Step 3 – **SLOWLY RAISE** RFPT B(A) speed by placing RFPT B(A) *LOWER /RAISE* speed control switch in *RAISE* until speed is greater than approximately 2550 rpm.

Places LOWER /RAISE speed control switch in *RAISE* until speed is greater than approximately 2550 rpm *as indicated on ACT SPEED indicator 2-RFB-SI-7376*

SAT/UNSAT*

Step 4 – **WHEN** RFPT B(A) speed is greater than approximately 2550 rpm, **THEN RAISE** *RFPT B(A) SP CTL, C32-SIC-R601B(A),* output to match *DFCS STPT* and *SPEED STPT* on Panel P603 to within 100 rpm.

RAISES RFPT B(A) SP CTL, C32-SIC-R601B(A), output to match *DFCS STPT* and *SPEED STPT* on Panel P603 to within 100 rpm.

****CRITICAL STEP****SAT/UNSAT***

Step 5 – **NOTIFY** Radwaste Operator to monitor and log effluent conductivity for each CDD in service.

Notifies Radwaste Operator.

SAT/UNSAT*

Step 6 – **NOTIFY** Chemistry to sample the effluent of each CDD in service for resin.

Notifies Chemistry.

SAT/UNSAT*

NOTE: When the MAN/DFCS control switch is placed in DFCS this will trigger a loss of DFCS speed demand signal. The DFCS Speed Setpoint will momentarily ramp lower. This malfunction will automatically clear in 2 seconds.

Step 7 – **CONFIRM** the following RFPT B(A) speed signals on Panel P603 agree within approximately 100 rpm:

a. *DFCS STPT* (speed demand from DFCS)
b. *SPEED STPT* (speed demand from 5009 control)
c. *ACT SPD* (actual RFPT speed)

AND PLACE *MAN/DFCS* control switch in *DFCS*.

Verifies that RFPT B speed signals agree and places MAN/DFCS in DFCS.

****CRITICAL STEP****SAT/UNSAT***

Observes that MAN/DFCS control switch is placed in DFCS, DFCS CTRL light is energized, then goes out and the RFP B CONTROL TROUBLE annunciator alarms.

ALTERNATE PATH STARTS HERE

Step 8 – Acknowledges RFP B CONTROL TROUBLE annunciator.

Acknowledges RFP B CONTROL TROUBLE annunciator.

SAT/UNSAT*

Step 9 – Reviews APP-UA-13 for window 6-6.

Reviews APP-UA-13 for window 6-6.

SAT/UNSAT*

PROMPT: As the Turbine Building AO report the local annunciator panel has the WOODWARD CONTROL TROUBLE alarm flashing, and that when acknowledged the alarm cleared.

NOTE: Acknowledge and clear the alarm using the remote function for the 5009 control panel.

Step 8 – APP-UA-13 requires that CO directs the Turbine Building AO to investigate the alarm condition at the local 5009 panel in the breezeway.

Directs AO to report the cause of the alarm at the local panel.

SAT/UNSAT*

PROMPT: As the SRO acknowledge the report and state that you have requested I & C to troubleshoot the Woodward Governor.

Step 9 – Notifies SRO of the annunciator. SRO notifies I & C to troubleshoot the Woodward Governor.

SRO notified.

SAT/UNSAT*

NOTE: The Performer may reference AOP-23 but entry into the AOP is NOT required.

SIMULATOR OPERATOR: Delete CF059F to simulate repair made by I&C. Inform examiner that malfunction has been deleted.

PROMPT: As the SRO report that I & C has found and repaired a loose connection. (Direct the Performer that the RFPT Woodward is in MANUAL and ready to be restored to DFCS control.)

PROMPT: Simulator Operator must acknowledge local alarm panel to clear the common alarm in the Control Room

Step 10 – References Section 8.32 of 2OP-32.

Section 8.32 of 2OP-32 obtained.

SAT/UNSAT*

Restarted numbering to aid examiner in following along in OP-32 Section 8.32.

Step 1 – **PLACE** RFPT B MAN/DFCS selector switch in MAN.

Places RFPT B MAN/DFCS selector switch in MAN.

****CRITICAL STEP****SAT/UNSAT***

Step 2 – **DEPRESS** RFPT B CTRL RESET on Panel XU-1.

RFPT B CTRL RESET on Panel XU-1 reset by depressing reset pushbutton.

****CRITICAL STEP**SAT/UNSAT***

Step 3 – **ENSURE** the following RFPT A(B) speed signals on Panel P603 agree within approximately 100 rpm:

a. *DFCS STPT* (speed demand from DFCS)
b. *SPEED STPT* (speed demand from 5009 control)
c. *ACT SPD* (actual RFPT speed)

Verifies that DFCS STPT, ACT SPD and SPEED STPT agree within 100 rpm.

SAT/UNSAT*

Step 4 – **WHEN** speed signals agree within 100 rpm, **THEN PLACE** *MAN/DFCS* selector switch in *DFCS* **AND CONFIRM** the *DFCS CTRL* white backlight is illuminated.

Places MAN/DFCS control switch in DFCS, verifies DFCS CTRL light is energized.

****CRITICAL STEP**SAT/UNSAT***

NOTE: The Performer returns to OP-32 section 5.7 at step 5.7.2.8 to complete placing RFP B in service.

Restarted numbering to aid examiner in following along in OP-32 Section 5.7.2.

Step 8 – **SLOWLY RAISE** RFPT B(A) speed by depressing the raise pushbutton on *C32-SIC-R601B(A)* until RFP discharge pressure is approximately equal to reactor pressure.

Bumps raise pushbutton to increase RFP B discharge pressure until ~equal to RPV pressure (~1000 psig).

SAT/UNSAT*

Step 9 – Open RFP B DISCH VLV, FW-V4.

Opens RFP B DISCH VLV, FW-V4.

**** CRITICAL STEP **** SAT/UNSAT***

Step 10 – **SLOWLY RAISE** RFPT B speed by depressing the raise pushbutton on C32-SIC-R601B until RFP B demand is approximately equal to RFP A demand.

RFP B DEM is approximately equal to RFP A DEM (± 0.5%).

SAT/UNSAT*

Step 11 – **DEPRESS** the A/M pushbutton on C32-SIC-R601B to place the controller in auto.

Depresses A/M so that C32-SIC-R601B A/M indicator indicates A.

**** CRITICAL STEP ** SAT/UNSAT***

Step 12 – **WHEN** RFP B flow is > 2.5 x 10^6 lbm/hr place RFP B RECIRC VLV, FW-FV-V47 in AUTO.

Places RFP B RECIRC VLV, FW-FV-V47 in AUTO.

SAT/UNSAT*

TERMINATING CUE: When the Feed Pump Recirc Valve is placed in AUTO and the Unit SCO is notified, this JPM is complete.

TIME COMPLETED _____

RELATED TASKS:

259203B101, Start the second Reactor Feed Pump per OP-32
259710B401 Respond to a RFP digital control trouble alarm per APP-UA-13.
259711B101 Transfer RFPT Woodward 5009A(B) to DFCS Control per OP-32.

K/A REFERENCE AND IMPORTANCE RATING:

259001		259002	
A4.02	3.9, 3.7	A1.07	2.6, 2.6
A1.04	2.8, 2.7	A2.06	3.3, 3.4
A3.01	3.3, 3.5	A4.01	3.8, 3.6
A3.08	2.8, 2.7	A4.03	3.8, 3.6
A3.09	3.0, 3.0	A4.07	3.8, 3.6
K5.03	2.8, 2.8		
2.1.1	3.7, 3.8		
2.1.20	4.3, 4.2		
2.1.31	4.2, 3.9		
2.2.2	4.0, 3.5		

REFERENCES:

OP-32 Rev. 123

TOOLS AND EQUIPMENT:

None.

SAFETY FUNCTION (from NUREG 1123, Rev 2.):

2 – Reactor Water Inventory Control

REASON FOR REVISION:

Updated for procedure revision.

Startup the second Reactor Feed Pump per 2OP-32 - DFCS Control Signal Failure

Time Required for Completion: 25 Minutes (approximate).

Time Taken: ____

APPLICABLE METHOD OF TESTING

Performance: Simulate ___ Actual ✓ Unit: ____

Setting: Control Room ___ Simulator ✓ (Not applicable to In-Plant JPMs)

Time Critical: Yes ___ No ✓ Time Limit N/A

Alternate Path: Yes ✓ No ___

EVALUATION

Performer:_____ SSN: _____

JPM: Pass _____ Fail _____

Remedial Training Required: Yes _____ No _____

Did Performer Verify Procedure? Yes _____ No _____
(Each Student should verify one JPM per evaluation set)

Comments: _____

_____

_____

_____

_____

Comments reviewed with Student

Evaluator Signature: _____ Date:_____

TASK CONDITIONS:

1. All applicable Prerequisites listed in Section 4.0 of the operating procedure are met.
6. All applicable Initial Conditions listed in Section 5.7.1 of the operating procedure are met.
7. An AO is standing by at the 2B RFP.
8. The 2B Reactor Feed Pump is currently idled per 2OP-32 Section 7.1.2.
9. Radwaste has been notified to place additional demineralizers in service as necessary.

INITIATING CUE:

You are directed to place the second Reactor Feed Pump in service per OP-32 section 5.7. Notify the Unit SCO when the second Reactor Feed Pump is in service with the Recirculation Valve in Automatic.

5.7 Reactor Feed Pump Startup From Idle Speed To Injection – Second Pump Operation

C
Continuous
Use

5.7.1 Initial Conditions

1. One RFP is in operation in accordance with Section 5.5. ☑

2. Reactor power is between 48% and 53%. ☑

3. Heater Drain System is being pumped forward. ☑

4. RFPT B(A) is idling in accordance with Section 5.12 **OR** has been reduced to idle speed in accordance with Section 7.1.2. ☑

5.7.2 Procedural Steps

1. **NOTIFY** Radwaste Operator to monitor CDD flows and place additional demineralizers in service as necessary. ☑

2. **ENSURE** *RFP B(A) LP SUPPLY VLV, RHS-V1(RHS-V2)*, is open. ☐

NOTE: This section directs startup of the second RFPT from idle speed. Steps are written for RFPT B with RFPT A components enclosed in parentheses.

NOTE: **WHEN** using the *RFPT B(A) LOWER/RAISE* speed control switch, **THEN** reactor feed pump turbine speed will change at a rate of 50 rpm per second. **IF** the switch is held in *LOWER* **OR** *RAISE* for greater than 3 seconds, **THEN** the rate of change will increase to 375 rpm per second.

3. **SLOWLY RAISE** RFPT B(A) speed by placing RFPT B(A) *LOWER /RAISE* speed control switch in *RAISE* until speed is greater than approximately 2550 rpm. ☐

4. **WHEN** RFPT B(A) speed is greater than approximately 2550 rpm, **THEN RAISE** *RFPT B(A) SP CTL, C32-SIC-R601B(A),* output to match *DFCS STPT* and *SPEED STPT* on Panel P603 to within 100 rpm. ☐

5.7.2 Procedural Steps

5. **NOTIFY** Radwaste Operator to monitor and log effluent conductivity for each CDD in service. ☐

6. **NOTIFY** Chemistry to sample the effluent of each CDD in service for resin. ☐

NOTE: **WHEN** RFPT B(A) *MAN/DFCS* control switch is placed in *DFCS*, *RFP B(A) SP CTL, C32-R601B(A),* will control RFPT speed.

NOTE: **WHEN** RFPT B(A) *MAN/DFCS* control switch is placed in *DFCS*, **AND** DFCS is in control, the RFPT B(A) *DFCS CTRL* light will be illuminated.

NOTE: **IF** RFPT B(A) *MAN/DFCS* selector switch is in *DFCS*, **AND** the DFCS control signal subsequently drops below 2450 rpm, **OR** increases to greater than 5450 rpm, **THEN** the Woodward 5009 digital controls will automatically assume RFPT speed control and maintain current speed. In this condition, the RFPT will only respond to *LOWER/RAISE* speed control switch commands until the *MAN/DFCS* selector switch is placed in *MAN,* DFCS *CTRL RESET* pushbutton is depressed, **AND** the *MAN/DFCS* selector switch returned to *DFCS.*

7. **CONFIRM** the following RFPT B(A) speed signals on Panel P603 agree within approximately 100 rpm:

   a. *DFCS STPT* (speed demand from DFCS) ☐

   b. *SPEED STPT* (speed demand from 5009 control) ☐

   c. *ACT SPD* (actual RFPT speed) ☐

   AND PLACE *MAN/DFCS* control switch in *DFCS.* ☐

CAUTION

Momentarily depressing the raise or lower pushbuttons on *C32-SIC-R601B(A),* will cause pump demand to change in increments of 0.1%. Continually depressing the raise or lower pushbuttons will cause pump demand to change at an exponential rate.

8. **SLOWLY RAISE** RFPT B(A) speed by depressing the raise pushbutton on *C32-SIC-R601B(A)* until RFP discharge pressure is approximately equal to reactor pressure. ☐

5.7.2 Procedural Steps

9. **OPEN** *RFP B(A) DISCH VLV, FW-V4(V3).* ☐

NOTE: **WHEN** the second pump begins to feed the reactor vessel, demand on the reactor feed pump in automatic will decrease.

10. **SLOWLY RAISE** RFPT B(A) speed, using *RFPT B(A) SP CTL,C32-SIC-R601B(A)*, until *B(A) DEM* is approximately equal to *A(B) DEM* of the on line RFP. ☐

NOTE: **WHEN** the second RFPT is placed in *A* (automatic), *MSTR RFPT SP/RX LVL CTL, C32-SIC-R600*, will balance RFP demands over a 2-minute time frame if both demands were **NOT** matched exactly prior to placing the second pump in *A* (automatic).

11. **DEPRESS** *A/M* pushbutton on *RFPT B(A) SP CTL, C32-SIC-R601B(A)*, **AND CHECK** *A/M* indicator changes to *A* (automatic). ☐

NOTE: **WHEN** *RFP B(A) RECIRC VLV, FW-FV-V47 (FW-FV-V46)* is closed, feedwater flow should momentarily rise causing a momentary rise in reactor vessel level.

12. **WHEN** pump flow is greater than 2.5 X 10^6 lbm/hr, **THEN PLACE** *RFP B(A) RECIRC VLV, FW-FV-V47(V46)*, in *AUTO.* ☐

CAUTION

Momentarily depressing the raise or lower pushbuttons on *MSTR RFPT SP/RX LVL CTL, C32-SIC-R600*, will cause level setpoint to change in increments of 0.1%. Continually depressing the raise or lower pushbuttons will cause level setpoint to change at an exponential rate.

13. **WHEN** *RFP B(A) RECIRC VLV* closes, **THEN ADJUST** level setpoint on *MSTR RFPT SP/RX LVL CTL, C32-SIC-R600*, to 187 inches. ☐

5.7.2 Procedural Steps

NOTE: Adjusting RFP bias may be necessary periodically throughout the operating cycle. This adjustment should be made at the discretion of the Unit SCO.

NOTE: Following any RFP bias adjustment, the BESS System Engineer should be notified of new bias values for trending purposes.

14. **IF** desired to balance RFP flows, **THEN ADJUST** bias as follows:

    a. **DEPRESS** *SEL* pushbutton on *RFPT B(A) SP CTL, C32-SIC-R601B(A)*, until *B(A) BIAS* is displayed. ☐

CAUTION

Momentarily depressing the raise or lower pushbuttons on *C32-SIC-R601B(A)* will cause pump bias to change in increments of 0.1%. Continually depressing the raise or lower pushbuttons will cause pump bias to change at an exponential rate.

    b. **SLOWLY ADJUST** *BIAS* on selected RFP until both RFP flow rates are approximately equal. ☐

    c. **IF** adjusting *BIAS* on a single RFP did **NOT** balance the flows, **THEN REPEAT** Steps 5.7.2.14.a and 5.7.2.14.b for the other RFP. ☐

    d. **DEPRESS** *SEL* button on both *RFPT B(A) SP CTL, C32-SIC-R601B* **AND** *A*, until *PMP B(A) DEM* is displayed. ☐

15. **NOTIFY** Radwaste Operator to monitor and log the CDD effluent conductivity for each demineralizer in service. ☐

16. **NOTIFY** Chemistry to sample the effluent for each CDD in service for resin. ☐

PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION

JOB PERFORMANCE MEASURE SYSTEMS

JPM F

LESSON TITLE: Actions for a Complete Loss of TBCCW.

LESSON NUMBER: JPM F

REVISION NO: 0

RECOMMENDED BY: Curt Robert _____
Instructor/Developer DATE

CONCURRENCE BY: _____
Line Superintendent/Supervisor DATE

APPROVED BY: _____
Superintendent/Supervisor Training DATE

SIMULATOR SETUP

IC-13 EOC

Rx Pwr 100%

Core Age EOC

Triggers

None

Malfunctions

Active – CW014F (TBCCW HX DISCH HDR RUPTURE)

Overrides

None

Remote Functions

None

Special Instructions

Ensure Malfunctions and Remote Functions are ACTIVE.

Scram the reactor and perform scram immediate actions

SAFETY CONSIDERATIONS:

None.

EVALUATOR NOTES: (Do not read to trainee)

1. The applicable procedure section **WILL** be provided to the trainee.
2. If this is the first JPM of the JPM set, read the JPM briefing contained NUREG 1021, Appendix E, or similar to the trainee.
3. A copy of 2OP-50, Section 8.13, signed off through step 13 should be provided to the examinee.

Read the following to trainee.

TASK CONDITIONS:

1. The Unit 2 TBCCW Discharge Header has ruptured and AOP-17, TURBINE BUILDING CLOSED COOLING WATER SYSTEM FAILURES, has been entered and announced.
2. Unit Two (2) reactor has been scrammed and immediate actions are complete.
3. 2C TBCCW pump is in service supplying **Unit One (1)**.
4. AOs are available to assist with field actions.

INITIATING CUE:

You are directed by the Unit SCO to complete the steps for a total loss of TBCCW per AOP-17 and to inform the SCO when these actions have been completed.

PERFORMANCE CHECKLIST

NOTE: Sequence is assumed unless denoted in the **Comments**.

Step 1 - Obtain latest revision of AOP-17 Section 3.2.3.
Current revision of AOP-17 Section 3.2.3 *obtained.*

*** SAT/UNSAT***

Restarted numbering to aid examiner in following steps of AOP-17 Section 3.2.3

Step 1 - **IF** *TBCCW HEAD TANK LEVEL* HI/LO (UA-03 1-4) is in alarm **AND** level is low, **THEN UNLOCK AND CLOSE** *HEAD TANK SUPPLY TO UNIT 1(2), TCC-V1*, for the affected unit.
Direct AO to close 2TCC-V1.

**** CRITICAL STEP ** SAT/UNSAT***

Step 2 – **TRIP** both Recirculation Pumps.
Place Recirc MG-Set 2A and 2B control switches in Stop.

**** CRITICAL STEP ** SAT/UNSAT***

Step 3 - **TRIP** the Main Turbine.
Verify Main Turbine Tripped. (Various indications at XU-1- Mechanical Trip light – TRIPPED, All Valves Closed light lit, Emergency Trip System light lit, 2-UA-23 1-3 AND 1-4 annunciators sealed in)

*** SAT/UNSAT***

Step 4 – **TRIP** both Reactor Feed Pumps.

Ensure RFP A and RFP B by verifying RFP A and B HP and LP Stop valves closed and/or annunciators 2-UA-04 1-2 and 1-4.

*** SAT/UNSAT***

Step 5 - **TRIP** all Condensate Pumps and Condensate Booster Pumps.

Condensate Pumps and Condensate Booster Pumps are placed to STOP. (Should be done so as to prevent an AUTO start)

**** CRITICAL STEP ** SAT/UNSAT***

NOTE: Heater Drain Pumps should be tripped from Unit Trip Load Shed.

Step 6 – **TRIP** all Heater Drain Pumps.

Verify Heater Drain Pumps tripped.

*** SAT/UNSAT***

Step 7 – **TRIP** TBCCW Pumps supplying the affected unit.

Place 2A and 2B TBCCW pumps in OFF, Leave 2C TBCCW pump in service on Unit One (1)

**** CRITICAL STEP ** SAT/UNSAT***

Step 8 - **ISOLATE** the Service Air System header by placing control switch *SERVICE AIR ISOL VLVS, SA-PV-706-1&2,* to *CLOSE.*

Place SERVICE AIR ISOL VLVS, SA-PV-706-1&2, to CLOSE.

*** SAT/UNSAT***

PROMPT: When examinee requests Unit One (1) SCO permission to cross-tie Service Air inform examinee that you will coordinate cross-tie of Service Air.

Step 9 – Cross-tie Unit 1 and Unit 2 Service Air Systems.

Obtain Unit One (1) SCO permission and acknowledge that the Unit One(1) SCO will coordinate cross-tie of Service Air.

*** SAT/UNSAT***

Step 10 – **TRIP** the affected unit's air compressors.

Place 2A, 2B, 2C,to OFF and 2D air compressor to STOP.

*** SAT/UNSAT***

PROMPT: When examinee place D air compressor in STOP inform examinee that another operator will reference and complete AOP-20.

Step 11 - **REFER** to 0AOP-20.0.
Place Acknowledges prompt that another operator will refer to AOP-20

*** SAT/UNSAT***

Step 12 - **PLACE** all MSIV switches to *CLOSE*.
Place B21-F022 A-D and B21-F028A-D MSIV control switches in CLOSE.

**** CRITICAL STEP ** SAT/UNSAT***

Step 13 – **TRIP** the following:

SJAE
At XU-80 depresses OFF/RESET pushbutton for SJAE A and B and verifies that valves reposition.

*** SAT/UNSAT***

SPE
At XU-2 places SPE A control switch in STOP.

*** SAT/UNSAT***

Mechanical Vacuum Pump(s), if running.
Not running N/A.

*** SAT/UNSAT***

Step 14 - Place **OPEN** condenser vacuum breakers.

Places condenser vacuum breaker control switch to OPEN.

**** CRITICAL STEP ** SAT/UNSAT***

Step 15 – Inform the Unit SCO when all the steps for a total loss of TBCCW per AOP-17 are complete.

Unit SCO informed all steps *for a total loss of TBCCW per AOP-17 are complete.*

*** SAT/UNSAT***

TERMINATING CUE: All steps for a total loss of TBCCW per AOP-17 are complete.

*** Comments required for any step evaluated as UNSAT.**

RELATED TASKS:

2740001B401, Respond to a Complete Loss of TBCCW per AOP-17.0.

K/A REFERENCE AND IMPORTANCE RATING:

400000 A2.02 2.8/3.0 - Ability to use procedures to mitigate the consequences of abnormally low surge tank level.

295018 AA1.02 3.3/3.4 - Ability to operate system loads as a result of a Complete Loss of Component Cooling Water.

REFERENCES:

AOP-17.0 Rev. 16

TOOLS AND EQUIPMENT:

None.

SAFETY FUNCTION (from NUREG 1123, Rev 2.):

8 – Plant Service Systems

REASON FOR REVISION:

New for NRC 2004 Exam.

Time Required for Completion: 18 Minutes (approximate).

APPLICABLE METHOD OF TESTING

Performance: Simulate ___ Actual ✔ Unit: 2

Setting: Control Room ___ Simulator ✔ (Not applicable to In-Plant JPMs)

Time Critical: Yes ___ No ✔ Time Limit N/A

Alternate Path: Yes ___ No ✔

EVALUATION

Trainee:_____ SSN: _____

JPM: Pass _____ Fail _____

Remedial Training Required: Yes _____ No _____

Did Trainee Verify Procedure as Authorized Copy?: Yes _____ No _____
(Each Student should verify one JPM per evaluation set.)

Comments: _____

_____

_____

_____

_____

Comments reviewed with Student

Evaluator Signature: _____ Date:_____

TASK CONDITIONS:

1. The Unit 2 TBCCW Discharge Header has ruptured and AOP-17 has been entered and announced.
2. Unit Two (2) reactor has been scrammed and immediate actions are complete.
3. 2C TBCCW pump is in service supplying **Unit One (1)**.
4. AOs are available to assist with field actions.

INITIATING CUE:

You are directed by the Unit SCO to complete the steps for a total loss of TBCCW per AOP-17 and to inform the SCO when these actions have been completed.

PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION

JOB PERFORMANCE MEASURE
SYSTEMS

JPM G

LESSON TITLE: Recirculation Pump Start – Recirculation Pump Speed Control Failure.

LESSON NUMBER: LOT-SIM-JP-002-A07

REVISION NO: 1

RECOMMENDED BY: Curt Robert _____
Instructor/Developer DATE

CONCURRENCE BY: _____
Line Superintendent/Supervisor DATE

APPROVED BY: _____
Superintendent/Supervisor Training DATE

SIMULATOR SETUP (Recommended)

IC-11	BOC
Rx Pwr	100%
Core Age	BOC

Triggers

E1 – Auto initiated, Recirc B Runback Reset Push Button (K2716A) = TRUE

Malfunctions

None

Overrides

E1 – Recirc B Flow Control 1.0 over 60 seconds

Remote

None

Special Instructions

Reduce core flow to ENP-24 limit, drive 1st 2 sets of rods on ENP-24.

Secure Recirc Pump B, place seal staging valve (V17) to Manual/Open, and reduce controller output to approx. 15%.

Ensure core flow >30.8 and <45 mlbm/hr, and Recirc A pump flow >24,500 gpm. Ensure scram avoidance region will not be entered when Recirc A pump flow is reduced to 23.500 gpm.

SAFETY CONSIDERATIONS:

None.

EVALUATOR NOTES: (Do not read to trainee)

1. The applicable procedure section **WILL** be provided to the trainee. Evaluator should provide copy of OP-02, Sections 5.2 and 8.2 completed up to the steps specified in the task conditions.

2. If this is the first JPM of the JPM set, read the JPM briefing contained NUREG 1021, Appendix E, or similar to the trainee.

Read the following to trainee.

TASK CONDITIONS:

1. Recirculation Pump 2B has tripped. The cause of the trip has been corrected.
2. Recirculation Pump 2A is in operation.
3. RWCU is in normal operation per 2OP-14.
4. An off-going operator has completed steps in 2OP-02, Section 8.2, up to step 8.2.2.4, and Section 5.2, up to step 5.2.2.22.
5. Another operator is available to make log entries as required.

INITIATING CUE:

You are directed to continue the startup of Recirculation Pump 2B and inform the Unit SCO when 2OP-02 Sections 5.2 and 8.2 are complete.

PERFORMANCE CHECKLIST

NOTE: Sequence is assumed unless denoted in the **Comments**.

Step 1 - Obtain a current revision of 2OP-02, Sections 5.2 and 8.2.
Current Revision of 2OP-02, Sections 5.2 and 8.2 obtained and verified, if applicable. Determines starting point at step 5.2.2.22.

SAT/UNSAT*

Started numbering to correspond with examinees steps to aid examiner in following.

Step 22 – Ensure temperature differential between the reactor coolant within the dome and bottom head drain is less than 145°F as follows:

a. Determine reactor pressure, convert to psia by adding 14.7 and use steam tables to convert reactor pressure to temperature.
Reactor temperature in the dome determined by converting psig to psia and using steam tables.

SAT/UNSAT*

PROMPT: If examinee requests another individual to read C12-TR-R018, Channel 153 (Local Indication), direct examinee to use available indication on panel P603.

NOTE: Since bottom head drain temperature indication is available, B32-TR-R650 (H12-P603) or process computer points B055-B058 should not be used.

b. Determine bottom head drain temperature using G31-TI-R607 Point 5 (Panel H12-P603), or C12-TR-R018 Channel 153 (Local).
Bottom head drain temperature using G31-TI-R607 Point 5 is determined.

SAT/UNSAT*

c. Determine temperature difference and record time.
Temperature differential determined and time recorded in OP-02.

SAT/UNSAT*

PROMPT: If examinee requests another individual to record differential temperature and time in the CO logbook, report log entry is complete.

PROMPT: If examinee asks, inform examinee APRM setup is not desired.

NOTE: Step 23 2OP-02, Section 5.2.2 is not applicable.

Step 24 – Slowly reduce speed of the operating Reactor Recirculation Pump using Recirc Pump 2A Speed Control potentiometer until loop flow is less than or equal to 50% (24,500 gpm) of rated loop flow.
Recirc loop 2A flow is ≤24,500 gpm on B32-FR-R614 or B32-R617.

**** CRITICAL STEP ** SAT/UNSAT***

Step 25 – Within 30 minutes prior to startup of the second pump, ensure temperature differential between operating loop and idle loop is less than or equal to 50°F and that operating loop flow is less than or equal to 24,500 gpm as follows:

a. Operating loop temperature (B32-TR-R650) or process computer (B055-B058)
Loop 2A temperature recorded in 2OP-02 using B32-TR-R650 or B055-B056.

SAT/UNSAT*

b. Idle loop temperature (B32-TR-R650) or process computer (B055-B058)
Loop 2B temperature recorded in 2OP-02 using B32-TR-R650 or B057-B058.

SAT/UNSAT*

c. Determine differential temperature, record results and time in 2OP-02
Differential temperature determined and recorded, along with time in 2OP-02.

SAT/UNSAT*

PROMPT: If examinee requests another individual to record differential temperature and time in the CO logbook, report log entry is complete.

NOTE: B32-FR-R614 (flow recorder) is available and should be used for the following step.

d. Operating loop flow rate on B32-FR-R614, if available, or flow indicator B32-R613 is less than or equal to 24,500 gpm (50% of rated loop flow) and time recorded in 2OP-02

Loop 2A flow rate from B32-FR-R614 and time recoded in 2OP-02.

SAT/UNSAT*

PROMPT: If examinee requests another individual to record Loop 2A flow rate and time in the CO logbook, report log entry is complete.

NOTE: Step 26 of 2OP-02, Section 5.2.2 is not applicable.
A recirc runback signal will be received when the discharge valve is closed.

Step 27 – Ensure Pump 2B discharge valve B32-F031B is closed.

CLOSES *Pump 2B discharge valve B32-F031B.*

**** CRITICAL STEP ** SAT/UNSAT***

NOTE: Step 28 of 2OP-02, Section 5.2.2 is not applicable.

Step 29 – Ensure 30 minutes has not elapsed since temperature differentials and flow rate were determined.

30 minutes has not elapsed since temperature differentials and flow rate were determined

SAT/UNSAT*

Step 30 – Start MG Set 2B drive motor and ensure the following:
MG Set 2B drive motor is started

**** CRITICAL STEP ** SAT/UNSAT***

a. MG Set B drive motor breaker closes.
Ensures MG Set 2B drive motor closes.

SAT/UNSAT*

b. MG Set B accelerates to speed.
Ensures MG 2B accelerates to speed.

SAT/UNSAT*

c. Approximately 6 seconds after the drive motor breaker closes, the generator field breaker closes and starts the Reactor Recirculation Pump.
Ensures MG 2B field breaker closes and Recirculation Pump 2B starts.

SAT/UNSAT*

NOTE: B32-R613 will indicate very little flow since the discharge valve is closed. Flow is through the discharge bypass valve only.

d. Recirc Pump 2B discharge flow B32-R613 indicates flow.
Ensures Recirc Pump 2B discharge flow B32-R613 indicates flow.

SAT/UNSAT*

PROMPT: If examinee requests another individual to record time the MG Set 2B drive motor breaker was closed in the CO logbook per OP-02 Step 5.2.2.31, report log entry is complete.

Step 32 – If in Modes 1 or 2 and the reactor is critical, perform the following:

a. Using 2 second jogs and 10 second rest times for the first minute, jog open Pump 2B discharge valve B32-F031B.
B32-F031B is opened using 2 second jogs and 10 second rest times for the first minute (5 total jogs).

**** CRITICAL STEP ** SAT/UNSAT***

b. Fully open Pump 2B discharge valve B32-F031B.
B32-F031B is fully opened.

**** CRITICAL STEP ** SAT/UNSAT***

NOTE: Steps 33 and 34 of 2OP-02, Section 5.2.2 are not applicable.

Step 35 – Place the control switch for Seal Staging Valve B32-V17 to AUTO and ensure the valve remains open.

B32-V17 open with the control switch in AUTO.

SAT/UNSAT*

NOTE: When the Runback Reset push button for Recirc Pump 2B is depressed, the speed demand will begin to increase. Speed demand signal will ramp to 100% over a 60 second period. Pump speed (and reactor power) will increase until the scoop tube is locked. Locking the scoop tube is an immediate operator action of AOP-03.0.

Maximum pump speed mismatch is 20% below 58 mlbm/hr total core flow and 10% above 58 mlbm/hr total core flow.

Step 36 – Reset Recirculation runback in accordance with Section 8.3.

Recognizes runback must be reset and obtains copy of 2OP-02, Section 8.3.

SAT/UNSAT*

Restarted numbering to correspond with OP-02 Section 8.3

PROMPT: If examinee requests I&C assistance in resetting the runback, as I&C report signals matched and runback can be reset.

Step 1 – Adjust the potentiometer on Recirc Pump 2B Speed Control lowering the speed demand signal until speed signal shows a slight decrease in pump speed.

Recirc B Speed Control is lowered to achieve a slight decrease in pump speed.

SAT/UNSAT*

ALTERNATE PATH STARTS HERE

NOTE: When the Runback Reset push button for Recirc Pump 2B is depressed, the speed demand will begin to increase. Speed demand signal will ramp to 100% over a 60 second period. Pump speed (and reactor power) will increase until the scoop tube is locked. Locking the scoop tube is an immediate operator action of AOP-03.0.

Maximum pump speed mismatch is 20% below 58 mlbm/hr total core flow and 10% above 58 mlbm/hr total core flow.

Step 2 - **MONITOR** Recirculation Pump speed and be prepared to manually lock out the scoop tube if speed increases rapidly.

Reads and signs off step to acknowledge importance of monitoring speed control operation once runback is reset.

NOTE: Examiner or booth operator- Record Pump Speeds and Core flow before the runback is reset.

Pump A Speed ____ Pump B Speed ____ Total Core Flow ___

Step 3 – Reset the Recirculation runback for Reactor Recirculation Pump 2B as follows:

a Depress the Recirc Runback Reset push button for Recirculation Pump 2B.
Recirc Runback Reset pushbutton for Pump 2B is depressed.

**** CRITICAL STEP ** SAT/UNSAT***

b Ensure reactor power and flow are stabilized.
Recognize increasing speed on Recirc Pump 2B and lock the scoop tube prior to exceeding maximum pump speed mismatch limit of 20%.

**** CRITICAL STEP ** SAT/UNSAT***

NOTE: Examiner or booth operator, record Pump Speeds and Core flow when the scoop tube is locked. If performer allows Recirculation Pump B speed to increase above Recirculation Pump A speed by 20% pumps will be outside of mismatch limitations per LCO 3.4.1. This shall be considered failure criteria.

Pump A Speed ____ Pump B Speed ____ Total Core Flow ___

NOTE: This condition requires entry into AOP-03.0. When examinee locks scoop tube and informs SCO of the failure, the JPM is complete since the task cannot be completed. Since the task cannot be completed, it is acceptable for the examiner to inform the examinee that the JPM is complete.

PROMPT: When informed as SCO of the failure, inform examinee that another operator will enter and announce AOP-03.0

Step 13 – Inform SCO of speed control failure.
SCO informed of speed control failure.

SAT/UNSAT*

TERMINATING CUE: When the scoop tube is locked for Recirc MG Set 2B, this JPM is complete.

*** Comments required for any step evaluated as UNSAT.**

RELATED TASKS:

202004B101, Startup A Reactor Recirculation Pump Per OP-02

202015B401, Respond To A Recirc Flow Control Failure Increasing Per AOP-03.0

K/A REFERENCE AND IMPORTANCE RATING:

202001 A4.01 3.7/3.7

Ability to manually operate and/or monitor in the control room: Recirculation pumps

REFERENCES:

2OP-02 Rev 117

TOOLS AND EQUIPMENT:

Steam Tables

SAFETY FUNCTION (from NUREG 1123, Rev 2.):

1 – Reactivity Control (Recirculation System)

REASON FOR REVISION:

Updated for procedure revision.

Time Required for Completion: 20 Minutes (approximate).

APPLICABLE METHOD OF TESTING

Performance: Simulate ___ Actual ✓ Unit: 2

Setting: Control Room ___ Simulator ✓ (Not applicable to In-Plant JPMs)

Time Critical: Yes ___ No ✓ Time Limit N/A

Alternate Path: Yes ✓ No ____

EVALUATION

Trainee:_____ SSN: _____

JPM: Pass _____ Fail _____

Remedial Training Required: Yes _____ No _____

Did Trainee Verify Procedure as Authorized Copy?: Yes _____ No _____
(Each Student should verify one JPM per evaluation set.)

Comments: _____

_____

_____

_____

_____

Comments reviewed with Student

Evaluator Signature: _____ Date:_____

TASK CONDITIONS:

1. Recirculation Pump 2B has tripped. The cause of the trip has been corrected.
2. Recirculation Pump 2A is in operation.
3. RWCU is in normal operation per 2OP-14.
4. An off-going operator has completed steps in 2OP-02, Section 8.2, up to step 8.2.2.4, and Section 5.2, up to step 5.2.2.22.
5. Another operator is available to make log entries as required.

INITIATING CUE:

You are directed to continue the startup of Recirculation Pump 2B and inform the Unit SCO when 2OP-02 Sections 5.2 and 8.2 are complete.

8.2 Transferring from One-Pump, One-Loop Operation to Two-Pump, Two-Loop Operation

C Continuous Use

8.2.1 Initial Conditions

Date/Time Started Today 0001

Initials

1. The reactor is operating in Modes 1, 2, or 3. CA

2. The Recirculation System is operating in a one-pump, one-loop configuration in accordance with Section 8.1. CA

R23 3. **IF** OPRM is inoperable, **THEN** operating conditions are **NOT** in Region B of the applicable Power to Flow Map. N/A

8.2.2 Procedural Steps

CAUTION

Starting a Recirculation Pump and opening its discharge valve during a reactor startup may cause a reactor Scram due to a high flux level while in the IRMs. Reactor power should be within the heating range prior to attempting a Recirculation Pump startup.

1. **IF** the recirculation loop to be started up is isolated, **THEN PERFORM** the following:

   a. **OPEN** *DISCH BYPASS VLV, B32-F032A(B)* N/A

   b. **OPEN** *PUMP A(B) SUCTION VLV, B32-F023A(B)* N/A

8.2.2 Procedural Steps

CAUTION

The heatup rate for the Recirculation Pump casing should **NOT** exceed 100°F per hour. Changing RX Water Level **OR** Core flow during heatup of a cold loop can result in rapid changes in heatup rate and should be avoided. If changes are required to enhance heatup rate of an idle loop the discharge and discharge bypass valves should be closed prior to a core parameter change and then the opening sequence repeated.

c. **IF** necessary, **THEN OPEN** *PUMP A(B) DISCH VLV, B32-F031A(B)*, to assist loop warmup. N/A

d. **MONITOR** Recirculation Pump suction temperature on *B32-TR-R650* to ensure heatup rate does **NOT** exceed 100°F/hr.

e. **OPEN** *SEAL INJECTION VLV, B32-V22(V30)*

f. **PLACE** *SEAL STAGING VLV, B32-V14(V17)*, control switch to *MAN/OPEN* **AND ENSURE** the valve opens. N/A

R37

CAUTION

IF the Recirculation Pump fails to start with the reactor critical, **THEN** the discharge valve should be reopened and left open to maintain reactor coolant temperature in the idle loop **AND** operating Reactor Recirc Pump speed increased per Reactor Engineer's direction to re-establish loop flow to the level prior to speed reduction in Step 5.2.2.24 to prevent bottom head cooldown. This action is especially necessary at low power levels.

CAUTION

R25
R26

Do **NOT** increase Recirculation Pump speed while in single loop operation, unless differential temperature between the bottom head region and vessel saturation temperature is less than 145°F.

R37 2. **IF** core flow is less than 30.8 x 10^6 lb/hr, **THEN LOG** bottom head drain temperature and idle loop temperature at 15 minute intervals to ensure cooldown rate is less than 100°F. CR

R37 3. **IF** the temperature differential between the coolant within the dome and the bottom head drain **CANNOT** be maintained less than 145°F, **THEN MANUALLY** CR

8.2.2 Procedural Steps

SCRAM the reactor.

4. **PERFORM** Section 5.2 to start up the idle Recirculation Pump **AND RETURN TO** Step 8.2.2.5. _____

CAUTION

R23 The OPRM System monitors LPRMs for indication of thermal hydraulic instability (THI). **WHEN** ≥ 25% power **AND** ≤ 60% recirculation flow, alarms and automatic trips are initiated upon detection of THI. Pump operations shall be within the limits of the applicable Power-Flow Map, as specified in the COLR. Care should be taken to avoid the Scram Avoidance Region.

CAUTION

R23 If the OPRM system is inoperable, Then operation shall be in accordance with the applicable Power to Flow Map in the COLR with the following restrictions:

- **IF** entry into Region A occurs, **THEN** a manual scram is required.

- **IF** entry into Region B, the 5% Buffer Region, or the OPRM Enabled Region occurs **AND** indications of Thermal Hydraulic Instability exist, a manual scram is required.

- **IF** entry into Region B occurs (Intentional entry is **NOT** allowed), **THEN IMMEDIATELY EXIT** by inserting control rods or increasing Recirc flow.

- Entry into the 5% Buffer Region should warrant increased monitoring of reactor instrumentation for signs of Thermal Hydraulic Instability. Time in the 5% Buffer Region should be minimized.

5. **IF** a runback signal exists, **THEN RESET** the runback in accordance with Section 8.3. _____

8.2.2 Procedural Steps

NOTE: The amount of time with the Recirculation Pump speeds highly mismatched should be limited. The operator should increase the pump speed of the restarted pump as fast as possible without initiating an APRM Rod Block or Upscale.

6. **IF** process computer point for core flow, U2CPWTCF is valid, **THEN ENSURE** its value is **NOT** substituted. _____

7. **INCREASE** the speed of the Recirculation Pump just started until the speed of both pumps are approximately equal by using *RECIRC PUMP 2A(B) SPEED CONTROL* potentiometer. _____

8. **IF** the APRM trip and alarm setpoints were changed to support single loop operation **THEN RESTORE** the APRM setpoints for two-loop operation in accordance with 2OP-09. _____

9. Within 4 hours after returning the idle loop to service, **PERFORM** 0PT-13.1. _____

Date/Time Completed _____

Performed By (Print)	Initials
_____	_____
_____	_____
_____	_____
_____	_____

Reviewed By: _____
Unit SCO

C
Continuous Use

5.2 Reactor Recirculation Pump Startup

5.2.1 Initial Conditions

Date/Time Started Today 0002

		Initials
1.	All applicable prerequisites as listed in Section 4.0 are met.	CR
2.	Both recirculation loops are full.	CR
3.	Reactor Recirculation Pump casings and seal cavities have been filled, vented and staged in accordance with Section 8.5.	CR
4.	LPCI initiation logic is cleared.	CR
5.	Reactor water level is greater than 182 inches.	CR
6.	The Drywell Coolers are in operation in accordance with 2OP-37.1 **AND** drywell temperature is less than 150°F.	CR
7.	The operator has read and understands the Precautions and Limitations as listed in Section 3.0.	CR
8.	The MG Set Lube Oil System is in operation in accordance with Section 5.1.	CR
R23 9.	**IF** OPRM is inoperable, **THEN** operating conditions are **NOT** in Region B of the applicable Power to Flow Map.	N/A

NOTE: **IF** in Mode 5 **OR** a Recirc Pump is in operation **AND** the following criteria are met, **THEN** the following Initial Condition may be waived.

- Reactor power greater than 26%
- Reactor heat-up **NOT** in progress
- The operating recirculation loop drive flow is greater than 19,000 gpm

10.	RWCU System flow exists for bottom head temperature determination.	CR

5.2.2 Procedural Steps

Reactor Recirculation Pump 2B

NOTE: Devices in parentheses are for Reactor Recirculation Pump B.

1. **ENSURE** *SEAL INJECTION VLV, B32-V22(V30)*, is open. CR

NOTE: The Seal Staging Valve should be open for at least 30 minutes prior to starting a Recirculation Pump to ensure seal cavities are vented. The seal staging low flow condition will **NOT** clear until the reactor is at pressure.

2. **PLACE** the control switch for *SEAL STAGING VLV, B32-V14(V17)*, to *MAN/OPEN* **AND ENSURE** the valve opens. CR

3. **ENSURE** seal staging high flow condition (greater than 1.3 gpm) does **NOT** exist by observing local flow indicators, located on 20' RB adjacent to H21-P009(H21-P025). CR

4. **ENSURE** alarm *OUTER SEAL LEAKAGE FLOW DETECTION HI*, A-6 5-3 (A-7 4-5), is clear. CR

5. **IF** the drywell is accessible, **THEN CHECK** proper oil level in Recirculation Pump A(B) motor as follows:

   a. **REMOVE** the cap on the upper and lower pump motor lube oil reservoir. N/A

   b. **ENSURE** lube oil level is up to the shelf in the reservoir. N/A

   c. **REPLACE** the cap on the upper and lower pump motor lube oil reservoir. N/A

5.2.2 Procedural Steps

6. **ENSURE** the following alarms on Annunciator Panel A-4 are clear:

   a. *RECIRC PUMP MTR A(B) UPPER BRG HI LVL*, A-4 1-6 (A-4 1-7) CR

   b. *RECIRC PUMP MTR A(B) UPPER BRG LO LVL*, A-4 2-6 (A-4 2-7) CR

   c. *RECIRC PUMP MTR A(B) LOWER BRG HI LVL*, A-4 3-6 (A-4 3-7) CR

CAUTION

Starting of the Recirculation Pump with the following annunciator sealed in is permitted provided that operating experience has shown the alarm will clear at higher pump speeds. Once the Recirculation Pump is operating, 2APP-A-04, Annunciator Procedure for Panel A-04, should be followed. If there are questions, the RCR System Engineer should be contacted.

   d. *RECIRC PUMP MTR A(B) LOWER BRG LO LVL*, A-4 4-6 (A-4 4-7) CR

NOTE: **IF** the temperature recorders in Step 5.2.2.7 are inoperable and can **NOT** be returned to service prior to starting the Recirculation Pump MG Set, **THEN** the affected equipment should be closely monitored for at least 2 hours following start. Consideration should be given to having Maintenance available for monitoring also.

7. **ENSURE** the following recorders are in operation:

   a. *B32-TR-R601, RECIRC. PUMP TEMP* CR

   b. *B32-TR-R625, RECIRC. DRIVE TEMP* CR

   c. *B32-TR-R626, DRIVE MOTOR & GEN. TEMP* CR

5.2.2 Procedural Steps

8. **ENSURE** *PUMP A(B) SUCTION VLV, B32-F023A(B)*, is open. CA

9. **ENSURE** *DISCH BYPASS VLV, B32-F032A(B)*, is open. CA

10. **PLACE** MG Set ventilation in service as follows:

    a. **ENSURE** *MG SET VENT SUPPLY FAN, 2E-SF-MG*, is in operation. CA

    b. **START** MG Set A(B) Vent Fan Set A(C) or B(D). CA

    c. **IF** portable dehumidifiers are in service in the MG set rooms, **THEN HAVE** Maintenance remove them. CA

11. **ENSURE** alarm *RX RECIRC MG SET A(B) VENT FAILURE*, UA-5 4-5 (UA-5 5-5), is clear. CA

12. **ENSURE** alarm *PUMP A(B) SEAL CLOSED CLG WTR FLOW LO*, A-6 1-4 (A-7 6-5), is clear. CA

13. **ENSURE** alarm *RECIRC PMP A(B) MOTOR VIB HIGH*, A-6 3-3 (A-7 2-5), is clear. CA

14. **ENSURE** MG Set A(B) lube oil temperature is greater than 90°F. CA

15. **ENSURE** *RECIRC PUMP 2A(B) SPEED CONTROL* potentiometer is adjusted for an output signal as follows: *RECIRC PUMP 2A* at 5%, (*RECIRC PUMP 2B* at 15%).(corresponds to approximately 28% speed). CA

5.2.2 Procedural Steps

16. **ENSURE** the MG Set A(B) generator lockout and auxiliary lockout relays are reset. CR

17. **ENSURE** the following alarms on Annunciator Panel A-6(A-7) are clear:

    a. *RECIRC M-G A(B) GENERATOR LOCKOUT*, A-6 2-1 (A-7 1-3). CR

    b. *RECIRC M-G A(B) GENERATOR AUX LOCKOUT*, A-6 4-1 (A-7 3-3). CR

18. **RESET** MG Set A(B) scoop tube lockout. CR

19. **CHECK** alarm *FLUID DRIVE A(B) SCOOP TUBE LOCK*, A-6 2-4 (A-7 1-6) is clear. CR

20. **ENSURE** alarm *RPT SYS A BKR 3A OR 3B TRIPPED* (A-6 4-3) is clear. CR

21. **ENSURE** alarm *RPT SYS B BKR 4A OR 4B TRIPPED* (A-7 3-5) is clear. CR

NOTE: Steps 5.2.2.22 through 5.2.2.25 are **NOT** required in Mode 5.

5.2.2 Procedural Steps

CAUTION

An idle recirculation loop shall **NOT** be started unless the temperature differential between the reactor coolant within the dome and the bottom head drain is less than 145°F, **AND**

a. For the first pump to be started, the temperature differential between the reactor coolant within the loop that is to be placed in operation and the coolant in the reactor pressure vessel is less than or equal to 50°F.

b. For the second pump, the temperature differential between the reactor coolant within the loop to be started and the operating loop is less than or equal to 50°F, **AND** the operating loop flow rate is less than or equal to 50% of rated loop flow (50% flow equals 23,500 gpm).

AND

R23

IF OPRM is inoperable, **THEN** operating conditions are **NOT** in Region B of the applicable Power to Flow Map.

The temperature differentials and flow rate shall be determined to be within limits within 30 minutes prior to startup of an idle recirculation loop.

CAUTION

An idle Recirculation Pump shall **NOT** be started if any fuel assemblies have been removed from the vessel and have **NOT** been replaced by a single or double blade guide. This is to prevent damage to in-core instrumentation from flow-induced vibration.

22. **ENSURE** temperature differential between the reactor coolant within the dome and the bottom head drain is less than 145°F as follows:

    a. **DETERMINE** the dome temperature as follows: _____

    _____ psig + 14.7 = _____ psia
    Reactor Press. | Conv. to psia | Reactor Press.

    Use steam tables to convert reactor pressure to temperature (**IF** head vents are open, **THEN** use 212°F for dome temperature)
    _____°F
    Reactor Temp

5.2.2 Procedural Steps

b. **DETERMINE** bottom head drain temperature using one of the following indications: _____

_____°F

- G31-TI-R607 Point 5 on Panel H12-P603

- C12-TR-R018 Channel 153 on Panel H12-P007

NOTE: **IF** bottom head drain temperature indication is **NOT** operable, **THEN** temperature of the operating recirculation suction line coolant can be used as an alternate measurement of bottom head drain temperature providing the following conditions are met:

1. Reactor power is greater than 26%.
2. Reactor heat up is **NOT** in progress.
3. The operating recirculation loop drive flow is greater than 19,000 gpm.

- B32-TR-R650 on H12-P603 or process computer (B055-B058) for operating recirculation loop temperature.

c. Differential temperature:

_____ - _____ = _____°F _____

Time _____

d. **RECORD** the differential temperature **AND** time in the Control Operator's logbook. _____

23. **IF** the first Recirc Pump is to be started, **THEN** **ENSURE** temperature differential between the coolant in the reactor vessel and the coolant in the loop to be started is less than or equal to 50°F as follows:

a. Reactor vessel coolant temperature (from Recorder *E41-TR-R605* point 1 or 2 on Panel H12-P614 if in shutdown cooling, or from *RWCU TEMP, G31-TI-R607* point 1, = ____°F. _____

5.2.2 Procedural Steps

b. Loop temperature *(B32-TR-R650)* or Process Computer [B055-B058]) = ____°F. _____

c. Differential temperature: _____

_____ - _____ = _____°F

Time _____

d. **RECORD** the differential temperature **AND** time in the Control Operator's logbook. _____

CAUTION

Reducing core flow less than 30.8 x 10^6 lbs/hr (40% rated core flow) may cause idle loop temperature to decrease. The operating pump flow reduction should be as close to pump start as possible. IF delays in restart of the second pump are encountered, the operating loop flow should be raised to greater than 30.8 x 10^6 lb/hr to ensure temperature in the idle loop is maintained.

24. **SLOWLY REDUCE** the speed of the operating Reactor Recirculation Pump using the *RECIRC PUMP 2A(B) SPEED CONTROL* potentiometer until loop flow is less than or equal to 50% (23,500 gpm) of rated loop flow. _____

5.2.2 Procedural Steps

25. Within 30 minutes prior to startup of the second pump, **ENSURE** temperature differential between the operating loop and the idle loop is less than or equal to 50°F **AND** that operating loop flow rate is less than or equal to 23,500 gpm as follows:

    a. Operating loop temperature (*B32-TR-R650*) or Process Computer [B055-B058] = _____°F. _____

    b. Idle loop temperature (*B32-TR-R650*) or Process Computer [B055-B058] = _____°F. _____

    c. Differential temperature: _____

    _____ - _____ = _____°F

    Time _____

    d. **RECORD** the differential temperature **AND** time in the Control Operator's logbook. _____

    e. Operating loop flow rate on *B32-FR-R614*, if available, **OR** on flow indicator *B32-R617(B32-R613)* is less than or equal to 23,500 gpm (50% of rated loop flow) = _____ gpm _____

    Time _____

    f. **RECORD** the operating loop flow rate **AND** time in the Control Operator's logbook. _____

5.2.2 Procedural Steps

CAUTION

WHEN the reactor vessel temperature is less than 212°F, **THEN** reactor coolant should be force-circulated through the core utilizing an RHR loop at rated flow or a reactor recirculation loop to ensure reactor vessel temperature is monitored accurately.

26. **IF** the RHR Shutdown Cooling System is in operation to the recirculation loop to be started, **THEN REMOVE** shutdown cooling from service in accordance with 2OP-17, **AND RETURN TO** Step 5.2.2.27. _____

CAUTION

R24

To reduce the probability of pressure-locking or thermal binding in the Recirculation Pump isolation valves, do **NOT** allow these valves to be closed for more than 5 minutes when the system is in a hot condition (see Step 3.6). These valves may require manual operation if system is allowed to cool down after closure.

27. **ENSURE** *PUMP A(B) DISCH VLV, B32-F031A(B)*, is closed. _____

28. **IF** the recirculation loop opposite to the one to be started is idle and temperature is more than 100°F below reactor saturation temperature, **THEN PERFORM** the following steps for the opposite loop:

    a. **ENSURE** *DISCH BYPASS VLV, B32-F032B(A)*, is closed. _____

    b. **ENSURE** *PUMP B(A) DISCH VLV, B32-F031B(A)*, is closed. _____

5.2.2 Procedural Steps

NOTE: A Recirculation Pump "start" means that the motor has come up to speed. It does **NOT** apply to a stall condition or an incomplete startup sequence.

NOTE: If starting a Recirculation Pump with the reactor critical, then it is possible that annunciators *APRM UPSCALE* (A-06 2-8) and *ROD OUT BLOCK* (A-05 2-2) may alarm.

CAUTION

For normal starting, a Recirculation Pump can be started twice successively with motor windings initially at ambient temperature or once with windings at rated temperature.

Additional, repetitive starts, when required for emergency or testing, are governed by motor winding temperature as follows:

a. Whenever the motor windings are at rated temperature, the Recirculation Pump can be started and brought to speed.

b. IF motor winding temperature indication is NOT available, THEN the windings can be assumed to have returned to rated temperature after 45 minutes idle time or 15 minutes running time. After this time, another start is permissible.

29. **IF** 30 minutes have elapsed since the temperature differentials and flow rate were determined, **THEN RETURN TO** Step 5.2.2.22. _____

30. **START** MG Set A(B) drive motor **AND ENSURE** the following: _____

    a. MG Set A(B) drive motor breaker closes. _____

    b. MG Set A(B) accelerates to speed. _____

    c. Approximately 6 seconds after the drive motor breaker closes, the generator field breaker closes and starts the Reactor Recirculation Pump. _____

    d. Recirc Pump A(B) *DISCHARGE FLOW, B32-R617(R613)*, indicates flow. _____

5.2.2 Procedural Steps

NOTE: Speed limiter number 1 limits Recirculation Pump speed to 28% until the Recirculation Pump discharge valve is open **AND** total reactor feedwater flow is greater than 16.4% of rated flow.

31. **RECORD** in the Control Operator's logbook the time at which MG Set A(B) drive motor breaker was closed. _____

CAUTION

Operation of a Reactor Recirculation Pump with the discharge valve closed AND the discharge bypass valve open should be limited to 5 minutes. Operation in this configuration should be limited to minimum pump speed.

CAUTION

The total number of times that a Reactor Recirculation Pump discharge valve motor operator can be subjected to starting current within any 5-minute period is limited to seven by the vendor. IF this limit is reached, the valve motor should be allowed to cool down for 2 hours before it is again started.

32. **IF** in Modes 1 or 2 **AND** the reactor is critical, **THEN PERFORM** the following:

    a. Using 2 second jogs and 10 second rest times for the first minute, **JOG OPEN** *PUMP A(B) DISCH VLV, B32-F031A(B).* _____

    b. **FULLY OPEN** *PUMP A(B) DISCH VLV, B32-F031A(B).* _____

5.2.2 Procedural Steps

33. **IF** in Mode 2 (with reactor **NOT** critical), 3, 4, or 5, **THEN PERFORM** the following:

    a. **FULLY OPEN** *PUMP A(B) DISCH VLV, B32-F031A(B).* _____

CAUTION

To reduce the probability of pressure-locking or thermal binding in the Recirculation Pump isolation valves, do **NOT** allow these valves to be closed for more than 5 minutes when the system is in a hot condition (see Step 3.6). These valves may require manual operation if system is allowed to cool down after closure.

CAUTION

Changing Rx Water Level **OR** Core flow during heatup of a cold loop can result in rapid changes in heatup rate and should be avoided. If changes are required to enhance heatup rate of an idle loop the discharge and discharge bypass valves should be closed prior to a core parameter change and then the opening sequence repeated.

34. **IF** *DISCH BYPASS VLV, B32-F032B(A)*, is closed for the opposite loop, **THEN PERFORM** the following:

    a. **JOG OPEN** *DISCH BYPASS VLV, B32-F032B(A)*, as needed to maintain a recirculation loop heatup rate of less than 100°F/hr. _____

    b. **WHEN** reactor recirculation loop B(A) temperature is approximately equal to reactor vessel temperature, **THEN FULLY OPEN** *DISCH BYPASS VLV, B32-F032B(A).* _____

    c. **OPEN** *PUMP B(A) DISCH VLV, B32-F031B(A).* _____

5.2.2 Procedural Steps

35. **PLACE** the control switch for *SEAL STAGING VLV, B32-V14(V17)* to *AUTO* **AND ENSURE** the valve remains open. _____

36. **IF** necessary, **THEN RESET** recirculation runback in accordance with Section 8.3. _____

37. **CHECK** the following indications on Panel H12-P603 with both recirculation loops in operation: .

    a. Loop flows greater than 10,000 gpm. _____

    b. Calibrated jet pump flows approximately 1.0×10^6 lb/hr. _____

    c. Reactor Recirculation Pump A(B) differential pressures about 10 psid. _____

    d. MG Set A(B) generator current approximately 100 amps. _____

    e. MG Set A(B) generator voltage approximately 1,000 volts. _____

    f. MG Set A(B) drive motor current approximately 120 amps. _____

Date/Time Completed _____

Performed By (Print)	Initials
_____	_____
_____	_____
_____	_____
_____	_____

Reviewed By: _____
Unit SCO

PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION

JOB PERFORMANCE MEASURE
SYSTEMS

JPM H

LESSON TITLE: Vent Primary Containment via SBGT to Control Drywell Pressure per AOP-14

LESSON NUMBER: JPM H

REVISION NO: 00

RECOMMENDED BY: Curt Robert
Instructor/Developer DATE

CONCURRENCE BY: _____
Line Superintendent/Supervisor DATE

APPROVED BY: _____
Superintendent/Supervisor Training DATE

SIMULATOR SETUP:

A. Initial Conditions:

1. Recommended Initial Conditions

IC	11 (Unit 2)
Rx. Pwr.	100%
Core Age	BOC

2. Required Plant Conditions

B. Malfunctions

ES009F Inadvertent Core Spray B Initiation

C. Overrides

None

D. Remote Function

AUTO Trigger 1- CAC-V9 Control Switch, K6217JNT OPEN == True SW_IAVSW193 CLOSE.
AUTO Trigger 2- CAC-V23 Control Switch, K6225JNT OPEN == True SW_VHSW146L OPEN.

E. Special Instructions

None.

SAFETY CONSIDERATIONS:

NONE

EVALUATOR NOTES: (Do not read to performer)

1. The applicable procedure section **WILL** be provided to the performer, once it is demonstrated he/she knows the correct procedure.

2. If this is the first JPM of the JPM set, read the JPM briefing contained in NUREG 1021, Appendix E, or similar to the performer.

Read the following to the JPM performer.

TASK CONDITIONS:

1. An inadvertent Core Spray Initiation signal has caused a loss of Drywell Cooling and drywell pressure is rising approaching 1.7 psig.

2. Actions of APP A-3 2-6 direct performance of AOP-14 for rising Drywell Pressure.

3. An AO has been dispatched to transfer RBCCW cooling to the Conventional Service Water Header.

4. The 2B Core Spray Pump has been overridden off.

5. Div I/Div II NON-INTRPT RNA SV-5262/5261 valves have been overridden OPEN.

INITIATING CUE:

The Unit SCO has directed you to vent the drywell per OP-10, Standby gas Treatment Operating Procedure.

Notify the SCO when the actions are complete and primary containment pressure is being controlled.

PERFORMANCE CHECKLIST

NOTE: Sequence is assumed unless denoted in the **Comments**.

Step 0 – Obtain current revision of OP-10, Section 8.2 and verify revision if applicable.
Current revision of OP-10, Section 8.2 obtained.

SAT/UNSAT*

TIME START _____

START DRYWELL PRESSURE _____

NOTE: Restarted numbering to correspond with performers steps in OP-10 section 8.2.

Step 1 - Record D12-RR-R600B, STACK RAD MONITOR, digital point display.
Value for D12-RR-R600B recorded in OP-10.

SAT/UNSAT*

Step 2 - Add 0.17 to the value to obtain the logarithmic equivalent of a 50% increase in stack radiation monitor reading and record result.
Value recorded in OP-10 of initial reading + 0.17.

SAT/UNSAT*

NOTE: Step 3 of OP-10 Section 8.2 is N/A.

Step 4 - **RECORD** the logarithmic equivalent for a stack radiation monitor increase as determined in Step 8.2.2.2.

Records number in step 4.

SAT/UNSAT*

Step 5 - Monitor Stack Rad Monitor, D12-RM-R600B, for increase in activity during venting.

D12-RM-R600B periodically monitored.

SAT/UNSAT*

Step 6 - **IF**, during performance of this procedure, stack radiation increases above the value determined in Step 8.2.2.4, **THEN PERFORM** the following:.....

Leaves step blank and goes on to Step 7.

SAT/UNSAT*

Step 7 - CLOSE REACTOR BUILDING SBGT TRAIN 2A INLET VALVE, VA-2D-BFV-RB.

Closes VA-2D-BFV-RB until it indicates fully closed.

**** CRITICAL STEP ** SAT/UNSAT***

Step 8 - CLOSE REACTOR BUILDING SBGT 2B INLET VALVE, VA-2H-BFV-RB.

Close VA-2H-BFV-RB until it indicates fully closed.

**** CRITICAL STEP ** SAT/UNSAT***

Step 9 - OPEN SBGT DW SUCT DAMPER, VA-2F-BFV-RB.

Opens VA-2F-BFV-RB, until it indicates open.

**** CRITICAL STEP ** SAT/UNSAT***

NOTE: Steps 10 and 11 2OP-10, Section 8.2 are not applicable.

Step 12a - OPEN DW PURGE EXH VALVE, CAC-V9.

CAC-V9 indicates full open.

**** CRITICAL STEP ** SAT/UNSAT***

Step 12b - OPEN DW PURGE EXH VALVE, CAC-V23.

CAC-V23 indicates full open.

**** CRITICAL STEP ** SAT/UNSAT***

PROMPT: Booth operator inform examinee as AO that RBCCW cooling has been aligned to the Conventional Header.

NOTE: Steps 12c. and 12d. of 2OP-10, Section 8.2 are not applicable. Examinee may align to vent from the drywell head by opening the CAC-V49 or CAC-V50 but this is not required.

NOTE: This task should be completed before drywell pressure reaches 1.7 psig or the JPM should be considered UNSAT.

TERMINATING CUE: When the Unit SCO is notified that the vent line up is complete and drywell pressure is lowering, this JPM is complete.

TIME COMPLETED _____

STOP DRYWELL PRESSURE _____

LIST OF REFERENCES

RELATED TASKS:

261 008 B1 01
Perform Normal Primary Containment Venting.

K/A REFERENCE AND IMPORTANCE RATING:

261000 A4.04 3.3/3.4
Ability to manually operate and monitor Primary Containment Pressure.

REFERENCES:

2OP-10, Sect. 8.2 Rev 60

TOOLS AND EQUIPMENT:

None

SAFETY FUNCTION (from NUREG 1123, Rev 2):

Safety Function 5, Containment Integrity

REASON FOR REVISION:

New, created for NRC 2004 exam.

Time Required for Completion: 15 Minutes (approximate).

Time Taken: ____

APPLICABLE METHOD OF TESTING

Performance: Simulate ___ Actual ✓ Unit: ____

Setting: Control Room ___ Simulator ✓ (Not applicable to In-Plant JPMs)

Time Critical: Yes ___ No ✓ Time Limit N/A

Alternate Path: Yes ___ No ✓

EVALUATION

Performer:_____ SSN: _____

JPM: Pass _____ Fail _____

Remedial Training Required: Yes _____ No _____

Did Performer Verify Procedure? Yes _____ No _____
(Each Student should verify one JPM per evaluation set)

Comments: _____

_____

_____

_____

_____

Comments reviewed with Student

Evaluator Signature: _____ Date:_____

TASK CONDITIONS:

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INITIATING CUE:

The Unit SCO has directed you to vent the drywell per OP-10, Standby gas Treatment Operating Procedure.

Notify the SCO when the actions are complete and primary containment pressure is being controlled.