

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-RO-CO-1

JPM Title: Shutdown margin with inoperable CEA

Approximate Time: 20 min

Actual Time: _____

Reference(s): TDB-V.9 "Shutdown Margin Worksheet" R35
TDB-II "Reactivity Curves" R28

JPM Prepared by: Jerry Koske Date: 05/11/05

JPM Reviewed by: _____ Date: _____

JPM Approved by: _____ Date: _____

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-RO-CO-1

JPM Title: Shutdown margin with inoperable CEA

Operators' Name: _____ Employee # _____

All Critical Steps (shaded) must be performed or simulated in accordance with the standards contained in this JPM

The Operator's performance was evaluated as (circle one):

SATISFACTORY

UNSATISFACTORY

Evaluator's Signature: _____ Date: _____

Reason, if unsatisfactory:

Tools & Equipment: Technical Data Book, calculator

Safety Considerations: None

Comments:

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-RO-CO-1

JPM Title: Shutdown margin with inoperable CEA

INITIATING CUE: The plant is operating at 100% power with all CEAs fully withdrawn. Group 2 CEA #27 has been declared inoperable (untrippable). You have been requested to perform an instantaneous shutdown margin calculation to determine if technical specification requirements for shutdown margin are being met.

The RCS boron concentration is 700 ppm. The burnup is 7000 MWD/MTU

Critical Steps shown in gray

STEP	ELEMENT	STANDARD
1	Obtain a copy of TDB-V.9	Provide a copy of TDB-V.9
2	Obtain a copy of TDB section II, Reactivity Curves.	Obtains copy of TDB-II
3	Determines part I of TDB procedure should be used.	Performs calculation using part 1.
4	Performs calculation of the difference between actual and required shutdown margin.	Difference calculated on line 11 of TDB-V.9, section 1 is -0.42 [between -0.22, -0.62]
5	Determines if SDM is adequate	Shutdown margin is adequate

Termination Criteria: Shutdown Margin determination has been made

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-RO-CO-1

INITIATING CUE: The plant is operating at 100% power with all CEAs fully withdrawn. Group 2 CEA #27 has been declared inoperable (untripable). You have been requested to perform an instantaneous shutdown margin calculation to determine if technical specification requirements for shutdown margin are being met.

The RCS boron concentration is 700 ppm. The burnup is 7000 MWD/MTU

SHUTDOWN MARGIN WORKSHEET

PART I - Instantaneous Shutdown Margin for use prior to a Reactor Trip or immediately following a Reactor trip. No changes are assumed for either boron or xenon, since this worksheet is only applicable for calculation of an instantaneous shutdown margin.

NOTE: Enter values exactly as determined from the figures in the Technical Data Book and carry the algebraic signs through the calculations.

Condition

1. Present Date/Time: _____ / _____
2. Reactor Power (before trip): _____ %
3. CEA Positions:
Group 1 _____ inches
Group 2 _____ inches
Group 3 _____ inches
Group 4 _____ inches
4. Reactor Coolant System Boron Concentration prior to shutdown: (Boron concentration analysis must have been performed within the past 24 hours or more recently if boration or dilution has occurred.)
_____ ppm
4
5. Burnup (Take the most recent burnup from the Control Room Log and add 30 MWD/MTU per EFPD.)
_____ MWD/MTU
5

Calculation of Shutdown Margin

6. Enter Regulating Group Worth, based on burnup (Step 5) and CEA positions (Step 3) using TDB Figure II.B.2.
_____ % Δp TDB Figure used: _____
6

7. Enter Shutdown Group Worths, based on burnup (Step 5) using TDB Figure II.B.1.a.

a. Shutdown Group B _____ % Δp

b. Shutdown Group A _____ % Δp

c. Total Shutdown Worth

$$\frac{\quad}{7.a} + \frac{\quad}{7.b} = \frac{\quad}{7.c} \% \Delta p$$

8. Determine Power Defect

Enter Power Defect based on Reactor power level (Step 2) and burnup (Step 5) using TDB Figure II.C.2.

$$\frac{\quad}{8} \% \Delta p$$

9. Determination of Stuck CEA Allowance (3 cases)

NOTE: Consider dropped CEAs which can not be verified to be fully inserted as inoperable.

(Enter N/A if this case is not applicable.)

a. Case I - All CEAs are assumed to be operable. (No known inoperable CEAs)

Assume the highest worth CEAs will stick out of the core upon a Reactor trip. Enter the value of the most reactive CEA, based on burnup (Step 5), from TDB Figure II.B.1.b., lines (1) thru (3) for the pre-trip configuration. Select the higher value.

$$\frac{\quad}{9.a} \% \Delta p$$

NOTE: The worth of one inoperable CEA is dependent on the configuration of the withdrawn group(s) and the inoperable CEA.

9. b. Case II - One CEA is known to be inoperable (per Technical Specification 2.10.2(4) a.)

(Enter N/A if this case is not applicable.)

Account for this defective CEA (and the highest worth stuck CEA) by entering only the value from lines (4) thru (17) of TDB Figure II.B.1.b. for the inoperable CEA, based on burnup (Step 5). Select the higher value.

_____ %Δp
9.b

NOTE: The worth of more than one inoperable CEA is calculated by multiplying the most conservative Stuck CEA plus Ejected CEA Worth (TDB Figure II.B.1.b. lines 4-17 by the number of inoperable CEAs.

NOTE: The values of lines (4) thru (17) of TDB FIGURE II.B.1.b. Include the total reactivity associated with the known inoperable CEA and the highest worth CEA which is assumed to stick out of the core upon a Reactor trip.

- c. Case III - More than one CEA is known to be inoperable (per Technical Specification 2.10.2.(4)a.).

(Enter N/A if this case is not applicable.)

- (1) Enter total number of CEA's which are known to be inoperable per Technical Specification 2.10.2.(4) a.).

9.c.(1)

- (2) Enter the most conservative defective CEA worth from TDB FIGURE II.B.1.b. Lines (4) thru (17) depending on defective CEA(s) location, based on burnup (Step 5). Select the higher value.

_____ %Δp
9.c.(2)

$$\left[\left(\frac{\#}{9.c.(1)} \right) \times \left(\frac{\% \Delta p}{9.c.(2)} \right) \right] = \frac{\% \Delta p}{9.c.}$$

9. d. Enter total available CEA worth from TDB Figure II.B.1.a. based on burnup (Step 5)

_____ % Δp
9.d

- e. Determine the maximum stuck CEA worth by selecting the minimum of either 9.c or 9.d and record that value.

_____ % Δp
9.e

- f. Enter value from 9.a or 9.b or 9.e as appropriate _____ % Δp
9.f

10. Calculation of the Total Instantaneous Shutdown Margin (SDM_I):

$SDM_I = \text{Stuck CEAs} + \text{Power Defect} - \text{S/D CEAs worth} - \text{Regulating CEA worth}$

$$SDM_I = \frac{\text{_____}}{9.f} \% \Delta p + \frac{\text{_____}}{8} \% \Delta p - \frac{\text{_____}}{7.c} \% \Delta p - \frac{\text{_____}}{6} \% \Delta p = \frac{\text{_____}}{10} \% \Delta p \text{ Total}$$

11. Calculate difference from required 3.6% Δp Shutdown Margin.

$$(\frac{\text{_____}}{10} \% \Delta p) + 3.6\% \Delta p = \frac{\text{_____}}{11} \% \Delta p$$

NOTE: A 3.6% Δp shutdown margin must be maintained in a Hot Shutdown condition, $T_c > 210^\circ \text{F}$ (Technical Specification 2.10.2(1) and TDB-VI Item 13.0).

12. Shutdown Margin check:

- If Step 11 is less than or equal to zero, the shutdown margin is adequate.
- If Step 11 is greater than zero, use OI-ERFCS-1, Procedure 32 to determine the number of gallons of acid to add.

REMARKS _____

Completed by _____ Date/Time _____ / _____

SHUTDOWN MARGIN WORKSHEET

PART I - Instantaneous Shutdown Margin for use prior to a Reactor Trip or immediately following a Reactor trip. No changes are assumed for either boron or xenon, since this worksheet is only applicable for calculation of an instantaneous shutdown margin.

NOTE: Enter values exactly as determined from the figures in the Technical Data Book and carry the algebraic signs through the calculations.

Condition

1. Present Date/Time:

07/11/05 0900

2. Reactor Power (before trip):

100 %

3. CEA Positions:

Group 1 128 inches

Group 2 128 inches

Group 3 128 inches

Group 4 128 inches

4. Reactor Coolant System Boron Concentration prior to shutdown: (Boron concentration analysis must have been performed within the past 24 hours or more recently if boration or dilution has occurred.)

700 ppm
4

5. Burnup (Take the most recent burnup from the Control Room Log and add 30 MWD/MTU per EFPD.)

7000 MWD/MTU
5

Calculation of Shutdown Margin

6. Enter Regulating Group Worth, based on burnup (Step 5) and CEA positions (Step 3) using TDB Figure II.B.2.

3.33 % Δp
6

TDB Figure used: II.B.2.b

7. Enter Shutdown Group Worths, based on burnup (Step 5) using TDB Figure II.B.1.a.

a. Shutdown Group B 1.986 % Δp

b. Shutdown Group A 2.911 % Δp

c. Total Shutdown Worth

$$\frac{1.986}{7.a} + \frac{2.911}{7.b} = \frac{4.897}{7.c} \% \Delta p$$

8. Determine Power Defect

Enter Power Defect based on Reactor power level (Step 2) and burnup (Step 5) using TDB Figure II.C.2.

$$\frac{1.757}{8} \% \Delta p$$

9. Determination of Stuck CEA Allowance (3 cases)

NOTE: Consider dropped CEAs which can not be verified to be fully inserted as inoperable.

(Enter N/A if this case is not applicable.)

a. Case I - All CEAs are assumed to be operable. (No known inoperable CEAs)

Assume the highest worth CEAs will stick out of the core upon a Reactor trip. Enter the value of the most reactive CEA, based on burnup (Step 5), from TDB Figure II.B.1.b., lines (1) thru (3) for the pre-trip configuration. Select the higher value.

$$\frac{N/A}{9.a} \% \Delta p$$

NOTE: The worth of one inoperable CEA is dependent on the configuration of the withdrawn group(s) and the inoperable CEA.

9. b. Case II - One CEA is known to be inoperable (per Technical Specification 2.10.2(4) a.)

(Enter N/A if this case is not applicable.)

Account for this defective CEA (and the highest worth stuck CEA) by entering only the value from lines (4) thru (17) of TDB Figure II.B.1.b. for the inoperable CEA, based on burnup (Step 5). Select the higher value.

2.45 %Δp
9.b

NOTE: The worth of more than one inoperable CEA is calculated by multiplying the most conservative Stuck CEA plus Ejected CEA Worth (TDB Figure II.B.1.b. lines 4-17 by the number of inoperable CEAs.

NOTE: The values of lines (4) thru (17) of TDB FIGURE II.B.1.b. Include the total reactivity associated with the known inoperable CEA and the highest worth CEA which is assumed to stick out of the core upon a Reactor trip.

- c. Case III - More than one CEA is known to be inoperable (per Technical Specification 2.10.2.(4)a.).

(Enter N/A if this case is not applicable.)

- (1) Enter total number of CEA's which are known to be inoperable per Technical Specification 2.10.2.(4) a.).

N/A
9.c.(1)

- (2) Enter the most conservative defective CEA worth from TDB FIGURE II.B.1.b. Lines (4) thru (17) depending on defective CEA(s) location, based on burnup (Step 5). Select the higher value.

N/A %Δp
9.c.(2)

[(# 9.c.(1)) X (9.c.(2) %Δp)] = N/A %Δp
9.c

9. d. Enter total available CEA worth from TDB Figure II.B.1.a. based on burnup (Step 5)

N/A % Δp
9.d

- e. Determine the maximum stuck CEA worth by selecting the minimum of either 9.c or 9.d and record that value.

N/A % Δp
9.e

- f. Enter value from 9.a or 9.b or 9.e as appropriate 2.45 %Δp
9.f

10. Calculation of the Total Instantaneous Shutdown Margin (SDM_i):

SDM_i = Stuck CEAs + Power Defect - S/D CEAs worth - Regulating CEA worth

$$SDM_i = \frac{2.45}{9.f} \% \Delta p + \frac{1.757}{8} \% \Delta p - \frac{4.897}{7.c} \% \Delta p - \frac{3.33}{6} \% \Delta p = \frac{-4.02}{10} \% \Delta p \text{ Total}$$

11. Calculate difference from required 3.6% Δp Shutdown Margin.

$$\left(\frac{-4.02}{10} \% \Delta p \right) + 3.6 \% \Delta p = \frac{-0.42}{11} \% \Delta p$$

NOTE: A 3.6% Δp shutdown margin must be maintained in a Hot Shutdown condition, T_c > 210°F (Technical Specification 2.10.2(1) and TDB-VI Item 13.0).

12. Shutdown Margin check:

- a. If Step 11 is less than or equal to zero, the shutdown margin is adequate.
- b. If Step 11 is greater than zero, use OI-ERFCS-1, Procedure 32 to determine the number of gallons of acid to add.

REMARKS _____

Completed by _____ Date/Time _____ / _____

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-RO-CO-2

JPM Title: Minimum HPSI flow with Containment Sump Blockage

Approximate Time: 15 minutes Actual Time: _____

Reference(s): EOP-AOP Attachments R 17

JPM Prepared by: Jerry Koske Date: 05/12/05

JPM Reviewed by: _____ Date: _____

JPM Approved by: _____ Date: _____

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-RO-CO-2

JPM Title: Minimum HPSI flow with Containment Sump Blockage

Operators' Name: _____ Employee # _____

All Critical Steps (shaded) must be performed or simulated in accordance with the standards contained in this JPM

The Operator's performance was evaluated as (circle one):

SATISFACTORY

UNSATISFACTORY

Evaluator's Signature: _____ Date: _____

Reason, if unsatisfactory:

Tools & Equipment: EOP-AOP Attachments

Safety Considerations: None

Comments:

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-RO-CO-2

JPM Title: Minimum HPSI flow with Containment Sump Blockage

INITIATING CUE: **Following a loss of coolant accident, containment sump blockage has restricted the available HPSI and Containment Spray flow. Efforts are underway to provide makeup water to the SIRWT. The CRS has directed you to determine the minimum HPSI flow required to remove decay heat.**

2 hours and 20 minutes have elapsed since the reactor tripped due to the LOCA.

START

Critical Steps shown in gray

STEP	ELEMENT	STANDARD
1	Obtains a copy of EOP/AOP attachments.	Locates EOP/AOP attachments
2	Refers to the proper attachment	Refers to the second page of Attachment 26 (EOP/AOP attachments page 149 of 150)
3	Determines required HPSI flow.	Determines that 132 gpm HPSI flow is the minimum required to remove decay heat [values between 128 – 136 gpm are acceptable]

Termination Criteria: **Candidate has determined HPSI flow required to remove decay heat.**

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-RO-CO-2

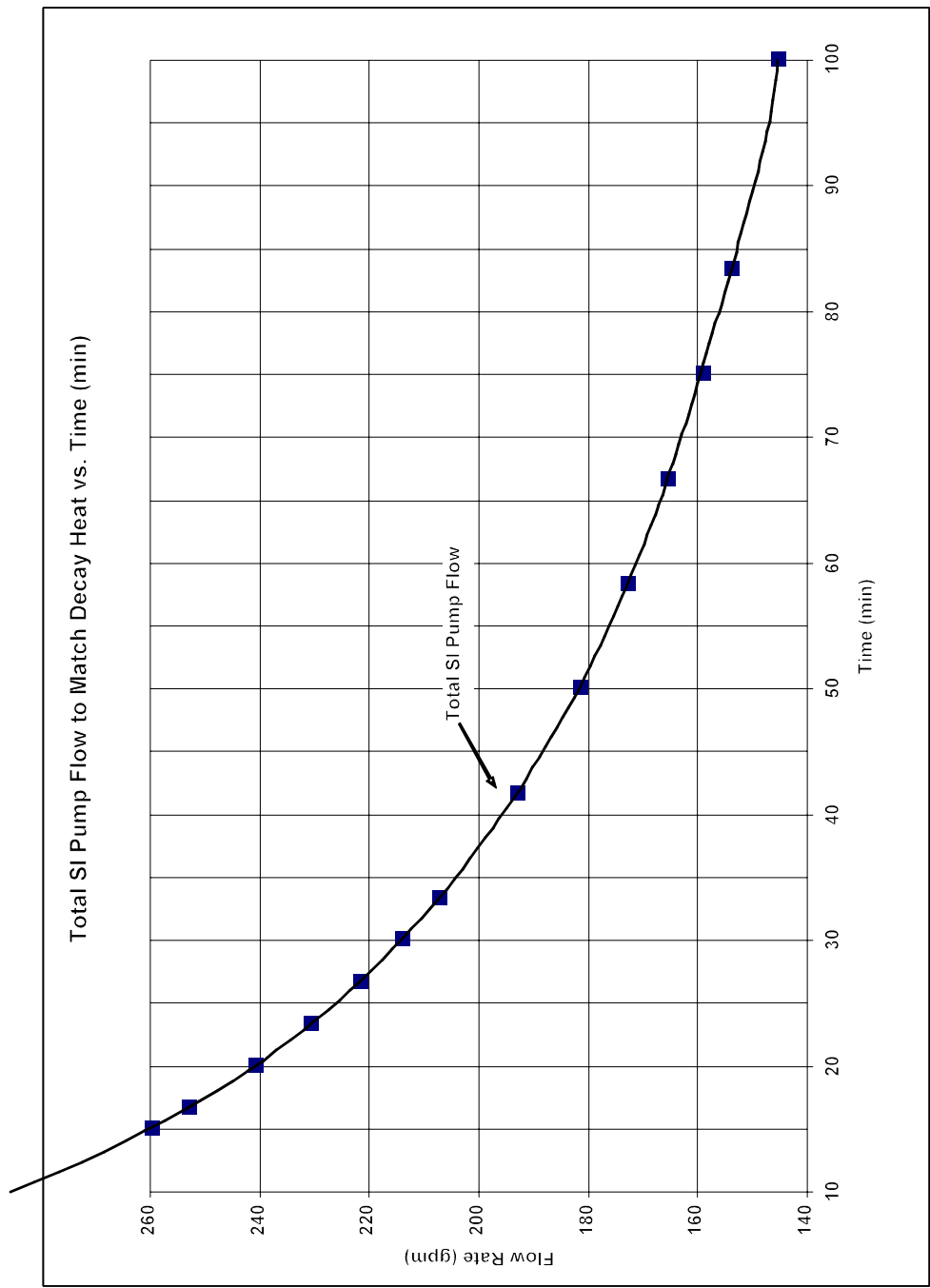
INITIATING CUE: Following a loss of coolant accident, containment sump blockage has restricted the available HPSI and Containment Spray flow. Efforts are underway to provide makeup water to the SIRWT. The CRS has directed you to determine the minimum HPSI flow required to remove decay heat.

2 hours and 20 minutes have elapsed since the reactor tripped due to the LOCA.

START

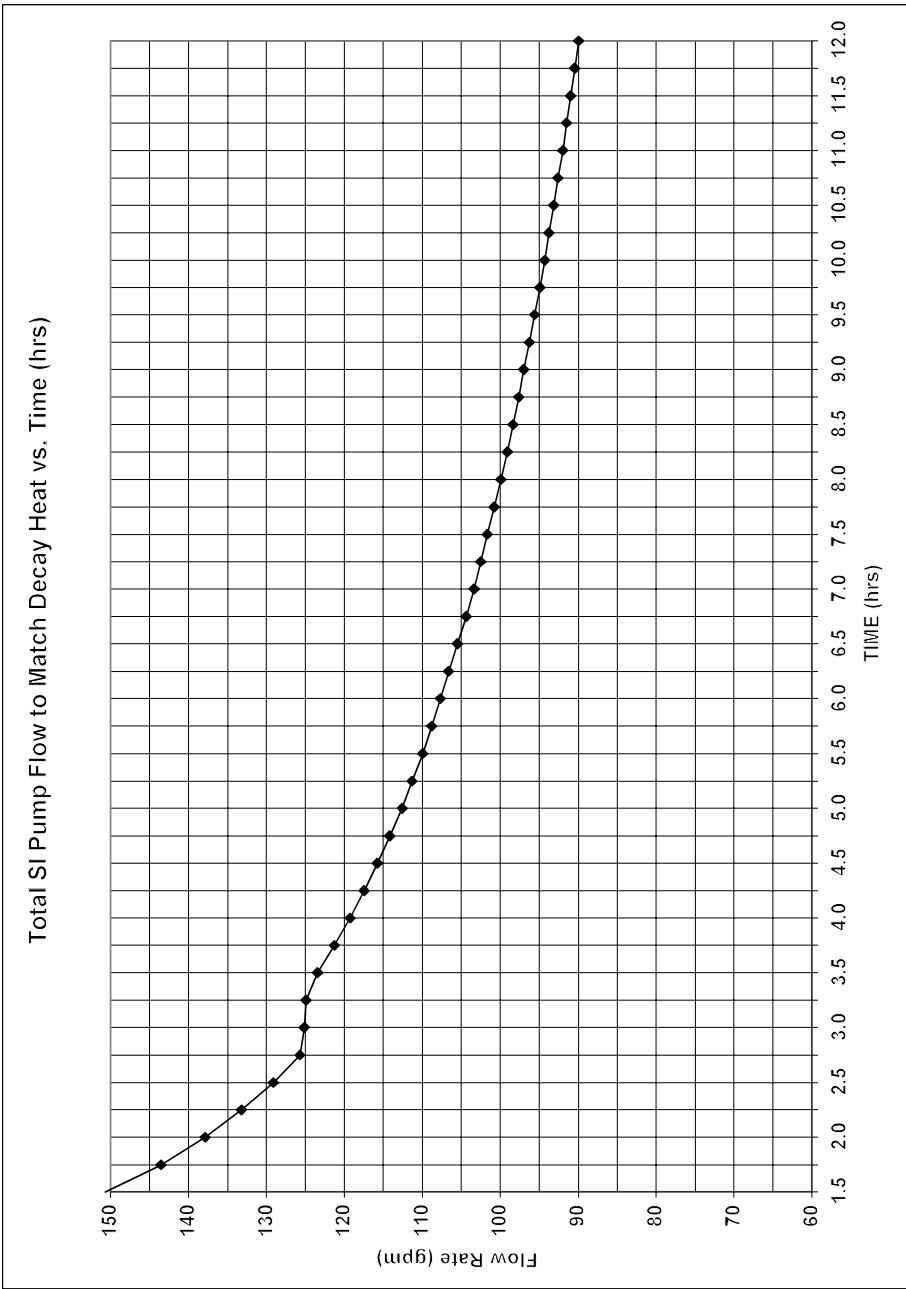
Attachment 26

Total SI Pump Flow to Match Decay Heat vs. Time



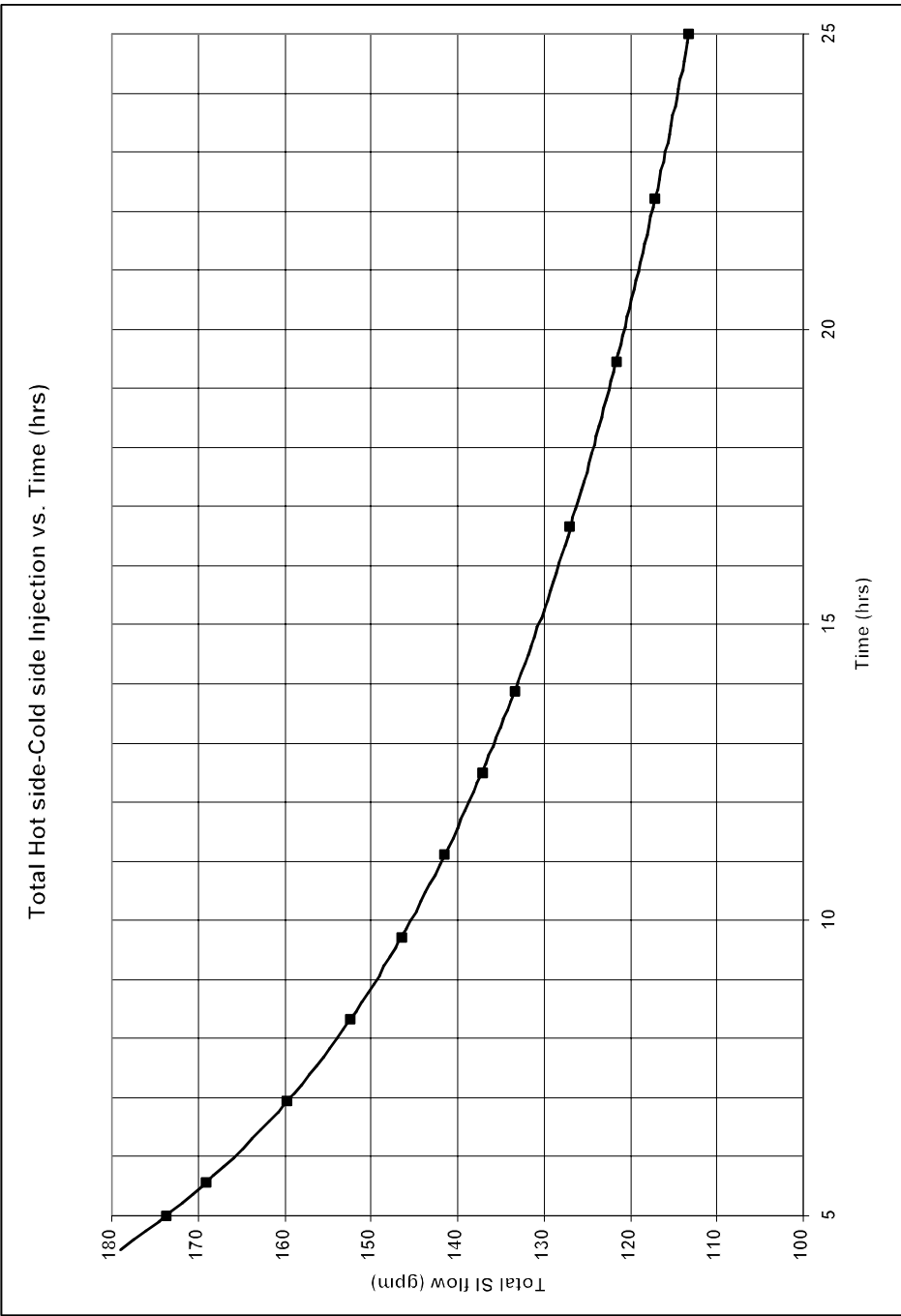
Attachment 26

Total SI Pump Flow to Match Decay Heat vs. Time



Attachment 26

Total SI Pump Flow to Match Decay Heat vs. Time



Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-RO-EC-1

JPM Title: Boration paths with equipment out of service

Approximate Time: 20 min

Actual Time: _____

Reference(s): SO-O-21
TDB-VI
One line electrical drawing

JPM Prepared by: Jerry Koske Date: 05/12/05

JPM Reviewed by: _____ Date: _____

JPM Approved by: _____ Date: _____

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-RO-EC-1

JPM Title: Boration paths with equipment out of service

Operators' Name: _____ Employee # _____

All Critical Steps (shaded) must be performed or simulated in accordance with the standards contained in this JPM

The Operator's performance was evaluated as (circle one):

SATISFACTORY

UNSATISFACTORY

Evaluator's Signature: _____ Date: _____

Reason, if unsatisfactory:

Tools & Equipment: SO's, TDB and plant drawings

Safety Considerations: None

Comments:

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-RO-EC-1

JPM Title: Boration paths with equipment out of service

INITIATING CUE: The plant is in SO-O-21, Shutdown Condition 1, “Refueling Cavity Water Level Greater than or Equal to 23 feet above the top of the core with UGS removed”

CH-11A and CH-11B levels are both 30% with a boron concentration of 3.5 WT % Boric Acid. The SIRWT level is 24” with a boron concentration of 2150 ppm. Charging pump CH-1C has been tagged out of service.

480 volt buses 1B3A and 1B3A-4A will be deenergized to allow some work to be performed on BT-1B3A.

You have been requested to determine if 2 independent boration paths will be available once the buses are deenergized. If so, identify the borated water source(s) and pump for each boration path.

START

Critical Steps shown in gray

STEP	ELEMENT	STANDARD
		Note: steps 1-3 may be performed in any order:
1	Determine equipment that will be affected by deenergizing the busses	Refers to plant one line electrical drawing (or other suitable plant reference) and determines that there will be no power to CH-1A, SI-1A and SI-2C.
2	Determines BAST suitability as a boric acid source	Refers to TDB-VI (COLR) figure 9 and determines that with 2150 PPM in the SIRWT and BAST boron at 3.5%, BAST level must be greater than 32%. With a level of 30% in each BAST, neither BAST

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-RO-EC-1

JPM Title: Boration paths with equipment out of service

STEP	ELEMENT	STANDARD
		can be a source by itself, but together they can count as one source.
3	Determines SIRWT suitability as a boric acid source	Determine that the SIRWT can not be used as a source with the charging pumps because the level is less than 80" but that it can be used as a source for the HPSI pump.
4	Determines if two independent boration paths are available with the buses deenergized and identifies them.	Determines that 2 independent boration paths are available: 1. CH-11A <u>AND</u> CH-11B through CH-1B 2. SIRWT through SI-2B

Termination Criteria: Boration paths have been identified.

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-RO-EC-1

INITIATING CUE: The plant is in SO-O-21, Shutdown Condition 1,
“Refueling Cavity Water Level Greater than or Equal to
23 feet above the top of the core with UGS removed”

CH-11A and CH-11B levels are both 30% with a boron
concentration of 3.5 WT % Boric Acid. The SIRWT level
is 24” with a boron concentration of 2150 ppm.
Charging pump CH-1C has been tagged out of service.

480 volt buses 1B3A and 1B3A-4A will be deenergized
to allow some work to be performed on BT-1B3A.

You have been requested to determine if 2 independent
boration paths will be available once the buses are
deenergized. If so, identify the borated water source(s)
and pump for each boration path.

START

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-RO-RC-1

JPM Title: RCA Entry and Exit with spill

Approximate Time: 12 minutes Actual Time: _____

Reference(s): GET-Radiation Worker Training
Standing Order G-101
K/A 2.3.1 (RO Imp 2.6)

JPM Prepared by: Jerry Koske Date: 05/12/05

JPM Reviewed by: _____ Date: _____

JPM Approved by: _____ Date: _____

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-RO-RC-1

JPM Title: RCA Entry and Exit with spill

Operators' Name: _____ Employee # _____

All Critical Steps (shaded) must be performed or simulated in accordance
with the standards contained in this JPM

The Operator's performance was evaluated as (circle one):

SATISFACTORY

UNSATISFACTORY

Evaluator's Signature: _____ Date: _____

Reason, if unsatisfactory:

Tools & Equipment: None

Safety Considerations: None

Comments: This JPM will be performed during RCA entrance and
exit during conduct of in-plant JPMs.

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-RO-RC-1

JPM Title: RCA Entry and Exit with spill

INITIATING CUE: You have been directed to enter Room 13 to ensure that blowdown tank transfer pump, FW-34A is operating properly.

START

Critical Steps shown in gray

STEP	ELEMENT	STANDARD
Note to Examiner:		
Provide Initiating CUE to candidate prior to RCA entry.		
1	Review RWP	Reads RWP
2	Determine Radiological Conditions in Room 13.	Checks survey maps and/or discusses radiological conditions with RP personnel.
3	Obtains Dosimetry	Verify TLD attached to security badge. Obtain EAD.
4	Sign in on appropriate RWP	Insert EAD in reader. Scan PID and RWP number
5	Enter RCA	RCA entered
6	Enter Room 13	Enters Room 13
As soon as candidate clears shield wall while entering room 13: CUE: Floor covered with water.		

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-RO-RC-1

JPM Title: RCA Entry and Exit with spill

STEP	ELEMENT	STANDARD
7	Exits Room and Contacts Control Room.	Leaves Room Immediately and Contacts Control Room. CUE: Control Room contacted RP. RP has determined that spill is not contaminated. The spill has been cleaned up.
8	Enter Room 13	Enters room CUE: All parameters for FW-34A are normal
9	Exits Room 13	Exits room Note to Examiner: In-plant JPMs that are conducted in the RCA may be performed at this time. Steps 10 and 11 are performed during RCA exit.
10	Monitor for personnel contamination prior to exiting RCA	Monitor for contamination using PCM
11	Sign out of RCA	Insert EAD in reader, enter PID number and confirm dose

Termination Criteria: RCA has been exited

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-RO-RC-1

INITIATING CUE: You have been directed to enter Room 13 to ensure that blowdown tank transfer pump, FW-34A is operating properly.

START

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-SRO-CO-1

JPM Title: Shutdown Margin Review with Boron Depletion

Approximate Time: 20 min

Actual Time: _____

Reference(s): TDB-V.9 "Shutdown Margin Worksheet" R35
TDB-II "Reactivity Curves" R28

JPM Prepared by: Jerry Koske Date: 05/11/05

JPM Reviewed by: _____ Date: _____

JPM Approved by: _____ Date: _____

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-SRO-CO-1

JPM Title: Shutdown Margin Review with Boron Depletion

Operators' Name: _____ Employee # _____

All Critical Steps (shaded) must be performed or simulated in accordance with the standards contained in this JPM

The Operator's performance was evaluated as (circle one):

SATISFACTORY

UNSATISFACTORY

Evaluator's Signature: _____ Date: _____

Reason, if unsatisfactory:

Tools & Equipment: Technical Data Book, calculator

Safety Considerations: None

Comments:

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-SRO-CO-1

JPM Title: Shutdown Margin Review with Boron Depletion

INITIATING CUE: The plant has been tripped due to RCP seal failures. One reactor coolant pump has been tripped. All CEAs, including group “N”, have been inserted and boration has taken place. The plant is being cooled down. The RCS is currently at 420°F and a boron concentration of 830 ppm.

Prior to shutdown, the plant was operating at full power with all CEAs fully withdrawn and a boron concentration of 710 ppm. Burnup is 7000 MWD/MTU.

The STA has performed a shutdown margin calculation and determined that, at the current boron concentration, there is adequate shutdown margin as long as the RCS temperature remains above 400°F.

The Shift Manager has directed you, the CRS, to review the STA’s Shutdown Margin Calculation.

START

Critical Steps shown in gray

STEP	ELEMENT	STANDARD
1	Obtain a copy of TDB section II, Reactivity Curves.	Obtains copy of TDB-II
2	Reviews the shutdown margin calculation	Reviews the shutdown margin calculation
3	Identifies error on line d(1)	Entered value should be 0 ppm rather than 510 ppm. Current power level, rather than power level before trip was used when reading TDB figure.

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-SRO-CO-1

JPM Title: Shutdown Margin Review with Boron Depletion

STEP	ELEMENT	STANDARD
4	Corrects calculation and determines SDM	Determines that shutdown margin is inadequate because previous error resulted in adding zero for the boron depletion correction in the required boron concentration. Boron need to be 20 ppm (10 to 30 ppm) greater than current value.

Termination Criteria: Shutdown Margin calculation has been reviewed and corrected.

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-SRO-CO-1

INITIATING CUE: The plant has been tripped due to RCP seal failures. One reactor coolant pump has been tripped. All CEAs, including group “N”, have been inserted and boration has taken place. The plant is being cooled down. The RCS is currently at 420°F and a boron concentration of 830 ppm.

Prior to shutdown, the plant was operating at full power with all CEAs fully withdrawn and a boron concentration of 710 ppm. Burnup is 7000 MWD/MTU.

The STA has performed a shutdown margin calculation and determined that, at the current boron concentration, there is adequate shutdown margin as long as the RCS temperature remains above 400°F.

The Shift Manager has directed you, the CRS, to review the STA’s Shutdown Margin Calculation.

START

PART II - Hot Shutdown, Cold Shutdown, and Refueling (No CEA Movement Planned)

NOTE: This calculation is valid for transient Xenon conditions, as PART II assumes the core is Xenon Free.

Conditions

INITIALS/DATE

1. Date/Time:

7/11/05/2100

W, 7/11/05

2. Burnup (Take the most recent burnup from the Control Room Log and add 30 MWD/MTU per EFPD.)

7000
2 MWD/MTU

W, 7/11/05

3. Record the Reactor Coolant System indicated loop temperature:

a. If on Shutdown Cooling, use TE-346Y (TR-346, RED Pen = Outlet temperature)

= N/A °F
3.a

b. If not on Shutdown Cooling, then use the lowest valid RCS loop temperature.

= 420 °F
3.b

W, 7/11/05

4. Reactor Coolant System Boron Concentration (Boron Analysis must have been performed within the past 24 hours or more recently if boration or dilution has occurred.)

830 ppm
4

W, 7/11/05

5. Verify that all regulating and shutdown CEAs are inserted to at least the Lower Electrical Limit (LEL)

W, 7/11/05

6. Determine the required boron concentration by using the applicable TDB Figure II.A.3, based on RCS temperature (Step 3.a or Step 3.b), core burnup (Step 2) and Group N position.

If in mode 5 enter the refueling boron concentration from the COLR.

820 ppm TDB Figure used: II A 3 f W 17/11/05
6 (circle one) Group N (IN / OUT)

7. Determine the deviation between actual and predicted critical boron (N/A if in Mode 5).

- a. Reactor Coolant System boron concentration prior to shutdown or trip. (N/A if in Mode 5)

710 ppm
7.a

- b. Reactor power level before shutdown or trip (% of 1500 MWth)

100 %
7.b

- c. Using core burnup (Step 2), determine the predicted full power boron concentration from TDB-II.A.1.b.

680 ppm
7.c

- d. Using the Reactor power (Step 7.b), determine the predicted delta boron concentration for the previous power conditions (use TDB-II.A.2)

(1) 510 ppm
7.d.(1)

- (2) Predicted boron concentration is:

680 + 510 = 1190 ppm
7.c 7.d.(1) 7.d.(2)

- e. Calculate the deviation between predicted and actual boron concentrations: (if the deviation is negative, enter zero)

710 - 1190 = 0 ppm
7.a 7.d.(2) 7.e

8. Adjust the required boron by adding the value of the boron deviation. If in Mode 5, enter the refueling boron concentration on line 8.

$$\frac{820}{6} + \frac{\phi}{7.e} = \frac{820}{8} \text{ ppm}$$

9. Calculate the difference between actual and adjusted required boron.

$$\frac{830}{4} - \frac{820}{8} = \frac{10}{9} \text{ ppm}$$

10. Soluble Boron Concentration

- a. IF Step 9 is greater than or equal to zero, the boron concentration is adequate.
- b. IF Step 9 is less than zero, use OI-ERFCS-1, Procedure 32 or manual calculations and borate the Reactor coolant system to the concentration given in Step 8.

REMARKS _____

Completed by  Date/Time 7/1/05 2:10

Corrected

FORT CALHOUN STATION
TECHNICAL DATA BOOK

TDB-V.9
PAGE 5 OF 15

PART II - Hot Shutdown, Cold Shutdown, and Refueling (No CEA Movement Planned)

NOTE: This calculation is valid for transient Xenon conditions, as PART II assumes the core is Xenon Free.

Conditions

INITIALS/DATE

1. Date/Time:

7/11/05/2100

W, 7/11/05

2. Burnup (Take the most recent burnup from the Control Room Log and add 30 MWD/MTU per EFPD.)

7000
2 MWD/MTU

W, 7/11/05

3. Record the Reactor Coolant System indicated loop temperature:

a. If on Shutdown Cooling, use TE-346Y (TR-346, RED Pen = Outlet temperature)

= N/A °F
3.a

b. If not on Shutdown Cooling, then use the lowest valid RCS loop temperature.

= 420 °F
3.b

W, 7/11/05

4. Reactor Coolant System Boron Concentration (Boron Analysis must have been performed within the past 24 hours or more recently if boration or dilution has occurred.)

830
4 ppm

W, 7/11/05

5. Verify that all regulating and shutdown CEAs are inserted to at least the Lower Electrical Limit (LEL)

W, 7/11/05

6. Determine the required boron concentration by using the applicable TDB Figure II.A.3, based on RCS temperature (Step 3.a or Step 3.b), core burnup (Step 2) and Group N position.

If in mode 5 enter the refueling boron concentration from the COLR.

820 ppm
6

TDB Figure used: II A 3 f
(circle one) Group N (IN / OUT)

W 17/11/05

7. Determine the deviation between actual and predicted critical boron (N/A if in Mode 5).

- a. Reactor Coolant System boron concentration prior to shutdown or trip. (N/A if in Mode 5)

710 ppm
7.a

- b. Reactor power level before shutdown or trip (% of 1500 MWth)

100 %
7.b

- c. Using core burnup (Step 2), determine the predicted full power boron concentration from TDB-II.A.1.b.

680 ppm
7.c

- d. Using the Reactor power (Step 7.b), determine the predicted delta boron concentration for the previous power conditions (use TDB-II.A.2)

(1) φ 510 ppm
7.d.(1)

- (2) Predicted boron concentration is:

680 + 510 φ = 1190 ppm
7.c 7.d.(1) 7.d.(2)

- e. Calculate the deviation between predicted and actual boron concentrations: (if the deviation is negative, enter zero)

710 - 1190⁶⁸⁰ = φ 30 ppm
7.a 7.d.(2) 7.e

8. Adjust the required boron by adding the value of the boron deviation. If in Mode 5, enter the refueling boron concentration on line 8.

$$\frac{820}{6} + \frac{\cancel{0}30}{7.e} = \frac{820}{8} \text{ ppm}$$

⁸⁵⁰

9. Calculate the difference between actual and adjusted required boron.

$$\frac{830}{4} - \frac{820}{8} = \frac{10}{9} \text{ ppm}$$

⁸⁵⁰

10. Soluble Boron Concentration

- a. IF Step 9 is greater than or equal to zero, the boron concentration is adequate.
- b. IF Step 9 is less than zero, use OI-ERFCS-1, Procedure 32 or manual calculations and borate the Reactor coolant system to the concentration given in Step 8.

REMARKS _____

Completed by  Date/Time 7/1/05 2110

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-SRO-CO-2

JPM Title: Equipment Operability Requirements during Mode Change

Approximate Time: 15 minutes Actual Time: _____

Reference(s): Technical Specifications
TDB-III.42 R1

JPM Prepared by: Jerry Koske Date: 05/14/05

JPM Reviewed by: _____ Date: _____

JPM Approved by: _____ Date: _____

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-SRO-CO-2

JPM Title: Equipment Operability Requirements during Mode Change

Operators' Name: _____ Employee # _____

All Critical Steps (shaded) must be performed or simulated in accordance
with the standards contained in this JPM

The Operator's performance was evaluated as (circle one):

SATISFACTORY

UNSATISFACTORY

Evaluator's Signature: _____ Date: _____

Reason, if unsatisfactory:

Tools & Equipment: None

Safety Considerations: None

Comments:

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-SRO-CO-2

JPM Title: Equipment Operability Requirements during Mode Change

INITIATING CUE: You are an SRO assigned to the One Stop Shop during a refueling outage. The reactor has been shutdown for 24 hours and a RCS cooldown is in progress. The RCS temperature is 450°F and the pressure is 1250 psia.

To allow for some emergent maintenance, outage management has asked you to determine if Safety Injection Tank Isolation valve, HCV-2974 could be closed and deenergized at this time.

START

Critical Steps shown in gray

STEP	ELEMENT	STANDARD
1	Checks Technical Specifications	Refers to Tech Sec section 2.3 and determines that this condition is allowed by Tech Specs.
2	Refers to TDB-III.42	Refers to TDB-III.42 and determines that HCV-2974 (SIT Isolation valve) must remain locked open until RCS pressure is below 400 psia.

Termination Criteria: Candidate determines if condition is allowable or not.

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-SRO-CO-2

INITIATING CUE: You are an SRO assigned to the One Stop Shop during a refueling outage. The reactor has been shutdown for 24 hours and a RCS cooldown is in progress. The RCS temperature is 450°F and the pressure is 1250 psia.

To allow for some emergent maintenance, outage management has asked you to determine if Safety Injection Tank Isolation valve, HCV-2974 could be closed and deenergized at this time.

START

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-SRO-EC-1

JPM Title: Review of OP-ST-SHIFT-0001

Approximate Time: 20 min

Actual Time: _____

Reference(s): OP-ST-SHIFT-0001 R90

JPM Prepared by: Jerry Koske Date: 05/15/05

JPM Reviewed by: _____ Date: _____

JPM Approved by: _____ Date: _____

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-SRO-EC-1

JPM Title: Review of OP-ST-SHIFT-0001

Operators' Name: _____ Employee # _____

All Critical Steps (shaded) must be performed or simulated in accordance
with the standards contained in this JPM

The Operator's performance was evaluated as (circle one):

SATISFACTORY

UNSATISFACTORY

Evaluator's Signature: _____ Date: _____

Reason, if unsatisfactory:

Tools & Equipment: None

Safety Considerations: None

Comments:

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-SRO-EC-1

JPM Title: Review of OP-ST-SHIFT-0001

INITIATING CUE: You are acting as Shift Manager. Complete the Shift Manager review for Monday 1900 of the attached portion of OP-ST-SHIFT-0001. Determine if any actions must be taken as a result of the log readings.

START

Critical Steps shown in gray

STEP	ELEMENT	STANDARD
1	Reviews portion of OP-ST-SHIFT-0001	Reviews each Monday 1900 reading on provided portion of OP-ST-SHIFT-0001
2	Determines that RCS Cold Leg Temperature does not meet acceptance criteria.	On page 9 of 49, determines that the maximum difference between $T_{\text{cold cal}}$ on AI-31A and the highest T_{cold} is greater than 0.2°F. Determines that calibration is required using OI-RPS-2.
3	Determines that the acceptance criteria for RM-057 are not met.	On page 14 of 49, determines that counts have doubled on RM-057. Determines that SO-G-105 must be entered and contacts the Shift Chemist for a primary-secondary sample.

Termination Criteria: The Shift Manager review of the provided portion of OP-ST SHIFT-0001 has been completed.

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-SRO-EC-1

INITIATING CUE: You are acting as Shift Manager. Complete the Shift Manager review for Monday 1900 of the attached portion of OP-ST-SHIFT-0001. Determine if any actions must be taken as a result of the log readings.

START

SHIFT DATA SHEET

WEEK ENDING:

SI TANK LEVEL

INSTRUMENT		SI-6C LI-2944	SI-6A LI-2904	SI-6D LI-2964	SI-6B LI-2924	Magnetrol Alarms CLEAR	TIME	INITIALS	STA	SM		
S U N	0700	71.5	72	72	71.7	All clear	0720	DS	ST	SM	0700	S U N
	1900	71.5	72	72	71.6	All clear	1912	NS	ST	SM	1900	
M O N	0700	71.5	72	72	71.6	All clear	0710	DS	ST	SM	0700	M O N
	1900	71.5	71.8	72	71.6	All clear	1915	NS	ST		1900	
T U E	0700										0700	T U E
	1900										1900	
W E D	0700										0700	W E D
	1900										1900	
T H U	0700										0700	T H U
	1900										1900	
F R I	0700										0700	F R I
	1900										1900	
S A T	0700										0700	S A T
	1900										1900	

APPLICABLE MODES:

Modes 1 and 2

PROCEDURE REFERENCE:

None

TECH. SPEC. REFERENCE:

3.1, Table 3-2, Item 14.a

ACCEPTANCE CRITERIA:

- Levels are >87% and ≤ 74%
- The following A-7 Annunciators are CLEAR:
C-2U C-3U D-2U D-3U C-2L C-3L D-2L D-3L

REMARKS:

SHIFT DATA SHEET

WEEK ENDING:

SI TANK PRESSURE

INSTRUMENT	SI-6C PI-2941	SI-6A PI-2901	SI-6D PI-2961	SI-6B PI-2921	ANNUN CLEAR	TIME	INITIALS	STA	S M		
SUN	0700	255	250	265	260	All clear	DS	ST	SM	0700	SUN
	1900	255	250	265	260	All clear	NS	ST	SM	1900	
MON	0700	250	250	260	255	All clear	DS	ST	SM	0700	MON
	1900	250	250	255	250	All clear	NS	ST		1900	
TUE	0700									0700	TUE
	1900									1900	
WED	0700									0700	WED
	1900									1900	
THU	0700									0700	THU
	1900									1900	
FRI	0700									0700	FRI
	1900									1900	
SAT	0700									0700	SAT
	1900									1900	

APPLICABLE MODES:

Modes 1 and 2

PROCEDURE REFERENCE:

None

TECH. SPEC. REFERENCE:

3.1, Table 3-2, Item 14.a

ACCEPTANCE CRITERIA:

- Pressures are ≥ 240 psig and ≤ 270 psig
- The following A-7 Annunciators are CLEAR:
A-2U A-3U A-4U B-4U A-2L A-3L
A-4L B-4L B-2U B-3U B-2L B-3L

REMARKS:

SHIFT DATA SHEET

WEEK ENDING:

INSTRUMENT		LIC-381	LIC-382	TIME	INITIALS	STA	SM		
SUN	0700	191	193	0721	DS	ST	SM	0700	SUN
	1900	191	193	1913	NS	ST	SM	1900	
MON	0700	191	192	0711	DS	ST	SM	0700	MON
	1900	190	192	1916	NS	ST		1900	
TUE	0700							0700	TUE
	1900							1900	
WED	0700							0700	WED
	1900							1900	
THU	0700							0700	THU
	1900							1900	
FRI	0700							0700	FRI
	1900							1900	
SAT	0700							0700	SAT
	1900							1900	

APPLICABLE MODES:

Modes 1 and 2

PROCEDURE REFERENCE:

None

TECH. SPEC. REFERENCE:

3.1, Table 3-2, Item 13.a

ACCEPTANCE CRITERIA:

- Levels are \geq 185 inches

REMARKS:

POWER RANGE SAFETY CHANNELS

SHIFT DATA SHEET

WEEK ENDING:

INSTRUMENT	AI-31A Minus Offset		AI-31B Minus Offset		AI-31C Minus Offset		AI-31D Minus Offset		RPS pwr Max Diff.	XC105 (MW)*	XC105 divided by 15*	RPS/105 (%) Max Diff. *	TIME	INITIALS	STA	SM		
	ΔT	NI	ΔT	NI	ΔT	NI	ΔT	NI										
S U N	0700	99.2	99.4	99.6	99.5	99.6	99.6	99.7	99.6	0.5	1494	99.6	0.4	0725	DS	ST	SM	0700
	1900	99.3	99.4	99.6	99.5	99.6	99.6	99.7	99.6	0.4	1492	99.5	0.2	1917	NLS	ST	SM	1900
M O N	0700	99.3	99.5	99.5	99.5	99.5	99.5	99.7	99.6	0.4	1494	99.6	0.3	0715	DS	ST	SM	0700
	1900	99.2	99.4	99.6	99.2	99.5	99.5	99.6	99.5	0.4	1495	99.7	0.5	1920	NLS	ST		1900
T U E	0700																	0700
	1900																	1900
W E D	0700																	0700
	1900																	1900
T H U	0700																	0700
	1900																	1900
F R I	0700																	0700
	1900																	1900
S A T	0700																	0700
	1900																	1900

APPLICABLE MODES:

Mode 1 - *NOT required during Startup/Shutdown Periods
(including power operation less than 25%)

PROCEDURE REFERENCE:

OP-ST-RPS-0005
RE-CPT-RX-0003

TECH. SPEC. REFERENCE:

3.1, Table 3-1, Items 1.a and 1.b

ACCEPTANCE CRITERIA:

- Maximum difference between the highest and lowest RPS pwr reading (ΔT or NI) and XC105(%) (Thermal pwr) is 1.0% with Reactor power above 25% and stable.
- Maximum difference between the highest and lowest RPS pwr reading (ΔT or NI) is 2% with Reactor power above 50% and stable.
- With the conditions of the RCS flow streaming anomaly, Two (2) channels (A & B or C & D) of ΔT may be as much as 10% lower and/or higher than NI and/or XC105. This applies to all Reactor power levels.

REMARKS:

The RPS Max Diff is the maximum difference for the eight (8) power readings minus scaling amp offset.

Values recorded are to be rounded to nearest tenth.

The RPS/XC105 comparisons are required daily per 3.1 Table 3-1, Item 1b. Mark the XC105, XC105/15, and RPS/105 columns N/A if XC105 is invalid. Perform RE-CPT-RX-0003 if XC105 is invalid for 2 consecutive readings.

Perform OP-ST-RPS-0005 as necessary to adjust RPS power indication.

SHIFT DATA SHEET

WEEK ENDING:

RCS COLD LEG TEMPERATURE

INSTRUMENT		AI-31A		AI-31B		AI-31C		AI-31D		T _{cold} /T _{cold set} Max. Diff.	TIME	INITIALS	STA	SM		
		T _{cold}	T _{cold set}	T _{cold}	T _{cold set}	T _{cold}	T _{cold set}	T _{cold}	T _{cold set}							
S U N	0700	542.9	542.8	542.9	542.9	542.8	542.9	542.9	542.9	0.1	0728	DS	ST	SM	0700	S U N
	1900	542.9	542.9	542.8	542.8	542.9	542.9	542.9	542.9	0.1	1920	NLS	ST	SM	1900	
M O N	0700	542.9	542.8	542.9	542.9	542.8	542.9	542.9	542.9	0.1	0718	DS	ST	SM	0700	M O N
	1900	542.9	542.6	542.9	542.9	542.8	542.9	542.9	542.9	0.1	1923	NLS	ST		1900	
T U E	0700														0700	T U E
	1900														1900	
W E D	0700														0700	W E D
	1900														1900	
T H U	0700														0700	T H U
	1900														1900	
F R I	0700														0700	F R I
	1900														1900	
S A T	0700														0700	S A T
	1900														1900	

APPLICABLE MODES:

Mode 1 and 2

PROCEDURE REFERENCE:

OI-RPS-2

TECH. SPEC. REFERENCE:

- 3.1, Table 3-3, Item 17.a
- 3.10(7)a

ACCEPTANCE CRITERIA:

- Maximum T_{cold} above 15% Reactor Power is 545°F
- Maximum difference between each T_{cold set} and the highest T_{cold} reading for the applicable reactor power level is as follows:
 - >75% to 100% = 0.2°F
 - >50% to ≤75% = 0.5°F
 - 15% to ≤50% = 1.0°F

REMARKS: EAR 94-130 evaluated up to a 1.0°F deviation on T_{cold Cal} regardless of power level for operability concerns.

SHIFT DATA SHEET

WEEK ENDING:

INSTRUMENT	AI-31A DVM P _{Trip}	AI-31B DVM P _{Trip}	AI-31C DVM P _{Trip}	AI-31D DVM P _{Trip}	P _{rip} Max Diff.	TIME	INITIALS	STA	SM		
SUN	0700	1886	1883	1888	1892	9	0730	DS	ST	SM	0700
	1900	1886	1883	1888	1892	9	1922	MS	ST	SM	1900
MON	0700	1886	1884	1890	1890	6	0720	DS	ST	SM	0700
	1900	1886	1885	1890	1890	5	1926	MS	ST		1900
TUE	0700										0700
	1900										1900
WED	0700										0700
	1900										1900
THU	0700										0700
	1900										1900
FRI	0700										0700
	1900										1900
SAT	0700										0700
	1900										1900

APPLICABLE MODES:

Modes 1 and 2

PROCEDURE REFERENCE:

None

TECH. SPEC. REFERENCE:

3.1, Table 3-1, Item 4.a(1)

ACCEPTANCE CRITERIA:

- Trip setpoints are \geq TDB-VI limits for existing T_{cool} and Reactor power
- Minimum P_{Trip} is 1750 psia
- Maximum difference between the highest and lowest P_{Trip} is 40 psi
- If RCS Flow Streaming conditions are present, P_{Trip} Max. Diff. is the higher of the difference between Channels A and B and between Channels C and D. The maximum for P_{Trip} Max. Diff. is 40 psi.

REMARKS:

SHIFT DATA SHEET

WEEK ENDING:

RCS FLOW VOLTAGES

INSTRUMENT		AI-31A		AI-31B		AI-31C		AI-31D		Meter Input Max. Dif.	TIME	INITIALS	STA	SM		
		Meter Input	Trip S.P.	Meter Input	Trip S.P.	Meter Input	Trip S.P.	Meter Input	Trip S.P.							
S U N	0700	-3.267	-3.053	-3.265	-3.049	-3.267	-3.049	-3.265	-3.052	.002	0734	DS	54	0700	S U N	
	1900	-3.267	N/A	-3.265	N/A	-3.267	N/A	-3.265	N/A	.002	1926	N/A	54	1900		
M O N	0700	-3.267	-3.053	-3.265	-3.049	-3.267	-3.049	-3.265	-3.052	.002	0724	DS	54	0700	M O N	
	1900	-3.267	N/A	-3.265	N/A	-3.267	N/A	-3.265	N/A	.002	1929	N/A	54	1900		
T U E	0700													0700	T U E	
	1900		N/A		N/A		N/A		N/A					1900		
W E D	0700													0700	W E D	
	1900		N/A		N/A		N/A		N/A					1900		
T H U	0700													0700	T H U	
	1900		N/A		N/A		N/A		N/A					1900		
F R I	0700													0700	F R I	
	1900		N/A		N/A		N/A		N/A					1900		
S A T	0700													0700	S A T	
	1900		N/A		N/A		N/A		N/A					1900		

APPLICABLE MODES:

Modes 1 and 2

PROCEDURE REFERENCE:

OP-ST-RPS-0002

TECH. SPEC. REFERENCE:

3.1, Table 3-1, Item 3.a

ACCEPTANCE CRITERIA:

- Meter Input flow voltages are greater than their respective Low Flow Trip setpoint voltages.
- Maximum difference between the highest and lowest Meter Input valves is 0.140 volts.

REMARKS: Record the highest absolute voltage reading observed over approximately a 15 second interval.

SHIFT DATA SHEET

WEEK ENDING:

AXIAL POWER DISTRIBUTION (APD/ASI)

INSTRUMENT	AI-31A		AI-31B		AI-31C		AI-31D		TIME	INITIALS	STA	SM	
	Lower Trip S.P.	ASI	Upper Trip S.P.	Lower Trip S.P.	ASI	Upper Trip S.P.	Lower Trip S.P.	ASI	Upper Trip S.P.				
S U N	0700	-1324	.0259	.1324	.1321	.0271	.1311	-.131	.0310	.1301	.0738	DS	ST
	1900	-1318	.0265	.1324	-.131	.0310	.1312	-.1312	.0310	.1301	.1930	ALS	ST
M O N	0700	-1325	.0281	.1324	-.1300	.0315	.1311	-.1312	.0371	.1308	.0728	DS	ST
	1900	-1324	.0259	.1324	-.1301	.0310	.1310	-.1312	.0361	.1310	.1931	ALS	ST
T U E	0700												
	1900												
W E D	0700												
	1900												
T H U	0700												
	1900												
F R I	0700												
	1900												
S A T	0700												
	1900												

APPLICABLE MODES:

Mode 1 greater than 15% power

PROCEDURE REFERENCE:

OP-ST-RPS-0004

TECH. SPEC. REFERENCE:

- 3.1, Table 3-1, Item 13.a
- 3.10(7)a

ACCEPTANCE CRITERIA:

- Lower trip setpoint is equal to or less negative (-) than the 4 Pump Operation limit in TDB-VI
- Upper Trip setpoint is equal to or less positive (+) than the 4 Pump Operation limit in TDB-VI
- ASI is within the Lower and Upper Trip setpoints for their respective channels
- ASI is within the DNB limits in TDB-VI

REMARKS:

SHIFT DATA SHEET [AR 12757]

WEEK ENDING:

EFFLUENT RADIATION MONITORS

INSTRUMENT		RM-050	RM-051	RM-052	RM-062	RM-043	RM-063	TIME	INITIALS	STA	SM	
S U N	Meter Reading CPM	6.44E2	8.9E1	5.8E1	4.8E1	3.6E1	0.0	1935	ALS	ST	SA	1900
	ALERT SP	1.73E4	7.74E4	9.16E3	8.24E3	3.10E3	N/A					
	Sample Flow	2.0	N/A	2.1	2.0	* 2.1	N/A					
M O N	Meter Reading CPM	6.43E2	8.9E1	5.8E1	4.8E1	3.6E1	0.0	1935	ALS	ST		1900
	ALERT SP	1.73E4	7.74E4	9.16E3	8.24E3	3.10E3	N/A					
	Sample Flow	2.1	N/A	2.0	2.0	* 2.1	N/A					
T U E	Meter Reading CPM											1900
	ALERT SP						N/A					
	Sample Flow						N/A					
W E D	Meter Reading CPM											1900
	ALERT SP						N/A					
	Sample Flow						N/A					
T H U	Meter Reading CPM											1900
	ALERT SP						N/A					
	Sample Flow						N/A					
F R I	Meter Reading CPM											1900
	ALERT SP						N/A					
	Sample Flow						N/A					
S A T	Meter Reading CPM											1900
	ALERT SP						N/A					
	Sample Flow						N/A					

APPLICABLE MODES:

Modes 1, 2, 3, 4 and 5

PROCEDURE REFERENCE:

- TDB-IV.7
- OP-ST-RM-0002
- CH-ODCM-0001

TECH. SPEC. REFERENCE:

- 2.1.4(4)
- 2.8.2(3)
- 2.15, Table 2-4, Item 3
- 2.21, Table 2-10, Item 2
- 3.1, Table 3-3, Item 3.a

ACCEPTANCE CRITERIA:

- ALERT SP per TDB-IV.7
- RM-043 Flow is >1.85 SCFM and <2.15 SCFM
- RM-050 Flow is >1.5 SCFM and <3.0 SCFM
- RM-052 and RM-062 Flow is >0.80 SCFM and <5.00 SCFM in Automatic Flow Control Mode
- RM-052 and RM-062 Flow is >1.25 SCFM and <2.75 SCFM in Manual Flow Control Mode

Monitor	Sample Pump Run Time	Stack Flow FCI-758 X10,000 CFM	Initials	Date
RM-043	Start Stop			
RM-043				
RM-052				
RM-052				
RM-062				
RM-062				

REMARKS:

* Reading transferred from AB Log, FC-143.

SHIFT DATA SHEET [AR 12767]

WEEK ENDING:

Previous
Meter Reading:
7.1 E1

S U N	INSTRUMENT	RM-053	RM-054A	RM-054B	RM-055	RM-057		RM-064	TIME	INITIALS	S T A	S M	
						YES	NO						
S U N	Meter Reading CPM	1.3E3	9.6E1	2.20E2	1.6E2	7.1 E1	YES	NO	1.9E1	1940	N/S	7/5	S
	ALERT SP	6.0E3	4.93E3	4.94E3	4.0E4	1.5 E2							U
M O N	Meter Reading CPM	1.3E3	9.7E1	4.1E2	1.6E2	1.48E2	YES	NO	1.9E1	1940	N/S	7/7	N
	ALERT SP	6.0E3	4.93E3	4.94E3	4.0E4	1.5 E2							
T U E	Meter Reading CPM						YES	NO					T
	ALERT SP												U
W E D	Meter Reading CPM						YES	NO					E
	ALERT SP												W
T H U	Meter Reading CPM						YES	NO					T
	ALERT SP												H
F R I	Meter Reading CPM						YES	NO					U
	ALERT SP												F
S A T	Meter Reading CPM						YES	NO					R
	ALERT SP												I
	Meter Reading CPM						YES	NO					S
	ALERT SP												A
	Meter Reading CPM						YES	NO					T
	ALERT SP												

APPLICABLE MODES:

Modes 1, 2, 3, 4 and 5

PROCEDURE REFERENCE:

- TDB-IV.7
- OP-ST-RM-0002
- CH-ODCM-0001
- Standing Order SO-G-105

TECH. SPEC. REFERENCE:

- 2.1.4(6)
- 2.21, Table 2-10, Item 3
- 3.1, Table 3-3, Item 3.a
- 3.1, Table 3-3, Item 5.a

ACCEPTANCE CRITERIA:

- ALERT SP per TDB-IV.7
- RM-057 counts have not doubled from previous day

REMARKS: If counts on RM-057 have doubled, contact Shift Chemist for primary-secondary sample and implement Standing Order SO-G-105.

SHIFT DATA SHEET [AR 12757]

WEEK ENDING:

AREA RADIATION MONITORS

INSTRUMENT		RM-070	RM-071	RM-072	RM-073	RM-074	RM-075	RM-076	RM-077	TIME	INITIALS	STA	SM		
S U N	Meter Reading mrem/HR	11.1	5.6	3.6	139	20.1	135	0.1	0.1	1945	NLS	ST	SM	1900	S U N
	Warn S.P. mrem/HR	36	25	20	3E2	50	35	10	10						
M O N	Meter Reading mrem/HR	11.0	5.5	3.5	137	20.0	135	0.2	0.1	1945	NLS	ST		1900	M O N
	Warn S.P. mrem/HR	36	25	20	3E2	50	35	10	10						
T U E	Meter Reading mrem/HR													1900	T U E
	Warn S.P. mrem/HR														
W E D	Meter Reading mrem/HR													1900	W E D
	Warn S.P. mrem/HR														
T H U	Meter Reading mrem/HR													1900	T H U
	Warn S.P. mrem/HR														
F R I	Meter Reading mrem/HR													1900	F R I
	Warn S.P. mrem/HR														
S A T	Meter Reading mrem/HR													1900	S A T
	Warn S.P. mrem/HR														

- APPLICABLE MODES:
Modes 1, 2, 3, 4 and 5
- PROCEDURE REFERENCE:
OP-ST-RM-0001
- USAR REFERENCE:
• 9.5.5
- TECH. SPEC. REFERENCE:
• 3.1, Table 3-3, Item 3.a
- ACCEPTANCE CRITERIA:
• Meter readings are digital displayed or are on scale and less than the Warn/Alert setpoint, or the Shift Manager has been notified
- Observed on scale meter response to Warn/Alert Setpoint Check
- REMARKS: RM-073 is only required for fuel movement. N/A if not in service.

SHIFT DATA SHEET [AR 12757]

WEEK ENDING:

AREA RADIATION MONITORS

INSTRUMENT		RM-078	RM-079	RM-080	RM-081	RM-082	RM-084	RM-085	RM-086	TIME	INITIALS	STA	SM		
S U N	Meter Reading mrem/HR	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1	1948	N/S	S	M	1900	S U N
	Warn S.P. mrem/HR	10	10	10	10	10	10	10	10						
M O N	Meter Reading mrem/HR	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1	1950	N/S	S	T	1900	M O N
	Warn S.P. mrem/HR	10	10	10	10	10	10	10	10						
T U E	Meter Reading mrem/HR													1900	T U E
	Warn S.P. mrem/HR														
W E D	Meter Reading mrem/HR													1900	W E D
	Warn S.P. mrem/HR														
T H U	Meter Reading mrem/HR													1900	T H U
	Warn S.P. mrem/HR														
F R I	Meter Reading mrem/HR													1900	F R I
	Warn S.P. mrem/HR														
S A T	Meter Reading mrem/HR													1900	S A T
	Warn S.P. mrem/HR														

APPLICABLE MODES:

Modes 1, 2, 3, 4 and 5

PROCEDURE REFERENCE:

OP-ST-RM-0001

USAR REFERENCE:

- 9.5.5

TECH. SPEC. REFERENCE:

- 3.1, Table 3-3, Item 3.a

ACCEPTANCE CRITERIA:

- Meter readings are digital displayed or are on scale and less than the Warn/Alert setpoint, or the Shift Manager has been notified
- Observed on scale meter response to Warn/Alert Setpoint Check

REMARKS:

SHIFT DATA SHEET

WEEK ENDING:

AREA RADIATION MONITORS

INSTRUMENT		RM-087	RM-088	RM-089	RM-095	RM-096	RM-097	RM-098	TIME	INITIALS	STA	SM		
SUN	Meter Reading mrem/HR	0.1	0.1	0.1	17.1	0.1	0.1	0.2	1953	NS	ST	SA	1900	SUN
	Warn S.P. mrem/HR	10	10	10	100	10	10	10						
MON	Meter Reading mrem/HR	0.1	0.1	0.1	17.2	0.1	0.1	0.2	1953	NS	ST		1900	MON
	Warn S.P. mrem/HR	10	10	10	100	10	10	10						
TUE	Meter Reading mrem/HR												1900	TUE
	Warn S.P. mrem/HR													
WED	Meter Reading mrem/HR												1900	WED
	Warn S.P. mrem/HR													
THU	Meter Reading mrem/HR												1900	THU
	Warn S.P. mrem/HR													
FRI	Meter Reading mrem/HR												1900	FRI
	Warn S.P. mrem/HR													
SAT	Meter Reading mrem/HR												1900	SAT
	Warn S.P. mrem/HR													

- APPLICABLE MODES:
Modes 1, 2, 3, 4 and 5
- PROCEDURE REFERENCE:
OP-ST-RM-0001
- USAR REFERENCE:
• 9.5.5
- TECH. SPEC. REFERENCE:
• 3.1, Table 3-3, Item 3 a
- ACCEPTANCE CRITERIA:
• Meter readings are digital displayed or are on scale and less than the Warn/Alert setpoints, or the Shift Manager has been notified
- Observed on scale meter response to Warn/Alert Setpoint Check
- REMARKS:

AREA RADIATION MONITORS

SHIFT DATA SHEET WEEK ENDING:

INSTRUMENT		RM-091A	RM-091B	TIME	INITIALS	STA	SM		
SUN	Meter Reading R/Hr	0	0	1957	N/S	ST	SM	1900	SUN
	Warn S.P. R/Hr	40	40						
MON	Meter Reading R/Hr	0	0	1957	N/S	ST		1900	MON
	Warn S.P. R/Hr	40	40						
TUE	Meter Reading R/Hr							1900	TUE
	Warn S.P. R/Hr								
WED	Meter Reading R/Hr							1900	WED
	Warn S.P. R/Hr								
THU	Meter Reading R/Hr							1900	THU
	Warn S.P. R/Hr								
FRI	Meter Reading R/Hr							1900	FRI
	Warn S.P. R/Hr								
SAT	Meter Reading R/Hr							1900	SAT
	Warn S.P. R/Hr								

APPLICABLE MODES:

Modes 1, 2, 3, 4 and 5

PROCEDURE REFERENCE:

OP-ST-RM-0001

TECH. SPEC. REFERENCE:

- 2.21, Table 2-10, Item 1
- 3.1, Table 3-3, Item 3.a

ACCEPTANCE CRITERIA:

- Meter readings are digital displayed or are on scale and less than the Alert setpoints, or the Shift Manager has been notified
- Observed on scale meter response to Alert Setpoint Check

REMARKS:

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-SRO-RC-1

JPM Title: Approve Gas Decay Tank Release

Approximate Time: 15 min

Actual Time: _____

Reference(s): OI-WDG-2
Form FC-213

JPM Prepared by: Jerry Koske Date: 05/17/05

JPM Reviewed by: _____ Date: _____

JPM Approved by: _____ Date: _____

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-SRO-RC-1

JPM Title: Approve Gas Decay Tank Release

Operators' Name: _____ Employee # _____

All Critical Steps (shaded) must be performed or simulated in accordance
with the standards contained in this JPM

The Operator's performance was evaluated as (circle one):

SATISFACTORY

UNSATISFACTORY

Evaluator's Signature: _____ Date: _____

Reason, if unsatisfactory:

Tools & Equipment: None

Safety Considerations: None

Comments:

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-SRO-RC-1

JPM Title: Approve Gas Decay Tank Release

INITIATING CUE: You are the Shift Manager. A release of Waste Gas Decay Tank WD-29D has been scheduled using OI-WDG-2, Attachment 1. You have been requested to authorize the release.

START

Critical Steps shown in gray

STEP	ELEMENT	STANDARD
1	Review Release Package	Reviews the partially filled out portion of OI-WDG-2, Attachment One and the FC-213 Release Permit.
2	Authorize the release	Determines that the recommended flow rate on OI-WDG-2, Attachment 1 line 12 is not at least 30 SCFH below the maximum release rate (line 11) as required. Refuses to authorize the release <u>OR</u> corrects the value in line 12 to at least 30 SCFH less than the value in line 11 prior to authorizing release.

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-SRO-RC-1

JPM Title: Approve Gas Decay Tank Release

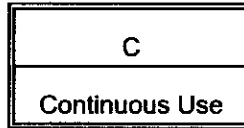
Termination Criteria: Shift Manager has made a decision on release authorization

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-SRO-RC-1

INITIATING CUE: You are the Shift Manager. A release of Waste Gas Decay Tank WD-29D has been scheduled using OI-WDG-2, Attachment 1. You have been requested to authorize the release.

START



Attachment 1 - Automatic Waste Gas Release

PREREQUISITES

(✓) INITIALS

1. Procedure Revision Verification

Revision Number 20 Date: 7/11/05

✓

2. Auxiliary Building Ventilation System is in operation per OI-VA-2.

✓

3. Ensure one of the following Radiation Monitors is in operation monitoring the Ventilation Stack per OI-RM-1 (ODCM Section 2.2):

- RM-062
- RM-052

✓ ✓

4. Verify one of the four following sets of CRHS/VIAS lockout relays are reset AND amber lights are on:

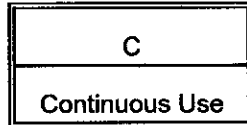
- a.
 - 86A/CRHS
 - 86A/VIAS

✓ ✓

- b.
 - 86A/CRHS
 - CHAN "A" DERIVED SIG CUTOFF SWITCH CS-A1/SP-A IN EMERGENCY STANDBY
 - 86A1/CRHS
 - 86A1/VIAS

- c.
 - 86B/CRHS
 - 86B/VIAS

- d.
 - 86B/CRHS
 - CHAN "B" DERIVED SIG CUTOFF SWITCH CS-B1/SP-B IN EMERGENCY STANDBY
 - 86B1/CRHS
 - 86B1/VIAS



Attachment 1 - Automatic Waste Gas Release

PREREQUISITES (continued)

(✓) INITIALS

NOTE

The radiation monitor is considered inoperable during the Check Source. Remaining stationed at the monitor AND ensuring the monitor returns to normal before leaving the area administratively replaces the log entry.

5. Perform Check Source on all operational Auxiliary Building Exhaust Stack Noble Gas Radiation Monitors (RM-062 and/or RM-052).

- RM-062
- RM-052

✓
✓

6. Verify all operational Auxiliary Building Exhaust Stack Noble Gas Radiation Monitors (RM-062 and/or RM-052) Alert and High Alarm Setpoints are per TBD-IV.7.

✓

7. Attachment 4 of OI-WDG-2 has been completed within the previous 90 days.

✓

NOTE

The most recently completed Checklist, OI-WDG-1-CL-B, with deviations maintained on file, may be used for alignment verification.

8. Waste Gas Disposal System is aligned for normal operation per OI-WDG-1-CL-B.

✓

9. Verify the following recorders are operable:

- RR-049A, Process Radiation Monitor Recorder (AI-31E)
- FR-758, Stack Total Flowrate Recorder (AI-44)
- FR-532, Waste Gas Release Rate Recorder (AI-100)

✓
✓
✓

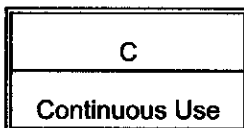
10. IF one or more of the recorders is inoperable or a manual release through the orifice is used,
THEN take applicable readings per ODCM on FC-213, Gas Discharge Log.

N/A

11. Record the maximum release flowrate specified in the Waste Decay Tank Release Permit, FC-213:

550 SCFH

✓



Attachment 1 - Automatic Waste Gas Release

PREREQUISITES (continued)

(✓) INITIALS

NOTE

If FIC-532 is in AUTO and the Release Flow Rate exceeds the FIC-532 Set point by 30 SCFH, FIC-532 will automatically close Waste Gas Flow Control Valves FCV-532A, FCV-532B, FCV-532C, and the HIGH DEVIATION FROM SET POINT alarm will be displayed on the controller.

CAUTION

To prevent exceeding the Maximum Release Rate specified in FC-213, the FIC-532 Set point should be set at least 30 SCFH below the Maximum Release Rate.

12. Record the recommended release flowrate:

530 SCFH

✓

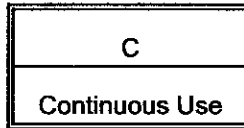
13. Authorization has been given to perform a Waste Gas Decay Tank Release.

Shift Mgr

14. At least one of the following conditions is met:

- Condenser Evacuation is in service per OI-CE-1
- VA-412, Condenser Evacuation Stack Discharge Isolation Valve, is closed

15. Ensure the Δp readings from VA-82 are logged on Table 1 every three hours for the duration of the release.



Attachment 1 - Automatic Waste Gas Release

PROCEDURE

(✓) INITIALS

1. Record the following information:

Permit No. _____

WGDT to be released:

- WD-29A
- WD-29B
- WD-29C
- WD-29D

2. Complete Checklist OI-WDG-2-CL-A.

3. Unlock and open the following Gas Release Header Isolation Valves (Rm 16):

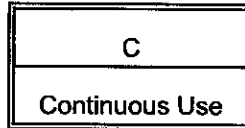
- WD-150, Gas Decay Tanks WD-29A, B, C & D Gas Release Header Isolation Valve
- WD-167, Waste Gas Decay Tanks WD-29A, B, C & D Gas Release Header Isolation Vlv

4. Place FR-532, Waste Gas Release Flow Recorder, Chart Drive Switch in ON.

NOTE

When FIC-532 is in MANUAL, the Setpoint indication will automatically track the Process Variable to ensure a bumpless transfer.

5. Ensure FIC-532 is in MANUAL (Display indicates ME) and zero Output is indicated on the Bar Graph and digital displays (AI-100).



Attachment 1 - Automatic Waste Gas Release

PROCEDURE (continued)

(✓) INITIALS

NOTE

Since there is no flow at this time, A50/A-4, WASTE GAS RELEASE THRU FCV-532C HI-LO Annunciator will alarm when HC-532 is placed in AUTO.

6. Place HC-532, Waste Gas Release Control Switch, in AUTO and verify the following:

- FCV-532C opens (Red Light on) (AI-100)
- FCV-532A remains closed (Green Light on) (AI-100)
- A50/A-4, WASTE GAS RELEASE THRU FCV-532C HI - LO Annunciator is in alarm (AI-100)
- FCV-532B remains closed (Rm 16)

NOTE

If the selected WGDT Outlet to Gas Release Header is opened too fast, FIC-532 will not stabilize (AI-100).

7. Slowly open the selected WGDT Outlet to Gas Release Header Valve (Rm 16):

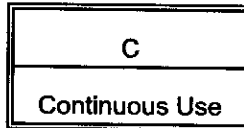
- WD-132, Gas Decay Tank WD-29A Outlet Valve
- WD-143, Gas Decay Tank WD-29B Outlet Valve
- WD-163, Gas Decay Tank WD-29C Outlet Valve
- WD-177, Gas Decay Tank WD-29D Outlet Valve

8. Record the Date, Start Time and Permit No. on the following:

- RR-049A, Process Radiation Monitor Recorder (AI-31E)
- FR-758, Stack Total Flowrate Recorder (AI-44)
- FR-532, Waste Gas Release Rate Recorder (AI-100)
- Control Room Log

9. Depress F1 or F2, as necessary, to display TOTAL CU FT on FIC-532 (Refer to Figure 1 for pushbutton location).

10. Record Start Data on Table 2.



Attachment 1 - Automatic Waste Gas Release

PROCEDURE (continued)

(✓) INITIALS

11. Depress F1 or F2, as necessary, to display FIC-532 on FIC-532
(Refer to Figure 1).

NOTE

Since FT-532 is a high accuracy flow transmitter, flow indications on FR-532 and FIC-532 will oscillate when FCV-532A is first moved off its closed seat and during low flow conditions. Flow indication oscillations should be allowed to dampen between each step change increase.

CAUTION

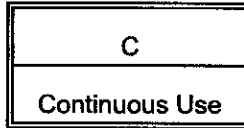
Automatic functions are bypassed when controller is in MANUAL.

12. Slowly increase the Manual Output using the Right Arrow Key (-) on FIC-532 until flow indication increases on FR-532 and FIC-532.
13. Verify the Set point is tracking the Process Variable on FIC-532 (AI-100).

NOTE

Step 14 need not be completed prior to performance of subsequent steps.

14. IF FIC-532 flow indication goes to full-scale during the release,
THEN perform the following:
- Place HC-532, Waste Gas Release Control Switch, in CLOSE to immediately terminate the Release
 - Verify flow indicator is over the reference mark, ensuring the magnetic coupling on the flow transmitter was not misaligned during the rapid process change
 - If not over the reference mark, contact I&C



Attachment 1 - Automatic Waste Gas Release

PROCEDURE (continued)

(✓) INITIALS

CAUTION

To prevent exceeding the Maximum Release Flowrate specified in FC-213, Waste Gas Release Permit, the FIC-532 Set point should be set at least 30 SCFH below the Maximum Release Flowrate not to exceed the recommended release flowrate.

15. Adjust Waste Gas Release Flow Rate in step changes using Manual Left/Right Arrow Keys (←, →) on FIC-532 until the desired Release Flowrate is reached.
-

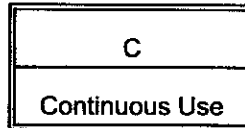
NOTE

The flowrate should be maintained at least 5 SCFH below the recommended release flowrate. This controller has a +/- 5 SCFH dead band. If the flowrate goes outside the dead band, the controller will adjust the valve output signal accordingly.

CAUTION

If FIC-532 is in AUTO and the Release Flow Rate exceeds the FIC-532 Set point by 30 SCFH, FIC-532 will automatically close Waste Gas Flow Control Valves FCV-532A, FCV-532B, FCV-532C, and the HIGH DEVIATION FROM SET POINT alarm will be displayed on the controller.

16. WHEN desired Gas Release Flow Rate is stable on FR-532 and FIC-532, THEN place FIC-532 in AUTOMATIC by depressing the Auto/Manual pushbutton (AI-100).
-
17. IF adjustments to flow are needed while FIC-532 is in AUTO, THEN carefully use the Set point Up/Down Arrow Keys (↑, ↓) on FIC-532 until the desired Release flowrate is reached.
-



Attachment 1 - Automatic Waste Gas Release

PROCEDURE (continued)

(✓) INITIALS

NOTE

When the selected WGDT is reduced to approximately 2.0 psig, A50/A-4, WASTE GAS RELEASE THRU FCV-532C HI - LO Annunciator will alarm (AI-100).

18. WHEN the selected WGDT has dropped to approximately 2.0 psig or as directed by the Shift Manager,
THEN complete the following (AI-100):

- a. Place HC-532 in CLOSE. _____
- b. Place FIC-532 in MANUAL by depressing the Auto/Manual pushbutton. _____
- c. Adjust waste gas flowrate to zero using the manual Left/Right arrow keys (←,→) on FIC-532. _____

19. Verify the following Gas Release Control Valves are closed:

- FCV-532A (AI-100) _____
- FCV-532C (AI-100) _____
- FCV-532B (Room 16) _____

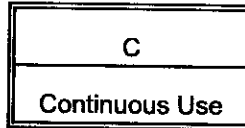
20. Record the Date, Termination Time and Permit No. on the following:

- RR-049A, Process Radiation Monitor Recorder (AI-31E) _____
- FR-758, Stack Total Flowrate Recorder (AI-44) _____
- FR-532, Waste Gas Release Rate Recorder (AI-100) _____
- Control Room Log _____

21. Record Stop Data on Table 2. _____

22. Close the selected WGDT Outlet to Gas Release Header Valve (Rm 16):

- WD-132, WD-29A _____
- WD-143, WD-29B _____
- WD-163, WD-29C _____
- WD-177, WD-29D _____



Attachment 1 - Automatic Waste Gas Release

PROCEDURE (continued)

(✓) INITIALS

23. Close and lock the following Gas Release Header Isolation Valves (Rm 16):

- WD-150
- WD-167

Ind Verif

24. Open the selected WGDT Drain Valve (Rm16):

- WD-136, Gas Decay Tank WD-29A Drain Valve
- WD-149, Gas Decay Tank WD-29B Drain Valve
- WD-169, Gas Decay Tank WD-29C Drain Valve
- WD-180, Gas Decay Tank WD-29D Drain Valve

25. Slowly open WD-181, Gas Decay Tanks WD-29A,B,C&D Drain Header Outlet (Rm16).

26. When no water is observed flowing by FI-531, Flow Indicator (Rm 16), close WD-181.

27. Close the selected WGDT Drain Valve (Rm16):

- WD-136, Gas Decay Tank WD-29A Drain Valve
- WD-149, Gas Decay Tank WD-29B Drain Valve
- WD-169, Gas Decay Tank WD-29C Drain Valve
- WD-180, Gas Decay Tank WD-29D Drain Valve

28. Place FR-532, Waste Gas Release Flow Recorder, Chart Drive Switch in OFF.

29. Attach the completed OI-WDG-2 and this attachment to FC-213.

30. Complete FC-213.

Completed by _____ Date/Time _____ / _____

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-SRO-EP-1

JPM Title: Emergency Classification and PARs

Approximate Time: 15 minutes

Actual Time: _____

Reference(s): EPIP-OSC-1 R37
EPIP-EOF-7 R15

JPM Prepared by: Jerry Koske Date: 05/15/05

JPM Reviewed by: _____ Date: _____

JPM Approved by: _____ Date: _____

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-SRO-EP-1

JPM Title: Emergency Classification and PARs

Operators' Name: _____ Employee # _____

All Critical Steps (shaded) must be performed or simulated in accordance
with the standards contained in this JPM

The Operator's performance was evaluated as (circle one):

SATISFACTORY

UNSATISFACTORY

Evaluator's Signature: _____ Date: _____

Reason, if unsatisfactory:

Tools & Equipment: None

Safety Considerations: None

Comments:

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-SRO-EP-1

JPM Title: Emergency Classification and PARs

INITIATING CUE: The plant is shutdown following a steam generator tube rupture. The ruptured steam generator has been isolated. All safeguards equipment operated as designed. One RCP is operating in each loop. The primary to secondary leakage rate is 54 gpm. RCS Dose equivalent Iodine-131 is 200 uCi/g. 100°F subcooling is indicated on all CETs and RCS RTDs.

The meteorological indications are as follows:

- Indicated 10m wind speed – 17 mph, 14 mph
- Indicated wind direction – 330°, 330°
- Indicated ΔT is -1.7°C/100m, -1.4°C/100m
- It is raining, 0.9 inches daily total

You are directed to enter the Emergency Plan, classify the event and determine offsite Protective Action Recommendations.

Complete page 1 of form FC-1188.

Critical Steps shown in gray

STEP	ELEMENT	STANDARD
1	Refer to Emergency Plan	Refer to EPIP-OSC-1
2	Classify the event	<p>The event should be classified as a Site Area Emergency per EAL 1.13 (Failure/Challenge to two fission product barriers) on form FC-1188.</p> <p>Note: Attachment 6.3 indicates that the fuel cladding barrier has failed due to the high DEI (F1) and the reactor coolant system has failed due to the leakage rate (R1)</p>

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-SRO-EP-1

JPM Title: Emergency Classification and PARs

STEP	ELEMENT	STANDARD
3	Determine Protective Action Recommendations	Refer to EPIP-EOF-7 and determine that there are no PARs for this situation. Document on form FC-1188

Termination Criteria: The event has been classified. PARS have been determined and FC-1188 has been completed.

Fort Calhoun Station – Operations Training
ADMINISTRATIVE JOB PERFORMANCE MEASURE

JPM No: AJPM-SRO-EP-1

INITIATING CUE: The plant is shutdown following a steam generator tube rupture. The ruptured steam generator has been isolated. All safeguards equipment operated as designed. One RCP is operating in each loop. The primary to secondary leakage rate is 54 gpm. RCS Dose equivalent Iodine-131 is 200 uCi/g. 100°F subcooling is indicated on all CETs and RCS RTDs.

The meteorological indications are as follows:

- Indicated 10m wind speed – 17 mph, 14 mph
- Indicated wind direction – 330°, 330°
- Indicated ΔT is -1.7°C/100m, -1.4°C/100m
- It is raining, 0.9 inches daily total

You are directed to enter the Emergency Plan, classify the event and determine offsite Protective Action Recommendations.

Complete page 1 of form FC-1188.

FORT CALHOUN STATION – EMERGENCY NOTIFICATION FORM

Off-Site Contact Time:	Person Making Off-Site Report:	Contactor's Call Back #:
THE COMMAND AND CONTROL POSITION MUST: Ensure initiation and completion of the FC-1188 form, but may obtain assistance from other personnel as needed. Ensure that all offsite notifications are performed as required.		
1. <input type="checkbox"/> Initial Declaration – for Initial declaration of any emergency classification <input type="checkbox"/> Hourly – When completing Hourly updates, one hour from time of the most recent event notification and on an hourly basis until event termination. <input type="checkbox"/> PAR Change – Any change in Protective Action Recommendations (PARs) and a new classification is not being declared. <input type="checkbox"/> Termination		
Classification: <input type="checkbox"/> NOUE <input type="checkbox"/> Alert <input type="checkbox"/> Site Area <input type="checkbox"/> General		EAL #:
Time Event Declared:		Time Event Terminated:
2. Wind From Degrees (10m):	Weather Wind Speed MPH (Use Slowest 10m):	Precipitation: <input type="checkbox"/> Yes <input type="checkbox"/> No
Stability Class _____ <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/> F <input type="checkbox"/> G+ (use most positive ΔT) ≤ -1.9 >-1.9 to ≤ -1.7 >-1.7 to ≤ -1.5 >-1.5 to ≤ -0.5 >-0.5 to ≤ 1.5 >1.5 to ≤ 4.0 > 4.0		
3. There <input type="checkbox"/> is <input type="checkbox"/> no release of radioactive effluent to the <input type="checkbox"/> was <input type="checkbox"/> an airborne environment that is the result of or <input type="checkbox"/> will be <input type="checkbox"/> a liquid associated with this event		
4. Protective Action Recommendations (PARs) <u>OPPD General Emergency Automatic PAR</u> = Evacuate 2 mile radius Review EPIP-EOF-7 for additional guidance on PARs		
	None	Evacuate Sectors
0-2 Miles		Shelter Sectors
2-5 Miles		
5-10 Miles		
5. Prognosis <input type="checkbox"/> Stable <input type="checkbox"/> Unstable		Plant Status <input type="checkbox"/> at Power <input type="checkbox"/> Shutdown
6. Remarks		
Approved:	Date:	Time:

FORT CALHOUN STATION
GENERAL FORM

FC-1188
R18

Notify the following agencies: (refer to Emergency Phone Book for alternate phone numbers)	✓	Name of contact (optional)
State of Iowa		
State of Nebraska		
Harrison County		
Pottawattamie County		
Washington County		
Record any comments, difficulties or observations you had while making this notification		

FORT CALHOUN STATION
GENERAL FORMFC-1188
R18

FORT CALHOUN STATION – EMERGENCY NOTIFICATION FORM

Off-Site Contact Time:	Person Making Off-Site Report:	Contactor's Call Back #:
<p>THE COMMAND AND CONTROL POSITION MUST: Ensure initiation and completion of the FC-1188 form, but may obtain assistance from other personnel as needed. Ensure that all offsite notifications are performed as required.</p>		
<p>1. <input checked="" type="checkbox"/> Initial Declaration – for <u>Initial</u> declaration of any emergency classification <input type="checkbox"/> Hourly – When completing <u>Hourly</u> updates, one hour from time of the most recent event notification and on an hourly basis until event termination. <input type="checkbox"/> PAR Change – <u>Any</u> change in Protective Action Recommendations (PARs) and a new classification is not being declared. <input type="checkbox"/> Termination</p>		
Classification: <input type="checkbox"/> NOUE <input type="checkbox"/> Alert <input checked="" type="checkbox"/> Site Area <input type="checkbox"/> General		EAL #: <u>1.13</u>
Time Event Declared:		Time Event Terminated:
2. Wind From Degrees (10m): <u>330</u>	Weather Wind Speed MPH (Use Slowest 10m): <u>14</u>	Precipitation: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Stability Class <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/> F <input type="checkbox"/> G+ (use most positive ΔT) ≤ -1.9 > -1.9 to ≤ -1.7 > -1.7 to ≤ -1.5 > -1.5 to ≤ -0.5 > -0.5 to ≤ 1.5 > 1.5 to ≤ 4.0 > 4.0		
3. There <input checked="" type="checkbox"/> is <input checked="" type="checkbox"/> no release of radioactive effluent to the environment that is the result of or associated with this event <input type="checkbox"/> was <input type="checkbox"/> an airborne <input type="checkbox"/> will be <input type="checkbox"/> a liquid		
4. Protective Action Recommendations (PARs) OPPD General Emergency Automatic PAR = Evacuate 2 mile radius Review EPIP-EOF-7 for additional guidance on PARs		
	None	Evacuate Sectors
0-2 Miles	<input checked="" type="checkbox"/>	
2-5 Miles	<input checked="" type="checkbox"/>	
5-10 Miles	<input checked="" type="checkbox"/>	
5. Prognosis <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Unstable		Plant Status <input type="checkbox"/> at Power <input checked="" type="checkbox"/> Shutdown
6. Remarks		
Approved:	Date:	Time:

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0329

JPM Title: Fill Safety Injection Tanks

Location: Simulator

Approximate Time: 18 minutes Actual Time: _____

Reference(s): OI-SI-1 , R77
NRC K/A 006000 A3.01 (RO 4.0 / SRO 3.9)

JPM Prepared by: Jerry Koske Date: 05/04/05

JPM Reviewed by: _____ Date: _____

JPM Approved by: _____ Date: _____

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0329

JPM Title: Fill Safety Injection Tanks

Operators' Name: _____ Employee # _____

All Critical Steps (shaded) must be performed or simulated in accordance with the standards contained in this JPM

The Operator's performance was evaluated as (circle one):

SATISFACTORY

UNSATISFACTORY

Evaluator's Signature: _____ Date: _____

Reason, if unsatisfactory:

Tools & Equipment: Key for HCV-2928

Safety Considerations: None

Comments: Run MFP SIS05A 5% until alarm comes in

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0329

JPM Title: Fill Safety Injection Tanks

INITIATING CUE: You have been directed to fill only SI-6A to 72% using HPSI pump SI-2A, HCV-312 and PCV-2909. Flushing of SI tank fill and drain lines is not required. Recirculation with all leakage cooler valves closed is desired. All prerequisites are met.

START

Critical Steps shown in gray

STEP	ELEMENT	STANDARD
1 (1)	Ensure SIRWT Tank Recirculation Valves are open: <ul style="list-style-type: none">HCV-385HCV-386	<u>AI-30A</u> Valve OPEN and RED light lit. <u>AI-30B</u> Valve OPEN and RED light lit.
2 (2)	Ensure HCV-2983, SI Check valve leakage Header CVCS Isolation valve is closed	<u>AI-30A</u> GREEN light lit
3 (3.a.1)	Place the selected leakage cooler discharge valves in manual: <ul style="list-style-type: none">PCV-2929PCV-2909PCV-2949PCV-2969	<u>AI-30A</u> PCV-2949 CS to MANUAL AMBER light OFF PCV-2909 CS to MANUAL AMBER light OFF <u>AI-30B</u> PCV-2929 CS to MANUAL AMBER light OFF PCV-2969 CS to MANUAL AMBER light OFF

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0329

JPM Title: Fill Safety Injection Tanks

STEP	ELEMENT	STANDARD
4 (3.a.2)	Close the leakage cooler discharge valve controller(s): <ul style="list-style-type: none"> • PCV-2929 • PCV-2909 • PCV-2949 • PCV-2969 	<u>AI-30A</u> PCV-2949 POT to 100% output, GREEN light lit PCV-2909 POT to 100% output, GREEN light lit <u>AI-30B</u> PCV-2929 POT to 100% output, GREEN light lit PCV-2969 POT to 100% output, GREEN light lit
5 (3.b)	Start SI-2A	<u>AI-30A</u> SI-2A CS to START and RED light lit Verify amps return to normal after start
6 (3.c)	Recirculate for 15 minutes	CUE: 15 minutes have elapsed
7 (5.a)	Open HCV-545	<u>CB-1,2,3</u> HCV-545 CS to OPEN, RED light lit
8 (5.b)	Open HCV-312	<u>AI-30B</u> HCV-312 CS held to OPEN until RED light lit
9 (5.c.2)	Throttle open PCV-2909	<u>AI-30A</u> Adjust POT to throttle open
10 (6)	Open SI Tank Drain valve, HCV-2916	<u>CB-1,2,3</u> HCV-2916 CS to OPEN, RED light lit
11 (7)	Close HCV-545	<u>CB-1,2,3</u> HCV-545 CS to CLOSE,

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0329

JPM Title: Fill Safety Injection Tanks

STEP	ELEMENT	STANDARD
		GREEN light lit
12 (10)	When SI-6C level = 72%: Close PCV-2909	Note: PCV-2909 should be closed before HCV-2916 because HCV-2916 is the last SIT drain valve open <u>AI-30A</u> PCV-2909 POT to 100% output, GREEN light lit
13 (11)	Close HCV-2916	<u>CB-1,2,3</u> HCV-2916 CS to CLOSE, GREEN light lit
14 (12)	Close HCV-312	<u>AI-30B</u> HCV-312 CS held to CLOSE until GREEN light lit
15 (13)	Stop SI-2A	<u>AI-30A</u> SI-2A CS to STOP and GREEN light lit, GREEN Flag
16 (14)	Open HCV-545	<u>CB-1,2,3</u> HCV-545 CS to OPEN, RED light lit
17 (15)	Lower leakage cooler pressure to less than 350 psig by cracking open PCV-2949	<u>AI-30A</u> Adjust POT to throttle open until pressure less than 350 psig on PIC-2949
18 (16.a)	Throttle closed PCV-2909	<u>AI-30A</u> PCV-2909 POT to 100% output, GREEN light lit
19 (16.b)	Place PCV-2909 in AUTO	<u>AI-30A</u> Momentarily place PCV-2909 CS in OVERRIDE and return to

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0329

JPM Title: Fill Safety Injection Tanks

STEP	ELEMENT	STANDARD
		AUTO, AMBER light lit
20 (17)	Close HCV-545	<u>CB-1,2,3</u> HCV-545 CS to CLOSE, GREEN light lit
21 (18)	Ensure the leakage cooler discharge valve controllers are in AUTO <ul style="list-style-type: none"> • PCV-2929 • PCV-2909 • PCV-2949 • PCV-2969 	<u>AI-30A</u> Momentarily place PCV-2949 CS in OVERRIDE and return to AUTO, AMBER light lit Verify PCV-2909 is in AUTO, AMBER light lit <u>AI-30B</u> Momentarily place PCV-2929 CS in OVERRIDE and return to AUTO, AMBER light lit Momentarily place PCV-2969 CS in OVERRIDE and return to AUTO, AMBER light lit
22 (19)	Verify Operability of all HPSI loop injection valves by confirming amber light is on: <ul style="list-style-type: none"> • HCV-314 • HCV-315 • HCV-311 • HCV-312 • HCV-317 • HCV-318 • HCV-320 • HCV-321 	<u>AI-30A</u> AMBER lights on for: <ul style="list-style-type: none"> • HCV-317 • HCV-314 • HCV-320 • HCV-311 <u>AI-30B</u> AMBER lights on for: <ul style="list-style-type: none"> • HCV-315 • HCV-318 • HCV-312 • HCV-321

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0329

JPM Title: Fill Safety Injection Tanks

STEP	ELEMENT	STANDARD
23 (20.b)	When both HPSI header pressures are between 250 psig and 140 psig:	CUE: HPSI header pressures are 200 psig. Tech Spec logging is being performed by another operator
	Close HCV-2928	Provide key for HCV-2928 <u>AI-128A</u> Place key in HCV-2928 CS and turn to Close position, GREEN light lit
24 (20.c)	Open HCV-2928	<u>AI-128A</u> Place HCV-2928 CS in OPEN position, RED light lit, Remove key <u>AI-30A</u> Reset and acknowledge "SI Pumps Valves Off-Normal Alarm"
25 (20.d)	Verify HPSI header pressures: <ul style="list-style-type: none">• HPSI header #1 approximately 0 psig• HPSI Header #2 approximately 250 psig	<u>AI-30A</u> CUE: PI-309 indicates 0 psig <u>AI-30B</u> CUE: PI-310 indicates 250 psig

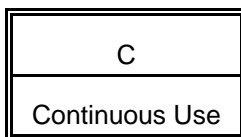
Termination Criteria: SI Tank SI-6A has been filled. HPSI pumps and valves have been restored to normal.

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0329

INITIATING CUE: You have been directed to fill only SI-6A to 72% using HPSI pump SI-2A, HCV-312 and PCV-2909. Flushing of SI tank fill and drain lines is not required. Recirculation with all leakage cooler valves closed is desired. All prerequisites are met.

START



Attachment 4 - Filling SI Tank(s) Using HPSI Pumps

PROCEDURE (continued)

(✓) INITIALS

NOTES

1. If successive fills are going to be performed:
 - Successive fill operations must not last longer than four hours
 - Recirculation is only required to be performed once for each suction header
2. Recirculation is not required if flushing is performed.
3. Recirculation may be N/A'd if filling Safety Injection Tanks to clear Technical Specification 2.3(2)f LCO.

3. IF recirculation is desired,
THEN complete the following:

a. IF it is desired to manually close leakage cooler discharge valve(s),
THEN complete the following:

1) Place the selected leakage cooler discharge valve(s) in MANUAL:

- PCV-2929, Leakage Clr SI-4B Discharge Valve
- PCV-2909, Leakage Clr SI-4A Discharge Valve
- PCV-2949, Leakage Clr SI-4C Discharge Valve
- PCV-2969, Leakage Clr SI-4D Discharge Valve

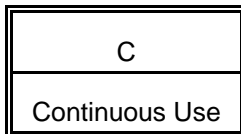
2) Close the leakage cooler discharge valve controller(s):

- PCV-2929, Leakage Clr SI-4B Disch Vlv Cntrlr
- PCV-2909, Leakage Clr SI-4A Disch Vlv Cntrlr
- PCV-2949, Leakage Clr SI-4C Disch Vlv Cntrlr
- PCV-2969, Leakage Clr SI-4D Disch Vlv Cntrlr

b. Start one of the following HPSI Pumps:

- SI-2A
- SI-2B
- SI-2C

c. Recirculate the HPSI through the minimum flow lines for 15 minutes.



Attachment 4 - Filling SI Tank(s) Using HPSI Pumps

PROCEDURE (continued)

(✓) INITIALS

3 d. IF no other evolutions are desired,
THEN complete the following:

1) Stop the running HPSI Pump:

- SI-2A
- SI-2B
- SI-2C

2) Ensure the selected Leakage Cooler Discharge Valve Controller(s)
in CLOSE:

- PCV-2929
- PCV-2909
- PCV-2949
- PCV-2969

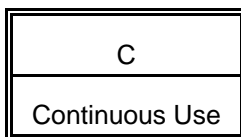
3) Ensure the selected Leakage Cooler Discharge Valve(s) control
switch(es) in AUTO:

- PCV-2929
- PCV-2909
- PCV-2949
- PCV-2969

4) Ensure the Leakage Cooler Discharge Valve Controller(s) are in
AUTO by checking the amber light is on. If amber light is not on,
momentarily place hand control switch in OVERRIDE position to
reset the AUTO circuitry:

- PCV-2929
- PCV-2909
- PCV-2949
- PCV-2969

5) GO TO Step 20.



Attachment 4 - Filling SI Tank(s) Using HPSI Pumps

PROCEDURE (continued)

(✓) INITIALS

4. IF flushing is desired,
THEN complete the following: (AI-30A/B)

NOTE

Opening HCV-545 prevents lifting SI-222.

- a. Open HCV-545, SIRWT/Lkg Hdr to RCDT Isolation Valve. (CB-1,2,3) _____

- b. Open the loop injection valve for each safety injection tank line to be used:

- HCV-314, Loop 1A HPSI Injection Valve _____
- HCV-315, Loop 1A HPSI Injection Valve _____
- HCV-311, Loop 1B HPSI Injection Valve _____
- HCV-312, Loop 1B HPSI Injection Valve _____
- HCV-317, Loop 2A HPSI Injection Valve _____
- HCV-318, Loop 2A HPSI Injection Valve _____
- HCV-320, Loop 2B HPSI Injection Valve _____
- HCV-321, Loop 2B HPSI Injection Valve _____

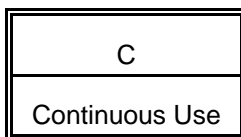
NOTE

At a minimum the leakage CLR discharge valve(s) for the associated HPSI loop injection valve(s) opened in Step 4.b will be opened.

- c. Open/close the desired leakage CLR discharge valve(s) as follows (AI-30A/B):

- 1) IF in AUTO,
THEN place the selected leakage cooler discharge valve(s) in
MANUAL:

- PCV-2929, Leakage Clr SI-4B Discharge Valve _____
- PCV-2909, Leakage Clr SI-4A Discharge Valve _____
- PCV-2949, Leakage Clr SI-4C Discharge Valve _____
- PCV-2969, Leakage Clr SI-4D Discharge Valve _____



Attachment 4 - Filling SI Tank(s) Using HPSI Pumps

PROCEDURE (continued)

(✓) INITIALS

CAUTION

Throttling of leakage cooler PCVs may be required to prevent HPSI Pump runout and limit flow to RCDT from SI-222, Safety Injection Tanks SI-6A/B/C/D Fill/Drain Line Relief Valve.

- 4.c 2) Throttle the selected leakage cooler discharge valve controller(s) open/closed as desired to flush the fill and drain lines:

- PCV-2929, Leakage Clr SI-4B Disch Vlv Cntrlr
- PCV-2909, Leakage Clr SI-4A Disch Vlv Cntrlr
- PCV-2949, Leakage Clr SI-4C Disch Vlv Cntrlr
- PCV-2969, Leakage Clr SI-4D Disch Vlv Cntrlr

NOTE

Flush duration is determined by the Shift Manager.

- d. Ensure the desired HPSI pump is running:

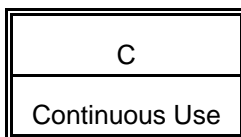
- SI-2A
- SI-2B
- SI-2C

5. IF flushing is not desired,
THEN complete the following: (AI-30A/B)

NOTE

Opening HCV-545 prevents lifting SI-222.

- a. IF a HPSI Pump is running,
THEN open HCV-545, SIRWT/Lkg Hdr to RCDT Isolation Valve.
(CB-1,2,3)



Attachment 4 - Filling SI Tank(s) Using HPSI Pumps

PROCEDURE (continued)

(✓) INITIALS

5 b. Open one or more of the following valves:

- HCV-314, Loop 1A HPSI Injection Valve
- HCV-315, Loop 1A HPSI Injection Valve
- HCV-311, Loop 1B HPSI Injection Valve
- HCV-312, Loop 1B HPSI Injection Valve
- HCV-317, Loop 2A HPSI Injection Valve
- HCV-318, Loop 2A HPSI Injection Valve
- HCV-320, Loop 2B HPSI Injection Valve
- HCV-321, Loop 2B HPSI Injection Valve

NOTE

At a minimum the leakage CLR discharge valve(s) for the associated HPSI loop injection valve(s) opened in Step 5.b will be opened.

c. Open/close the desired leakage cooler discharge valve(s) as follows:

1) IF in AUTO,
THEN place the selected leakage cooler discharge valve(s) in
MANUAL:

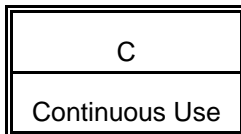
- PCV-2929, Leakage Clr SI-4B Discharge Valve
- PCV-2909, Leakage Clr SI-4A Discharge Valve
- PCV-2949, Leakage Clr SI-4C Discharge Valve
- PCV-2969, Leakage Clr SI-4D Discharge Valve

CAUTION

Throttling of the leakage cooler PCVs may be required to prevent HPSI pump runout and limit flow to RCDT from SI-222, Safety Injection Tanks SI-6A/B/C/D Fill /Drain Line Relief Valve.

2) Throttle the selected leakage cooler discharge valve controller(s) open/closed as desired:

- PCV-2929, Leakage Clr SI-4B Disch Vlv Cntrlr
- PCV-2909, Leakage Clr SI-4A Disch Vlv Cntrlr
- PCV-2949, Leakage Clr SI-4C Disch Vlv Cntrlr
- PCV-2969, Leakage Clr SI-4D Disch Vlv Cntrlr



Attachment 4 - Filling SI Tank(s) Using HPSI Pumps

PROCEDURE (continued)

(✓) INITIALS

NOTE

More than one tank at a time may be filled through one leakage control valve.

6. Open the SI Tank Drain Valve(s) for the tank(s) to be filled: (CB-1,2,3):

- HCV-2916, SI-6A
- HCV-2936, SI-6B
- HCV-2956, SI-6C
- HCV-2976, SI-6D

7. Ensure that HCV-545 is closed.

8. Ensure the desired HPSI pump is running:

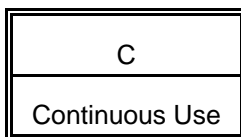
- SI-2A
- SI-2B
- SI-2C

CAUTION

To prevent lifting Relief Valve SI-222, the drain valve on the last SI tank to be filled must remain open until the Leakage Cooler Discharge Valve Controllers are in CLOSE per Step 10.

9. WHEN the desired level is reached in an SI Tank,
THEN close the Drain Valve for that tank:

- HCV-2916, SI-6A
- HCV-2936, SI-6B
- HCV-2956, SI-6C
- HCV-2976, SI-6D



Attachment 4 - Filling SI Tank(s) Using HPSI Pumps

PROCEDURE (continued)

(✓) INITIALS

NOTE

The following Step may be N/Aed if plant conditions require the valve to remain in MANUAL as determined by Shift Manager.

10. WHEN the desired level is reached in the last SI Tank,
THEN place the opened Leakage Cooler Discharge Valve Controller(s) in
CLOSE:

- PCV-2929
- PCV-2909
- PCV-2949
- PCV-2969

11. Close the last SI tank drain valve.

12. Close the HPSI loop injection valve(s) opened in Step 4.b or 5.b:

- HCV-314, Loop 1A HPSI Injection Valve
- HCV-315, Loop 1A HPSI Injection Valve
- HCV-311, Loop 1B HPSI Injection Valve
- HCV-312, Loop 1B HPSI Injection Valve
- HCV-317, Loop 2A HPSI Injection Valve
- HCV-318, Loop 2A HPSI Injection Valve
- HCV-320, Loop 2B HPSI Injection Valve
- HCV-321, Loop 2B HPSI Injection Valve

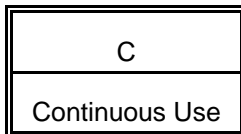
13. Stop the running HPSI Pump:

- SI-2A
- SI-2B
- SI-2C

NOTE

Steps 14 thru 17 may be N/A'd if plant conditions require the valve to remain in MANUAL as determined by Shift Manager.

14. Open HCV-545, SIRWT/Lkg Hdr to RCDT Isolation Valve.



Attachment 4 - Filling SI Tank(s) Using HPSI Pumps

PROCEDURE (continued)

(✓) INITIALS

15. Lower Leakage Cooler Pressure to less than 350 psig by cracking open the selected Leakage Cooler Discharge Valve Controller:

- PCV-2929
- PCV-2909
- PCV-2949
- PCV-2969

16. WHEN pressure on the selected leakage Clr Indicator is below 350 psig, THEN close the associated SI tank valves as follows (AI-30A/B):

a. Throttled closed the selected Leakage Cooler Discharge Valve Controller(s):

- PCV-2929
- PCV-2909
- PCV-2949
- PCV-2969

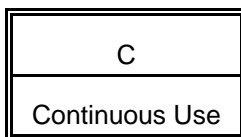
b. Place the selected Leakage Cooler Discharge Valve in AUTO:

- PCV-2929
- PCV-2909
- PCV-2949
- PCV-2969

17. Close HCV-545.

18. Ensure the Leakage Cooler Discharge Valve Controller(s) are in AUTO by checking the amber light is on. If amber light is not on, momentarily place hand control switch in OVERRIDE position to reset the AUTO circuitry:

- PCV-2929
- PCV-2909
- PCV-2949
- PCV-2969



Attachment 4 - Filling SI Tank(s) Using HPSI Pumps

PROCEDURE (continued)

(✓) INITIALS

19. Verify operability of all HPSI loop injection valves opened by confirming the amber light is on for each valve:

- HCV-314, Loop 1A HPSI Injection Valve
- HCV-315, Loop 1A HPSI Injection Valve
- HCV-311, Loop 1B HPSI Injection Valve
- HCV-312, Loop 1B HPSI Injection Valve
- HCV-317, Loop 2A HPSI Injection Valve
- HCV-318, Loop 2A HPSI Injection Valve
- HCV-320, Loop 2B HPSI Injection Valve
- HCV-321, Loop 2B HPSI Injection Valve

20. WHEN both HPSI header pressures have dropped back to between 250 psig and 140 psig following completion of SI Tank fill,
THEN perform the following:

- a. Close HCV-2928, HPSI Pump 2A Disch, observing all applicable Tech Spec LCO requirements regarding HPSI pump operability.
- b. WHEN HCV-2928 indicates closed,
THEN open HCV-2928.
- c. WHEN HCV-2928 has fully opened,
THEN restore SI-2A to operable status and log out of applicable Tech Spec LCOs.
- d. Verify HPSI Header #1 pressure drops to approximately 0 psig and HPSI Header #2 rises to approximately 250 psig.

Completed by _____ Date/Time: _____ / _____

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0718

JPM Title: Place a Containment Cooling Unit in Service

Location: Simulator

Approximate Time: 12 minutes Actual Time: _____

Reference(s): OI-VA-1, Attachment 2 R55
NRC K/A 022000 A4.01 (RO 3.6 / SRO 3.6)

JPM Prepared by: Jerry Koske Date: 05/05/05

JPM Reviewed by: _____ Date: _____

JPM Approved by: _____ Date: _____

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0718

JPM Title: Place a Containment Cooling Unit in Service

Operators' Name: _____ Employee # _____

All Critical Steps (shaded) must be performed or simulated in accordance with the standards contained in this JPM

The Operator's performance was evaluated as (circle one):

SATISFACTORY

UNSATISFACTORY

Evaluator's Signature: _____ Date: _____

Reason, if unsatisfactory:

Tools & Equipment: None

Safety Considerations: None

Comments:

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0718

JPM Title: Place a Containment Cooling Unit in Service

INITIATING CUE: You have been directed to place VA-7C and VA-8A in service.

All prerequisites are met.

START

Critical Steps shown in gray

STEP	ELEMENT	STANDARD
1. (1.a.1)	Open HCV-402B/D	<u>CB-1,2,3</u> Momentarily place HCV-402B/D in OPEN. Verify RED lights lit for both valves.
2 (1.a.2)	Ensure HCV-402C is closed	<u>CB-1,2,3</u> Ensure controller POT in closed position (100% output), GREEN light lit
3 (1.a.3)	Place HCV-402A/C in CIRC	<u>CB-1,2,3</u> Momentarily place HCV-402A/C in CIRC position and release HCV-402A RED light lit
4 (1.a.4)	Throttle open HCV-402C maintaining CCW discharge header pressure greater than or equal to 70 psig	<u>CB-1,2,3</u> Adjust POT for HCV-402C toward OPEN position. ENSURE pressure on PI-499 does not go below 70 psig.
5 (1.a.5)	Monitor the following parameters: <ul style="list-style-type: none">• VA-8A Flow• VA-8A Temperature• CCW Discharge Header	<u>CB-1,2,3</u> <ul style="list-style-type: none">• FI-418• TIC-422• PI-499

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0718

JPM Title: Place a Containment Cooling Unit in Service

STEP	ELEMENT	STANDARD
	Press	
	<ul style="list-style-type: none">• CCW Discharge Header Temp	<ul style="list-style-type: none">• TIC-2800
6 (1.b)	Start VA-7C	<u>AI-30A</u> VA-7C CS to AFTER-START (Red flag), RED light lit
7 (1.b)	Monitor Parameters: <ul style="list-style-type: none">• VA-7C amps	<u>AI-30A</u> <ul style="list-style-type: none">• VA-7C ammeter
	<ul style="list-style-type: none">• VA-7C DP• VA-7C cooling coil DP• VA-7C Outlet Temp	<u>AI-44</u> Monitor: <ul style="list-style-type: none">• PIC-702• PI-710• TI-719

Termination Criteria: VA-7C is running and CCW is being supplied to VA-8A

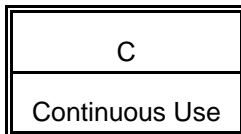
Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0718

INITIATING CUE: You have been directed to place VA-7C and VA-8A in service.

All prerequisites are met.

START



Attachment 2 - Containment Cooling Operation VA-7C & VA-7D

PREREQUISITES

(√) INITIALS

1. Procedure Revision Verification:

Revision No. _____ Date: _____

2. OI-VA-1-CL-A has been completed per OP-1.

3. IF Containment Cooling is desired,
THEN CCW is in service and at least one of the following Containment
Cooling Coils is operable:

- VA-8A _____
- VA-8B _____

4. Electrical power is available to the desired fan(s):

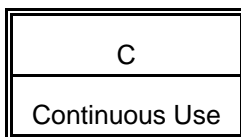
- VA-7C, Containment Air Cooling Fan, 1B3C-4C-3 _____
- VA-7D, Containment Air Cooling Fan, 1B3B-4B-4 _____

PROCEDURE

1. IF VA-7C, Cntmt Vent Fan, is to be started,
THEN perform the following:

- a. IF Containment Cooling is desired,
THEN initiate CCW to VA-8A as follows:

- 1) Momentarily place HCV-402B/D, Cntmt Clg Coil VA-8A AC Vlvs
Control SW to OPEN. _____
- 2) Ensure HCV-402C, Cntmt Clg Coil VA-8A Outlt Isol Vlv Cntrlr is
closed. _____
- 3) Momentarily place HCV-402A/C, Cntmt Clg Coil VA-8A Isol Vlvs
Control SW to CIRC. _____
- 4) Throttle open HCV-402C maintaining PI-499, CCW Discharge
Header Pressure, greater than or equal to 70 psig. _____



Attachment 2 - Containment Cooling Operation VA-7C & VA-7D

PROCEDURE (continued)

(✓) INITIALS

1.a 5) Monitor the following parameters:

- FI-418, VA-8A Flow
- TIC-422, VA-8A Temp
- PI-499, CCW Discharge Header Press
- TIC-2800, CCW Discharge Header Temp

CAUTION

Running a fan for extended period with the CCW isolated to the cooling coil can cause the water to heatup inside the coil and possibly lift or cause the reliefs to weep.

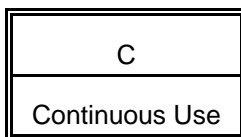
b. Start VA-7C and monitor the following (AI-30A):

- VA-7C amps
- PIC-702, Fan VA-7C Diff Press (AI-44)
- PI-710, Fan VA-7C Clg Coil Diff Press (AI-44)
- TI-719, Fan VA-7C Outlt Temp (AI-44)

2. IF VA-7D, Cntmt Vent Fan, is to be started,
THEN perform the following:

a. IF Containment Cooling is desired,
THEN initiate CCW to VA-8B as follows:

- 1) Momentarily place HCV-403B/D, Cntmt Clg Coil VA-8B AC Vlvs Control SW to OPEN.
- 2) Ensure HCV-403C, Cntmt Clg Coil VA-8B OUTLT Isol Vlv Cntrlr is closed.
- 3) Momentarily place HCV-403A/C, Cntmt Clg Coil VA-8B Isol Vlvs Control SW to CIRC.
- 4) Throttle open HCV-403C maintaining PI-499, CCW Discharge Header Pressure, greater than or equal to 70 psig.



Attachment 2 - Containment Cooling Operation VA-7C & VA-7D

PROCEDURE (continued)

(✓) INITIALS

2.a 5) Monitor the following parameters:

- FI-419, VA-8B Flow
- TIC-423, VA-8B Temp
- PI-499, CCW Discharge Header Press
- TIC-2800, CCW Discharge Header Temp

CAUTION

Running a fan for extended period with the CCW isolated to the cooling coil can cause the water to heatup inside the coil and possibly lift or cause the reliefs to weep.

b. Start VA-7D and monitor the following (AI-30B):

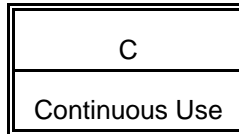
- VA-7D amps
- PIC-703, Fan VA-7D Diff Press (AI-44)
- PI-711, Fan VA-7D Clg Coil Diff Press (AI-44)
- TI-721, Fan VA-7D Outlt Temp (AI-44)

3. IF VA-7C, Cntmt Vent Fan, is to be shutdown,
THEN perform the following:

a. Stop VA-7C (AI-30A).

b. IF CCW Flow to the cooler is to be secured,
THEN isolate CCW to VA-8A as follows:

- 1) Throttle close HCV-402C, Cntmt Clg Coil VA-8A Outlt Isol Vlv Cntrlr maintaining PI-499, CCW Discharge Header Pressure, less than 125 psig.
- 2) Momentarily place HCV-402A/C, Cntmt Clg Coil VA-8A Isol Vlvs Control SW to ISOL.
- 3) Momentarily place HCV-402B/D, Cntmt Clg Coil VA-8A Vlvs Control SW to CLOSE.



Attachment 2 - Containment Cooling Operation VA-7C & VA-7D

PROCEDURE (continued)

(✓) INITIALS

4. IF VA-7D, Cntmt Vent Fan, is to be shutdown,
THEN perform the following:

a. Stop VA-7D (AI-30B). _____

b. IF CCW Flow to the cooler is to be secured,
THEN isolate CCW to VA-8B as follows:

1) Throttle close HCV-403C, Cntmt Clg Coil VA-8B Outlt Isol Vlv Cntrlr
maintaining PI-499, CCW Discharge Header Pressure, less than
125 psig. _____

2) Momentarily place HCV-403A/C, Cntmt Clg Coil VA-8B Isol Vlvs
Control SW to ISOL. _____

3) Momentarily place HCV-403B/D, Cntmt Clg Coil VA-8B Vlvs Control
SW to CLOSE. _____

Completed by _____ Date/Time _____ / _____

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0726

JPM Title: Restore Control Room Ventilation following Smoke Detector Trip

Location: Simulator

Approximate Time: 20 minutes Actual Time: _____

Reference(s): OI-VA-3 Attachments 1 and 9 R28
K/A 000067 AA1.05 (RO 3.0 / SRO 3.1)

JPM Prepared by: Jerry Koske Date: 05/05/05

JPM Reviewed by: _____ Date: _____

JPM Approved by: _____ Date: _____

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0726

JPM Title: Restore Control Room Ventilation following Smoke Detector Trip

Operators' Name: _____ Employee # _____

All Critical Steps (*) must be performed or simulated in accordance with the standards contained in this JPM

The Operator's performance was evaluated as (circle one):

SATISFACTORY

UNSATISFACTORY

Evaluator's Signature: _____ Date: _____

Reason, if unsatisfactory:

Tools & Equipment: None

Safety Considerations: None

Comments: This is an alternate path JPM
COP RCCH898A 0% COP RCCH898B 0%
Ensure VA-46A & B are tripped

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0726

JPM Title: Restore Control Room Ventilation following Smoke Detector Trip

INITIATING CUE: A smoke detector has tripped the Control Room ventilation system following a fire in the kitchen area. The fire has been extinguished and smoke has been cleared from the area.

You are directed to restore the Control Room ventilation system to the normal mode of operation, with VA-46A as the running unit. START

CRITICAL STEP	ELEMENT	STANDARD
1	Obtain copy of OI-VA-3	Locates OI-VA 3 Provide candidate with a copy of OI-VA-3
2 (Att-9 1)	Ensure the following: <ul style="list-style-type: none"> • All ventilation dampers closed • Operating ventilation units tripped (VA-46A/B) 	<u>AI-106A/B</u> GREEN lights Control switch in AUTO or STOP position GREEN light ON
3 (2)	Place Smoke Detector Override switches in override	<u>AI-106A/B</u> HC-VA46A-3 and HC-VA46B-3 in OVERRIDE Acknowledge Smoke Detector Override Annunciators
4.	Turns to OI-VA-3, attachment 1	CUE: All prerequisites are met
5. (att-1 2)	Ensure VA-46A/B are in stop	<u>AI-106A/B</u> HC-VA46-A-2 and HC-VA-46-B-2 in STOP with GREEN lights lit

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0726

JPM Title: Restore Control Room Ventilation following Smoke Detector Trip

CRITICAL STEP	ELEMENT	STANDARD
6 (3)	Verify filter fan control switch position	<u>AI-106A/B</u> HC-VA63A and HC-VA63B in AUTO
7 (4)	Ensure third-stage cooling VIAS Override control switch in normal	<u>AI-106A</u> HC-VA-46A, VA-46A 3 rd stage cooling VIAS override switch in NORMAL
8 (5.a)	Start VA-46A	<u>AI-106A</u> HC-VA 46A-2 to START then release. RED light lit
9 (5.b)	Verify valve alignment	<p>All of the following are OPEN: <u>AI-106A</u></p> <ul style="list-style-type: none"> • PCV 840B (RED Light lit) • PCV-840A-1(RED Light lit) • PCV-840A-2 (RED Light lit) <p><u>CB-1,2,3</u></p> <ul style="list-style-type: none"> • HCV-2898A (RED Light lit) • HCV-2898B (RED Light lit) <p>CUE : GREEN lights are ON for HCV-2898A and HCV-2898B. They are closed and will not open.</p> <p>When reported, candidate is directed to restore CR cooling using available equipment.</p>

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0726

JPM Title: Restore Control Room Ventilation following Smoke Detector Trip

CRITICAL STEP	ELEMENT	STANDARD
10	Shut Down VA-46A	<u>AI-106A</u> HC-VA 46A-2 to STOP and GREEN light lit
11 (4)	Ensure third-stage cooling VIAS Override control switch in normal	<u>AI-106B</u> HC-VA-46B, VA-46B 3 rd stage cooling VIAS override switch in NORMAL
12 (5.a)	Start VA-46B	<u>AI-106B</u> HC-VA 46B-2 to START then release. RED light lit
13 (5.b)	Verify valve alignment	All of the following are OPEN <u>AI-106B</u> <ul style="list-style-type: none"> • PCV 841B (RED Light lit) • PCV-841A-1 (RED Light lit) • PCV-841A-2 (RED Light lit) <u>CB-1,2,3</u> <ul style="list-style-type: none"> • HCV-2899A (RED Light lit) • HCV-2899B (RED Light lit) <p>CUE : The ductwork is clear of smoke</p>
14 (att-9 4)	Place smoke detector override switches in normal	<u>AI-106A/B</u> HC-VA-46A-3 and HC-VA-46B-3 in NORMAL

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0726

JPM Title: Restore Control Room Ventilation following Smoke Detector Trip

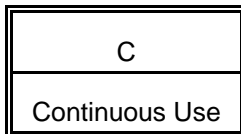
Termination Criteria: CR Ventilation in normal operation with VA-46B running

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: New CR Vent (rev 1)

INITIATING CUE: A smoke detector has tripped the Control Room ventilation system following a fire in the kitchen area. The fire has been extinguished and smoke has been cleared from the area.

You are directed to restore the Control Room ventilation system to the normal mode of operation, with VA-46A as the running unit. **START**



Attachment 1 - VA-46A/46B Normal Startup

PREREQUISITES

(✓) INITIALS

1. Procedure Revision Verification

Revision Number _____ Date: _____

2. Electrical power is available to the following components as required:

- VA-46A, Control Room Air Conditioner, MCC-3B1-FO2 _____
- VA-63A, Control Room Emergency Air Supply Fan, MCC-3B1-CO1 _____
- VA-64A, Control Room Emergency Supply Filter Heater, MCC-3B1-C2R _____
- VA-46B, Control Room Air Cond. Unit, MCC-4A1-DO1 _____
- VA-63B, Control Room Air Supply Fan, MCC-4C2-BO1 _____
- VA-64B, Control Room Air Filter Heater, MCC-4A1-CO3 _____
- VA-49, Control Room Toilet Exhaust Fan, MPP-1C3A-1 Bkr 7
(MCC-3B1-AO2) _____

3. Component Cooling Water is in service per OI-CC-1. _____

4. Verify that humidification is available in the Control Room by installed or portable means. _____

5. Instrument Air is in service per OI-CA-1. _____

6. Fire Protection System is in service per OI-FP-1 Attachment 30 for VA-64A and Attachment 31 for VA-64B. _____

7. VA-46A and VA-46B air filters are in place. _____

SE

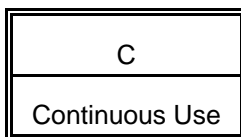
8. VA-64A and VA-64B prefilters, HEPA filters, and charcoal media are in place. _____

SE

9. Manual Dampers are lined up per IC-ST-VA-0027. _____

SE

10. Checklist OI-VA-3-CL-A complete per OP-1. _____



Attachment 1 - VA-46A/46B Normal Startup

PROCEDURE

(✓) INITIALS

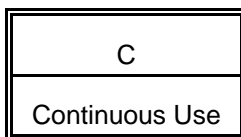
NOTES

1. By placing both HC-VA-46A/B-1, Cont Rm Ventilation "A"/"B" Mode Switches, in NORMAL, the running Ventilation unit will operate on a fixed amount of fresh air makeup (1000 cfm) with system dampers positioned as follows:
 - PCV-6681A/B, Fresh Air Inlet Dampers, open
 - PCV-6680A-1/2, VA-63A Filtered Air Inlet / Outlet Dampers closed
 - PCV-6680B-1/2, VA-63B Filtered Air Inlet / Outlet Dampers closed
 - PCV-6682, Recirculating Air Damper closed
2. The NORMAL Mode of operation is automatically overridden by the following:
 - Toxic Gas actuation
 - Smoke Detector actuation
 - VIAS actuation
 - Opening of MS-291 or 292, Main Steam Safety valves
 - Manually placing HC-VA-46A/B-1, Cont Rm Ventilation "A"/"B" Mode Switch in FILT-AIR or RECIRC.
3. HCV-2898A/B and HCV-2899A/B close on VIAS, isolating the economizers.

1. IF the unit being started has been de-energized for greater than 24 hours and the unit was not pumped down or the compressor was not isolated, THEN perform the following prior to startup:
 - a. Verify power has been applied for at least 24 hours:
 - VA-46A
 - VA-46B
 - b. Verify the Compressor Isolation Valves are open.

Maint

Maint



Attachment 1 - VA-46A/46B Normal Startup

PROCEDURE (continued)

(✓) INITIALS

2. Verify the non-operating unit is in STOP (AI-106A/B):

- HC-VA-46-A-2, Cont Room A/C VA-46-A
- HC-VA-46-B-2, Cont Room A/C VA-46-B

3. Verify both Filter Fan Control Switches are in the same position based on Plant conditions (AI-106A/B):

- HC-VA-63A, VA-63A Control Switch
- HC-VA-63B, VA-63B Control Switch

4. For the desired Ventilation Air Unit ensure Third-stage Cooling VIAS Override control switch is in NORMAL (AI-106A/B):

- HC-VA-46A, VA-46A 3rd Stage Cooling VIAS Override
- HC-VA-46B, VA-46B 3rd Stage Cooling VIAS Override

NOTE

If cooling water temperature is below the preset limit (normally 70°F), the CCW flows thru the economizer and condenser sections via a three-way plug valve.

5. If VA-46A, Control Room Air Conditioner is to be rotated on, complete the following:

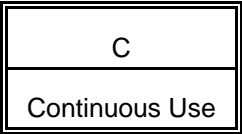
a. Place HC-VA-46A-2, Cont Room A/C VA-46A, in the START position.

b. Verify the following open:

- PCV-840B, VA-46A Inlet
- PCV-840A-1, VA-46A Outlet
- PCV-840A-2, VA-46A Outlet
- HCV-2898A, CR Air Cond VA-46A AC Inlet Valve
- HCV-2898B, CR Air Cond VA-46A AC Outlet Valve

6. If VA-46B Control Room Air Conditioner is to be rotated on, complete the following:

a. Place HC-VA-46B-2, Cont Room A/C VA-46B, in the START position.



Attachment 1 - VA-46A/46B Normal Startup

PROCEDURE (continued)

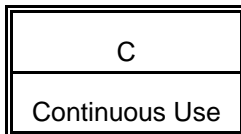
(✓) INITIALS

6 b. Verify the following open:

- PCV-841B, VA-46B Inlet
- PCV-841A-1, VA-46B Outlet
- PCV-841A-2, VA-46B Outlet
- HCV-2899A, CR Air Cond VA-46B AC Inlet Valve
- HCV-2899B, CR Air Cond VA-46B AC Outlet Valve

7. IF the remaining unit needs to be shutdown,
 THEN GO TO Attachment 2.

Completed by _____ Date/Time _____ / _____



Attachment 9 - System Restoration Following a Smoke Detector Trip

PREREQUISITES

(✓) INITIALS

1. Procedure Revision Verification

Revision Number _____ Date: _____

PROCEDURE

CAUTION

Before restarting the Control Room Ventilation Unit, the source of smoke in the Ventilation System must be identified and corrected.

1. IF smoke is detected in the Control Room Ventilation Duct,
THEN verify the following:

- All ventilation dampers are closed (AI-106A/B) _____
- The operating Ventilation Units VA-46A/B tripped. _____
- The operating Filtered Air Units VA-63A/B tripped. _____

2. Place the following Smoke Detector Auto Trip Override switches in
OVERRIDE to override all Zone 25 and Zone 31 detector trips:

- HC-VA-46A-3, Smoke Detector Auto Trip Override (AI-106A) _____
- HC-VA-46B-3, Smoke Detector Auto Trip Override (AI-106B) _____

3. Manually align the Control Room Ventilation System to the desired mode per
Attachment 1 (NORMAL), 4 (FILT-AIR), or 5 (RECIRC). _____

4. WHEN the smoke has been flushed from the duct,
THEN return the Smoke Detector Auto Trip Override switches to NORMAL:

- HC-VA-46A-3, Smoke Detector Auto Trip Override (AI-106A) _____
- HC-VA-46B-3, Smoke Detector Auto Trip Override (AI-106B) _____

Completed by _____ Date/Time _____ / _____

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0778

JPM Title: RPS T-Cold Calibration

Location: Simulator

Approximate Time: 10 minutes Actual Time: _____

Reference(s): OI-RPS-2, R6
NRC K/A 012000 A1.01 (RO 2.9 / SRO 3.4)

JPM Prepared by: Jerry Koske Date: 05/05/05

JPM Reviewed by: _____ Date: _____

JPM Approved by: _____ Date: _____

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0778

JPM Title: RPS T-Cold Calibration

Operators' Name: _____ Employee # _____

All Critical Steps (shaded) must be performed or simulated in accordance with the standards contained in this JPM

The Operator's performance was evaluated as (circle one):

SATISFACTORY

UNSATISFACTORY

Evaluator's Signature: _____ Date: _____

Reason, if unsatisfactory:

Tools & Equipment: Bypass key for trip unit #9

Safety Considerations: NONE

Comments: Simulator JPM

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0778

JPM Title: RPS T-Cold Calibration

INITIATING CUE: The plant is operating at 100% power. The channel “A” T-cold Cal is indicating low. The other channel T-cold values are within 0.1°F of each other.

The Shift Manager has directed you to adjust the channel “A” T-cold Cal.

All prerequisites have been met

START

Critical Steps shown in gray

STEP	ELEMENT	STANDARD
		CUE: Provide a copy of OI-RPS-2
1 (1.a)	Record T-cold DVM readings on all four RPS channels	<u>AI-31A/B/C/D</u> Select T-Cold on selector switch and record value in procedure
2 (1.b)	Record T-cold cal DVM readings on all four RPS channels	<u>AI-31A/B/C/D</u> For each channel, Select T-Cold CAL on selector switch and record value in procedure
3 (1.c)	Record T-cold cal pot settings for all four channels	<u>AI-31A/B/C/D</u> For each channel, Record POT setting in procedure
4 (1.d)	Obtain the RPS Trip Unit #9 bypass key	CUE: Provide key
5. (1.e)	Log into Tech Spec 2.15(1) 48 hour LCO for channel “A”	CUE: Log entry has been made
6 (1.f)	Bypass RPS TM/LP Trip Unit	<u>AI-30A</u>

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0778

JPM Title: RPS T-Cold Calibration

STEP	ELEMENT	STANDARD
	on channel "A"	Insert key in RPS channel "A" Trip Unit #9 bypass switch and place in BYPASS (clockwise) position. AMBER light lit
7 (1.g)	Adjust T-cold cal POT on RPS channel "A" until the T-cold cal reading on the DVM equals the highest RPS channel T-cold	<u>AI-30A</u> Adjust T-cold cal POT on RPS channel "A" until the T-cold cal reading on the DVM equals the highest RPS channel T-cold recorded in step 1 (1.a)
8 (1.h)	Ensure TM/LP Trip unit is reset	<u>AI-30A</u> Place RPS channel "A" Trip Unit #9 bypass switch in RESET (counterclockwise) position. AMBER light off.
9 (1.i)	Remove bypass key	<u>AI-30A</u> Remove key Cue: Accept key
10 (1.j)	Exit Tech Spec 2.15(1)	Cue: Log entry has been made
11 (1.l)	Record T-cold DVM readings on all four RPS channels	<u>AI-31A/B/C/D</u> For each channel, Select T-Cold on selector switch and record value in procedure
12 (1.m)	Record T-cold cal pot settings for all four channels	<u>AI-31A/B/C/D</u> For each channel, Record POT setting in procedure

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0778

JPM Title: RPS T-Cold Calibration

**Termination Criteria: RPS channel “A” T-cold has been calibrated and no
RPS Trip Units are bypassed**

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0778

INITIATING CUE: The plant is operating at 100% power. The channel “A” T-cold Cal is indicating low. The other channel T-cold values are within 0.1°F of each other.

The Shift Manager has directed you to adjust the channel “A” T-cold Cal.

All prerequisites have been met

START

Fort Calhoun Station
Unit No. 1

OI-RPS-2

OPERATING INSTRUCTION

Title: REACTOR PROTECTIVE SYSTEM - TM/LP T_{COLD CAL} CALIBRATION

FC-68 Number: DCR 10481

Reason for Change: Reformat per FCSG-9.

Initiator: J. Borger/S. Lindquist

Preparer: Stan Heyden

Correction (a): Page 1 and 2 (01-25-01)

REACTOR PROTECTIVE SYSTEM - TM/LP $T_{\text{COLD CAL}}$ CALIBRATION

ATT PURPOSE

PAGE

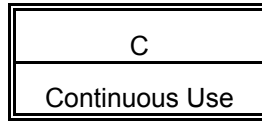
1 - Adjust the $T_{\text{cold cal}}$ POT(s) 2

PRECAUTIONS

1. The selected RPS TM/LP Trip Unit is placed in BYPASS prior to adjusting the $T_{\text{cold cal}}$ Pot to prevent an inadvertent channel trip.
2. T_{cold} DVM readings while at a steady state power are normally kept within close tolerances. Hence, if while at steady state power readings differ by greater than 1.0 °F, the System Engineer should be consulted prior to adjustment to ensure operability of the affected channel.

REFERENCES/COMMITMENT DOCUMENTS

1. Technical Specifications:
 - 1.1: Safety Limits - Reactor Core
 - 1.3: Table 1-1: RPS Limiting Safety System Settings
 - 2.15: Instrumentation and Control Systems
 - 2.15: Table 2-2: Instrument Operating Requirements for Reactor Protective System
 - 3.1: Table 3-3: Item 17: Reactor Coolant Inlet Temperature
 - 3.1: Table 3-1: Minimum Frequencies for Checks, Calibrations and Testing of Miscellaneous Instrumentation and Controls
 - 3.10(7)a: DNB Parameters
2. USAR:
 - 7.2: Reactor Protective System
 - 7.5: Instrumentation Systems
3. Others:
 - OP-ST-SHIFT-0001
 - SO-G-100: Operability Dispositions When Calibrating, Testing or Operating Safety Related Equipment
 - EAR 94-130, Appropriate Acceptance Criteria or Requirements to $T_{\text{COLD Cal}}$



Attachment 1 - Adjust the $T_{\text{cold cal}}$ POT(s)

PREREQUISITES

(✓) INITIAL

1. Procedure Revision Verification

Revision Number _____ Date: _____

2. Reactor is at steady state conditions.

3. Reactor power is greater than 15%.

4. Adjustment is requested by the Shift Manager OR the difference between the highest T_{cold} DVM reading and any $T_{\text{cold cal}}$ DVM reading for the applicable Reactor power level is as follows:

- greater than 75% to 100% power greater than or equal to 0.2°F
- greater than 50% to less than or equal to 75% power greater than or equal to 0.5°F
- greater than or equal to 15% to less than or equal to 50% power greater than or equal to 1.0°F

5. IF T_{cold} DVM readings differ by more than 1.0°F,
THEN contact the System Engineer prior to adjustment.

6. Shift Manager notified prior to adjustment.

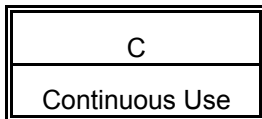
Shift Mgr

PROCEDURE

1. Perform the following:

- a. Record T_{cold} DVM readings on all four RPS channels.

- AI-31A _____ °F
- AI-31B _____ °F
- AI-31C _____ °F
- AI-31D _____ °F



Attachment 1 - Adjust the $T_{\text{cold cal}}$ POT(s)

PROCEDURE (continued)

(✓) INITIAL

1 b. Record $T_{\text{cold cal}}$ DVM readings on all four RPS channels.

- AI-31A _____ °F
- AI-31B _____ °F
- AI-31C _____ °F
- AI-31D _____ °F

c. Record $T_{\text{cold cal}}$ POT settings.

- AI-31A _____
- AI-31B _____
- AI-31C _____
- AI-31D _____

d. Obtain the RPS TM/LP Trip Unit # 9 Bypass Key.

CAUTION

Only **ONE** channel shall be adjusted at a time.

e. Log into Technical Specification 2.15(1) 48 hour LCO for selected channel:

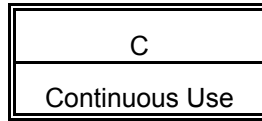
- AI-31A
- AI-31B
- AI-31C
- AI-31D

f. Bypass TM/LP trip unit on the selected channel:

- AI-31A
- AI-31B
- AI-31C
- AI-31D

g. Adjust $T_{\text{cold cal}}$ POT on the selected channel until the $T_{\text{cold cal}}$ DVM reading equals highest RPS channel T_{cold} recorded in Step a.

h. Ensure selected TM/LP Trip Unit #9 is RESET.



Attachment 1 - Adjust the $T_{\text{cold cal}}$ POT(s)

PROCEDURE (continued)

(✓) INITIAL

- 1 i. Remove Bypass Key for selected TM/LP Trip Unit. _____
- j. Exit Technical Specification 2.15(1) for the selected channel
 - AI-31A _____
 - AI-31B _____
 - AI-31C _____
 - AI-31D _____
- k. Repeat Steps e. through j. for any remaining channels out of specification. _____
- l. Record $T_{\text{cold cal}}$ DVM readings:
 - AI-31A _____ °F _____
 - AI-31B _____ °F _____
 - AI-31C _____ °F _____
 - AI-31D _____ °F _____
- m. Record new $T_{\text{cold cal}}$ POT settings:
 - AI-31A _____
 - AI-31B _____
 - AI-31C _____
 - AI-31D _____

Completed by _____ Date/Time _____ / _____

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0042

JPM Title: Transfer Clutch Power Supply

Location: Simulator

Approximate Time: 12 Minutes Actual Time: _____

Reference(s): OI-EE-4, Attachments 7 and 1 R30
NRC K/A 062000 A2.10 (RO 3.0 / SRO 3.3)

JPM Prepared by: Jerry Koske Date: 05/05/05

JPM Reviewed by: _____ Date: _____

JPM Approved by: _____ Date: _____

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0042

JPM Title: Transfer Clutch Power Supply

Operators' Name: _____ Employee # _____

All Critical Steps (shaded) must be performed or simulated in accordance with the standards contained in this JPM

The Operator's performance was evaluated as (circle one):

SATISFACTORY

UNSATISFACTORY

Evaluator's Signature: _____ Date: _____

Reason, if unsatisfactory:

Tools & Equipment: None

Safety Considerations: None

Comments: Cross Tie Instrument busses A&C, Open Supply
 breaker for instrument bus A. Place PS1&PS3 supply
 to bus "B"

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0042

JPM Title: Transfer Clutch Power Supply

INITIATING CUE: The plant is in an outage. Maintenance has been completed on Instrument Bus A and will begin on instrument bus B. You have been directed to transfer Clutch Power Supply PS1 & PS3 from Instrument Bus B to Instrument Bus A.

Inverter “A” has been bypassed

START

Critical Steps shown in gray

STEP	ELEMENT	STANDARD
1 (1 a)	Ensure Instrument Bus A is not cross-tied to Instrument Bus C	<u>AI-40A, AI-40C</u> Checks position of Instrument Bus Tie Breakers and determines that the Buses are cross-tied. CUE: If Candidates reports that the buses are cross tied, then say “The Shift Manager states that the cross-tie is no longer needed and directs you to hot bus transfer the Instrument Bus A loads connected to Instrument Bus C back to Instrument Bus A (Provide OI-EE-4, Attachment 1)
2 (Att 1-7.e.1)	Close 1-BUS-1A-1, Instrument Bus “A” Supply Breaker	<u>AI-40A</u> Instrument Bus “A” supply breaker to CLOSE

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0042

JPM Title: Transfer Clutch Power Supply

STEP	ELEMENT	STANDARD
3 (7.e.2)	Open I-BUS-AC-2, Instrument Bus C Tie Breaker	<u>AI-40C</u> Instrument Bus “C” tie breaker to OPEN
4 (7.e.3)	Open I-BUS-AC-1, Instrument Bus A Tie Breaker	<u>AI-40A</u> Instrument Bus “A” tie breaker to OPEN
5 (Att-7 1.c)	Verify Clutch Power Supply breaker RPS/CB-CD is closed	<u>AI-57</u> Breaker in ON position
6 (1.d)	Place Clutch Power Supply Transfer Switch RPS/TS-AB in the Instrument Bus A position #1	<u>AI-57</u> Turn switch to position 1 (left)
7 (1.e,f)	Verify Clutch Power Supply breaker RPS/CB-AB is closed. If in trip free position, the reset and close	<u>AI-57</u> RESET and CLOSE Clutch Power Supply Breaker RPS/BC-AB
8 (1.g)	Verify all four Clutch Power Supply ammeters read upscale.	<u>AI-3</u> Ammeters read upscale
9 (1.h)	Verify proper indicating lights in Clutch Power Supply Cabinet are energized.	<u>AI-3</u> WHITE lights ON

CUE: Inverter A has been placed in normal operation

Termination Criteria: Clutch Power Supply PS1 & PS3 are supplied from Instrument Bus A. Instrument busses A&C are not cross-tied

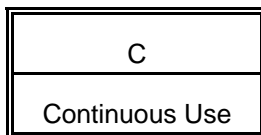
Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0042

INITIATING CUE: The plant is in an outage. Maintenance has been completed on Instrument Bus A and will begin on instrument bus B. You have been directed to transfer Clutch Power Supply PS1 & PS3 from Instrument Bus B to Instrument Bus A.

Inverter “A” has been bypassed

START



Attachment 1 - Inverter A (EE-8H) Operation

PREREQUISITES

(✓) INITIALS

1. Procedure Revision Verification

Revision No. _____ Date: _____

2. 125 VDC Bus 1 (EE-8F) is in service per OI-EE-3.

3. IF RCS temperature is greater than 300°F,
THEN verify Checklist OI-EE-4-CL-A has been completed.

PROCEDURE

NOTES

1. Instrument bus panels AI-40A has a pair of white lights for indicating grounds. Both lights will be dimly lit when no grounds are present on the bus. If a ground occurs, one light will become brighter than the other until the ground is removed. The lights automatically reset to the normal mode (both lights dimly lit) after ground removal.
2. A hard ground will cause an inverter trouble alarm to annunciate on CB-20. However, it is possible for the white lights to indicate a ground without the trouble alarm being in. The voltage sensing alarm relay only actuates on a hard ground signal.

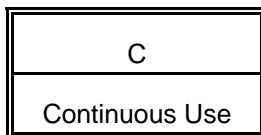
1. IF short-term bypass of Inverter A (EE-8H) is desired,
THEN perform the following:

NOTE

Once Inverter A (EE-8H) is in reverse transfer it is inoperable because it can not forward transfer automatically back to its instrument bus.

- a. Declare Inverter A (EE-8H) inoperable per Technical
Specification 2.7(2)(o).

SM/CRS



Attachment 1 - Inverter A (EE-8H) Operation

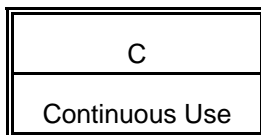
PROCEDURE (continued)

(✓) INITIALS

NOTE

Instrument Bus voltage may be lower than normal 117.6 - 122.4 Volts AC when being fed from a bypass transformer.

1.
 - b. Ensure MCC-3B1-E3R, EE-4N Inverter A Bypass transformer Breaker is closed. _____
 - c. Verify sync loss light is off. _____
 - d. Push the reverse transfer button. _____
 - e. Verify sync loss light is off. _____
 - f. Verify reverse transfer light is on. _____
2. IF restoration from short-term bypass of Inverter A (EE-8H) is desired, THEN perform the following:
 - a. Verify reverse transfer light is on. _____
 - b. Verify EE-8H-S1, Inverter A, EE-8H Manual Transfer Switch, is in the INVERTER position. _____
 - c. Ensure sync loss light is off. _____
 - d. Push the forward transfer button. _____
 - e. Verify reverse transfer light is off. _____
 - f. Verify forward transfer light is on. _____
 - g. Ensure EE-8H-CB3, Inverter A EE-8H Vent Fans Breaker is closed. _____



Attachment 1 - Inverter A (EE-8H) Operation

PROCEDURE (continued)

(✓) INITIALS

CAUTION

Adjustments to inverter output frequency or output voltage shall only be made by Electrical Maintenance. Guidance from EM-PM-EX-0800 may be referenced as necessary.

2.
 - h. Verify Inverter A Output Frequency is between 59.4 and 60.6 Hz (normal 60.0 Hz). _____
 - i. Verify Inverter A Output Voltage is between 117.6 and 122.4 Volts AC (normal 120.0 Volts AC). _____
 - j. Once Inverter A is operable and has been returned to its bus (i.e. forward transferred) declare Inverter A (EE-8H) operable. _____

SM/CRS

3. IF switching Inverter A (EE-8H) from normal operation to bypass power is desired,
THEN perform the following:

NOTE

Instrument Bus voltage may be lower than normal 117.6 - 122.4 Volts AC when being fed from a bypass transformer.

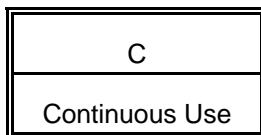
- a. Ensure MCC-3B1-E3R, EE-4N Inverter A Bypass Transformer Breaker is closed. _____
- b. Verify sync loss light is off. _____

NOTE

Once Inverter A (EE-8H) is in reverse transfer it is inoperable because it can not forward transfer automatically back to its instrument bus.

- c. Declare Inverter A (EE-8H) inoperable per Technical Specification 2.7(2)(o). _____

SM/CRS

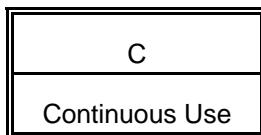


Attachment 1 - Inverter A (EE-8H) Operation

PROCEDURE (continued)

(✓) INITIALS

- | | | |
|----|---|-------|
| 3 | d. Push the reverse transfer button. | _____ |
| | e. Verify sync loss light remains off. | _____ |
| | f. Verify reverse transfer light is on. | _____ |
| | g. Place EE-8H-S1, Inverter A, EE-8H Manual Transfer Switch, in BYPASS. | _____ |
| | h. Verify sync loss light is on. | _____ |
| | i. Open EE-8H-CB1, Inverter A, EE-8H DC Input Breaker. | _____ |
| 4. | IF Bypass Transformer EE-4N is in operation AND Inverter A (EE-8H) startup is desired,
THEN perform the following: | |
| | a. Ensure EE-8H-CB1, Inverter A, EE-8H DC Input Breaker is open. | _____ |
| | b. Ensure EE-8F-CB24, Inverter A, EE-8H Breaker on DC Bus 1 is closed. | _____ |
| | c. Ensure EE-8H-S1, Inverter A, EE-8H Manual Transfer Switch, is in BYPASS. | _____ |
| | d. Momentarily push the precharge button, then wait ten (10) seconds. | _____ |
| | e. Close EE-8H-CB1, Inverter A, EE-8H DC Input Breaker. | _____ |
| | f. Verify sync loss light is on. | _____ |
| | g. Verify reverse transfer light is on. | _____ |
| | h. Place EE-8H-S1, Inverter A, EE-8H Manual Transfer Switch, in the INVERTER position. | _____ |
| | i. Ensure sync loss light is off. | _____ |
| | j. Push the forward transfer button. | _____ |



Attachment 1 - Inverter A (EE-8H) Operation

PROCEDURE (continued)

(✓) INITIALS

4 k. Verify reverse transfer light is off.

l. Verify forward transfer light is on.

m. Ensure EE-8H-CB3, Inverter A EE-8H Vent Fans Breaker is closed.

CAUTION

Adjustments to inverter output frequency or output voltage shall only be made by Electrical Maintenance. Guidance from EM-PM-EX-0800 may be referenced as necessary.

n. Verify Inverter A Output Frequency is between 59.4 and 60.6 Hz (normal 60.0 Hz).

o. Verify Inverter A Output Voltage is between 117.6 and 122.4 Volts AC (normal 120.0 Volts AC).

p. Once Inverter A is operable and has been returned to its bus (i.e. forward transferred) declare Inverter A (EE-8H) operable.

SM/CRS

CAUTION

Step 5 isolates Instrument Bus AI-40A from Instrument Bus AI-40C if cross-tied.

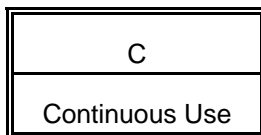
5. IF EE-4N, Bypass Transformer is not available AND Inverter A (EE-8H) startup is desired,
THEN perform the following:

a. Remove all loads from 120 Volt AC Instrument Bus A (AI-40A).

b. Remove all loads from 120 Volt AC Instrument Bus A1 (AI-40A).

c. Open I-BUS-AC-2, Instrument Bus C Tie Breaker (AI-40C).

d. Open I-BUS-AC-1, Instrument Bus A Tie Breaker (AI-40A).



Attachment 1 - Inverter A (EE-8H) Operation

PROCEDURE (continued)

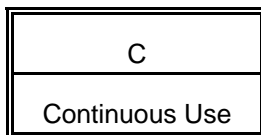
(✓) INITIALS

- 5 e. Ensure EE-8H-CB1, Inverter A, EE-8H DC Input Breaker is open. _____
- f. Place EE-8H-S1, Inverter A, EE-8H Manual Transfer Switch, in the INVERTER position. _____
- g. Momentarily push the precharge button, then wait ten (10) seconds. _____
- h. Close EE-8H-CB1, Inverter A, EE-8H DC Input Breaker. _____
- i. Verify reverse transfer light is on. _____
- j. Push the forward transfer button. _____
- k. Verify forward transfer light is on. _____
- l. Ensure EE-8H-CB3, Inverter A EE-8H Vent Fans Breaker is closed. _____

CAUTION

Adjustments to inverter output frequency or output voltage shall only be made by Electrical Maintenance. Guidance from EM-PM-EX-0800 may be referenced as necessary.

- m. Verify Inverter A Output Frequency is between 59.4 and 60.6 Hz (normal 60.0 Hz). _____
- n. Verify Inverter A Output Voltage is between 117.6 and 122.4 Volts AC (normal 120.0 Volts AC). _____
- o. Close I-BUS-IA-1, Instrument Bus A Supply Breaker (AI-40A). _____
- p. Ensure EE-8H-CB2, Inverter A, EE-8H AC Output Breaker is closed. _____
- q. Sequentially load 120 Volt AC Instrument Bus A (AI-40A). _____
- r. Sequentially load 120 Volt AC Instrument Bus A1 (AI-40A). _____



Attachment 1 - Inverter A (EE-8H) Operation

PROCEDURE (continued)

(✓) INITIALS

- 5 s. Once Inverter A is operable and has been returned to its bus (i.e. forward transferred) declare Inverter A (EE-8H) operable.

SM/CRS

NOTE

Upon loss of an Instrument Bus implement AOP-16, Loss of Instrument Bus Power.

6. IF hot bus transfer of Instrument Buses A and A1 feed to Instrument Bus AI-40C is desired,
THEN perform the following:

- a. Ensure the following plant conditions are met:

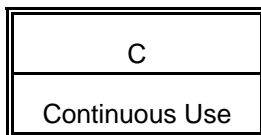
- Reactor Coolant System temperature is less than 300°F
- All Fuel movement has been secured
- All core alterations have been secured
- No work is being performed that requires electrical power from AI-57 on the Control Element Drive Mechanisms (CEDM)

Shift Mgr

- b. Verify that there are no hard grounds on either Instrument Bus A or Instrument Bus C.
- c. Block the PPLS/BLOCK A relay (device #817) in the PICKED-UP position (located behind CB-3).

EM

Ind Verif



Attachment 1 - Inverter A (EE-8H) Operation

PROCEDURE (continued)

(✓) INITIALS

- 6 d. Transfer the load on Instrument Inverter C to the bypass source by performing the following:

NOTE

Instrument Bus voltage may be lower than normal 117.6 - 122.4 Volts AC when being fed from a bypass transformer.

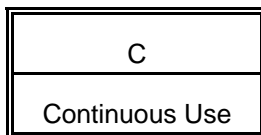
- 1) Ensure MCC-3C1-A4R, EE-4Q Inverter C Bypass Transformer, Breaker is closed. _____
- 2) Verify sync loss light is off. _____
- 3) Push the reverse transfer button. _____
- 4) Verify sync loss light is off. _____
- 5) Verify reverse transfer light is on. _____

- e. Transfer the load on Instrument Inverter A to the Bypass source by performing the following:

NOTE

Instrument Bus voltage may be lower than normal 117.6 - 122.4 Volts AC when being fed from a bypass transformer.

- 1) Ensure MCC-3B1-E3R, EE-4N Inverter A Bypass Transformer, Breaker is closed. _____
- 2) Verify sync loss light is off. _____
- 3) Push the reverse transfer button. _____
- 4) Verify sync loss light is off. _____
- 5) Verify reverse transfer light is on. _____



Attachment 1 - Inverter A (EE-8H) Operation

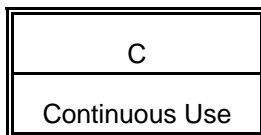
PROCEDURE (continued)

(✓) INITIALS

CAUTION

Maximum Inverter load is 62.5 amps. Non-essential loading may need to be reduced to prevent an overload condition following the load transfer.

- 6 f. Hot bus transfer loads from Instrument Bus A to Instrument Bus C by performing the following in the sequence listed:
 - 1) Close I-BUS-AC-2, Instrument Bus C Tie Breaker (AI-40C). _____
 - 2) Close I-BUS-AC-1, Instrument Bus A Tie Breaker (AI-40A). _____
 - 3) Open I-BUS-IA-1, Instrument Bus A Supply Breaker (AI-40A). _____
 - 4) Ensure Inverter C load is less than 62.5 amps. _____
- g. IF restoration from short-term bypass of Inverter C (EE-8K) is desired, THEN perform the following:
 - 1) Verify reverse transfer light is on. _____
 - 2) Verify EE-8K-S1, Inverter C, EE-8K Manual Transfer Switch, is in the INVERTER position. _____
 - 3) Ensure sync loss light is off. _____
 - 4) Push the forward transfer button. _____
 - 5) Verify reverse transfer light is off. _____
 - 6) Verify forward transfer light is on. _____
 - 7) Ensure EE-8K-CB3, Inverter C EE-8K Vent Fans Breaker is closed. _____



Attachment 1 - Inverter A (EE-8H) Operation

PROCEDURE (continued)

(✓) INITIALS

CAUTION

Adjustments to inverter output frequency or output voltage shall only be made by Electrical Maintenance. Guidance from EM-PM-EX-0800 may be referenced as necessary.

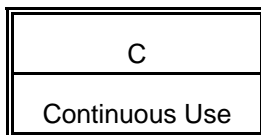
- 6.g 8) Verify Inverter C Output Frequency is between 59.4 and 60.6 Hz (normal 60.0 Hz). _____
- 9) Verify Inverter C Output Voltage is between 117.6 and 122.4 Volts AC (normal 120.0 Volts AC). _____
- h. IF desired,
THEN open EE-8H-CB2, Inverter A, EE-8H AC Output Breaker. _____
- i. IF desired,
THEN open EE-8H-CB1, Inverter A, EE-8H DC Input Breaker. _____
- j. IF desired,
THEN open MCC-3B1-E3R, EE-4N Inverter A Bypass Transformer Breaker. _____

NOTE

Upon loss of an Instrument Bus implement AOP-16, Loss of Instrument Bus Power.

7. IF hot bus transfer of Instrument Buses A and A1 feed back to normal alignment is desired,
THEN perform the following:
- a. Ensure the following plant conditions are met:
- Reactor Coolant System temperature is less than 300°F _____
 - All Fuel movement has been secured _____
 - All core alterations have been secured _____
 - No work is being performed, that requires electrical power from AI-57, on the Control Element Drive Mechanisms (CEDM) _____

Shift Mgr



Attachment 1 - Inverter A (EE-8H) Operation

PROCEDURE (continued)

(✓) INITIALS

- 7 b. Verify that there are no hard grounds on either Instrument Bus A or Instrument Bus C.

CAUTION

Maximum Inverter load is 62.5 amps. Non-essential loading may need to be reduced to prevent an overload condition following the load transfer.

- c. Transfer Instrument Inverter A to the bypass source by performing the following:

NOTE

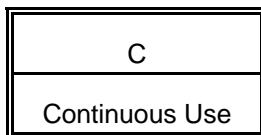
Instrument Bus voltage may be lower than normal 117.6 - 122.4 Volts AC when being fed from a bypass transformer.

- 1) Ensure MCC-3B1-E3R, EE-4N Inverter A Bypass Transformer Breaker, is closed.
 - 2) Verify sync loss light is off.
 - 3) Push the reverse transfer button.
 - 4) Verify sync loss light is off.
 - 5) Verify reverse transfer light is on.
- d. Transfer the load on Instrument Inverter C to the bypass source by performing the following:

NOTE

Instrument Bus voltage may be lower than normal 117.6 - 122.4 Volts AC when being fed from a bypass transformer.

- 1) Ensure MCC-3C1-A4R, EE-4Q Inverter C Bypass Transformer, Breaker is closed.
- 2) Verify sync loss light is off.

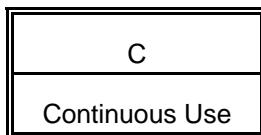


Attachment 1 - Inverter A (EE-8H) Operation

PROCEDURE (continued)

(✓) INITIALS

- | | | | |
|-----|---|-------|-------|
| 7.d | 3) Push the reverse transfer button. | _____ | |
| | 4) Verify sync loss light is off. | _____ | |
| | 5) Verify reverse transfer light is on. | _____ | _____ |
| e. | Hot bus transfer the Instrument Bus A loads connected to Instrument Bus C from Instrument Bus C to Instrument Bus A by positioning the following breakers in the sequence listed: | | |
| | 1) Close I-BUS-IA-1, Instrument Bus A Supply Breaker (AI-40A). | _____ | |
| | 2) Open I-BUS-AC-2, Instrument Bus C Tie Breaker (AI-40C). | _____ | |
| | 3) Open I-BUS-AC-1, Instrument Bus A Tie Breaker (AI-40A). | _____ | _____ |
| f. | WHEN restoration from short-term bypass of Inverter A (EE-8H) is desired,
THEN perform the following: | | |
| | 1) Verify reverse transfer light is on. | _____ | |
| | 2) Verify EE-8H-S1, Inverter A, EE-8H Manual Transfer Switch, is in the INVERTER position. | _____ | |
| | 3) Ensure sync loss light is off. | _____ | |
| | 4) Push the forward transfer button. | _____ | |
| | 5) Verify reverse transfer light is off. | _____ | |
| | 6) Verify forward transfer light is on. | _____ | |
| | 7) Ensure EE-8H-CB3, Inverter A EE-8H Vent Fans Breaker is closed. | _____ | |



Attachment 1 - Inverter A (EE-8H) Operation

PROCEDURE (continued)

(✓) INITIALS

CAUTION

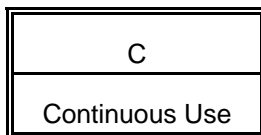
Adjustments to inverter output frequency or output voltage shall only be made by Electrical Maintenance. Guidance from EM-PM-EX-0800 may be referenced as necessary.

- 7.f 8) Verify Inverter A Output Frequency is between 59.4 and 60.6 Hz (normal 60.0 Hz). _____
- 9) Verify Inverter A Output Voltage is between 117.6 and 122.4 Volts AC (normal 120.0 Volts AC). _____
- g. IF restoration from short-term bypass of Inverter C (EE-8K) is desired, THEN perform the following:
- 1) Verify reverse transfer light is on. _____
- 2) Verify EE-8K-S1, Inverter C, EE-8K Manual Transfer Switch, is in the INVERTER position. _____
- 3) Ensure sync loss light is off. _____
- 4) Push the forward transfer button. _____
- 5) Verify reverse transfer light is off. _____
- 6) Verify forward transfer light is on. _____
- 7) Ensure EE-8K-CB3, Inverter C EE-8K Vent Fans Breaker is closed. _____

CAUTION

Adjustments to inverter output frequency or output voltage shall only be made by Electrical Maintenance. Guidance from EM-PM-EX-0800 may be referenced as necessary.

- 8) Verify Inverter C Output Frequency is between 59.4 and 60.6 Hz (normal 60.0 Hz). _____



Attachment 1 - Inverter A (EE-8H) Operation

PROCEDURE (continued)

(✓) INITIALS

7.g 9) Verify Inverter C Output Voltage is between 117.6 and 122.4 Volts AC (normal 120.0 Volts AC).

h. Remove the block from the PPLS/BLOCK A relay (device #817), located behind CB-3.

EM

Ind Verif

8. IF dead bus transfer of instrument Buses A and A1 back to normal alignment is desired,
THEN perform the following:

a. Ensure no grounds are present on Instrument Bus A.

b. Ensure I-BUS-IA-1, Instrument Bus A Supply Breaker, is open (AI-40A).

c. Ensure EE-8H-CB1, Inverter A, EE-8H DC Input Breaker is open.

d. Ensure EE-8H-S1, Inverter A, EE-8H Manual Transfer Switch, is in BYPASS.

e. Ensure MCC-3B1-E3R, EE-4N Inverter A Bypass Transformer, Breaker is closed.

f. Remove all loads from Buses A and A1.

g. Close EE-8H-CB2, Inverter A, EE-8H AC Output Breaker.

h. Open I-BUS-AC-2, Instrument Bus C Tie Breaker (AI-40C).

i. Open I-BUS-AC-1, Instrument Bus A Tie Breaker (AC-40A).

j. Close I-BUS-IA-1, Instrument Bus A Supply Breaker (AI-40A).

C
Continuous Use

Attachment 1 - Inverter A (EE-8H) Operation

PROCEDURE (continued)

(✓) INITIALS

NOTE

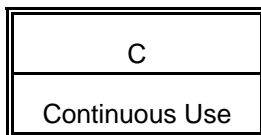
If desired then startup inverter A otherwise N/A all remaining steps.

- 8 k. Ensure EE-8F-CB24, EE-8H Inverter A, Breaker on DC Bus No. 1 is closed.

NOTE

The following steps will place Inverter A in service.

- l. Momentarily push the precharge button on Inverter A, then wait ten (10) seconds.
- m. Close EE-8H-CB1, Inverter A, EE-8H DC Input Breaker.
- n. Verify sync loss light is on.
- o. Verify reverse transfer light is on.
- p. Place EE-8H-S1, Inverter A, EE-8H Manual Transfer Switch, in the INVERTER position.
- q. Ensure sync loss light is off.
- r. Push the forward transfer button.
- s. Verify reverse transfer light is off.
- t. Verify forward transfer light is on.
- u. Ensure EE-8H-CB3, Inverter A EE-8H Vent Fans Breaker, is closed.



Attachment 1 - Inverter A (EE-8H) Operation

PROCEDURE (continued)

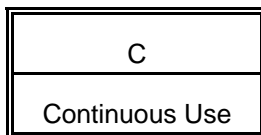
(✓) INITIALS

CAUTION

Adjustments to inverter output frequency or output voltage shall only be made by Electrical Maintenance. Guidance from EM-PM-EX-0800 may be referenced as necessary.

8.
 - v. Verify Inverter A Output Frequency is between 59.4 and 60.6 Hz (normal 60.0 Hz). _____
 - w. Verify Inverter A Output Voltage is between 117.6 and 122.4 Volts AC (normal 120.0 Volts AC). _____
 - x. Once Inverter A is operable and has been returned to its bus (i.e. forward transferred) declare Inverter A (EE-8H) operable. _____
9. IF Inverter A (EE-8H) is in service AND removal from operation of Bypass transformer is desired, THEN perform the following:
 - a. IF Clutch Power Supply is being fed from Instrument Bus A, THEN transfer Clutch power per OI-EE-4, Attachment 7. _____
 - b. Ensure sync loss light is off. _____
 - c. Verify reverse transfer light is off. _____
 - d. Verify forward transfer light is on. _____
 - e. Inform the Control Room that **INVERTER A TROUBLE** (CB-20, A15, A-6) will alarm when MCC-3B1-E3R, EE-4N Inverter A Bypass Transformer breaker is opened. _____
 - f. Open breaker MCC-3B1-E3R. _____
 - g. Verify Sync loss light is on. _____

SM/CRS



Attachment 1 - Inverter A (EE-8H) Operation

PROCEDURE (continued)

(✓) INITIALS

CAUTION

Adjustments to inverter output frequency or output voltage shall only be made by Electrical Maintenance. Guidance from EM-PM-EX-0800 may be referenced as necessary.

9.
 - h. Verify Inverter A Output Frequency is between 59.4 and 60.6 Hz (normal 60.0 Hz). _____
 - i. Verify Inverter A Output Voltage is between 117.6 and 122.4 Volts AC (normal 120.0 Volts AC). _____
10. IF Inverter A (EE-8H) is in service AND return to service of Bypass transformer EE-4N is desired, THEN perform the following:
 - a. Ensure the following:
 - 1) Inverter A is in operation. _____
 - 2) MCC-3B1-E3R, EE-4N Inverter A Bypass Transformer breaker is open. _____
 - 3) Inverter A sync loss light is on. _____
 - b. Inform the Control Room **INVERTER A TROUBLE** (CB-20, A15, A-6) alarm will clear when breaker MCC-3B1-E3R, breaker is closed. _____
 - c. Close breaker MCC-3B1-E3R. _____
 - d. Verify the sync loss light is off at the Inverter. _____
 - e. Verify with Control Room that **INVERTER A TROUBLE** (CB-20, A15, A-6) alarm is clear. _____
 - f. Verify reverse transfer light is off. _____
 - g. Verify forward transfer light is on. _____

C
Continuous Use

Attachment 1 - Inverter A (EE-8H) Operation

PROCEDURE (continued)

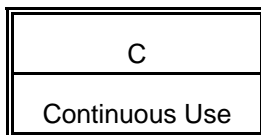
(✓) INITIALS

CAUTION

Adjustments to inverter output frequency or output voltage shall only be made by Electrical Maintenance. Guidance from EM-PM-EX-0800 may be referenced as necessary.

- 10 h. Verify Inverter A Output Frequency is between 59.4 and 60.6 Hz
(normal 60.0 Hz). _____
- i. Verify Inverter A Output Voltage is between 117.6 and 122.4 Volts AC
(normal 120.0 Volts AC). _____

Completed by _____ Date/Time _____ / _____



Attachment 7 - Clutch Power Supplies

PREREQUISITES

(✓) INITIALS

1. Procedure Revision Verification

Revision No. _____ Date: _____

2. 125 VDC Bus 1 (EE-8F) and Bus 2 (EE-8G) are in service per OI-EE-3.

3. IF RCS temperature is greater than 300°F,
THEN verify Checklist OI-EE-4-CL-A has been completed.

PROCEDURE

CAUTIONS

1. Only one power supply transfer switch may be transferred at a time.
2. This procedure may cause a Reactor Trip if performed incorrectly.

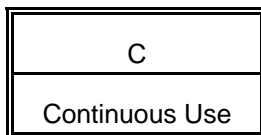
1. IF transferring Clutch Power Supply to 120 Volt AC Instrument Bus A,
THEN perform the following:

- a. Ensure Instrument Bus A is not cross-tied to Instrument Bus C.
- b. Bypass Inverter A per Attachment 1.
- c. Verify Clutch Power Supply breaker RPS/CB-CD is closed.

NOTE

Breaker RPS/CB-AB may go to the trip free position when Clutch Power Supply Transfer Switch RPS/TS-AB is placed in the Bus A position due to momentary undervoltage.

- d. Place Clutch Power Supply Transfer Switch RPS/TS-AB in the Instrument Bus A position #1.
- e. Verify Clutch Power Supply Breaker RPS/CB-AB is closed.
- f. IF Breaker RPS/CB-AB is in the trip free position,
THEN reset and close Breaker RPS/CB-AB.



Attachment 7 - Clutch Power Supplies

PROCEDURE (continued)

(✓) INITIALS

- 1
 - g. Verify all four Clutch Power Supply ammeters read upscale. _____
 - h. Verify proper indicating lights in Clutch Power Supply Cabinet are energized. _____
 - i. Place Inverter A in normal operation per Attachment 1. _____

CAUTIONS

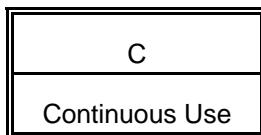
1. Only one power supply transfer switch may be transferred at a time.
2. This procedure may cause a Reactor Trip if performed incorrectly..

2. IF transferring Clutch Power Supply to 120 Volt AC Instrument Bus B, THEN perform the following:
 - a. Ensure Instrument Bus B is not cross-tied to Instrument Bus D. _____
 - b. Bypass Inverter B per Attachment 2. _____
 - c. Verify Clutch Power Supply Breaker RPS/CB-CD is closed. _____

NOTE

Breaker RPS/CB-AB may go to the trip free position when Clutch Power Supply Transfer Switch RPS/TS-AB is placed in the Bus B position due to momentary undervoltage.

- d. Place Clutch Power Supply Transfer Switch RPS/TS-AB in the Instrument Bus B position #2. _____
- e. Verify Clutch Power Supply Breaker RPS/CB-AB is closed. _____
- f. IF Breaker RPS/CB-AB is in the trip free position, THEN reset and close Breaker RPS/CB-AB. _____
- g. Verify all four Clutch Power Supply ammeters read upscale. _____



Attachment 7 - Clutch Power Supplies

PROCEDURE (continued)

(✓) INITIALS

- 2
 - h. Verify proper indicating lights in Clutch Power Supply Cabinet are energized. _____
 - i. Place Inverter B in normal operation per Attachment 2. _____

CAUTIONS

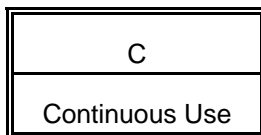
1. Only one power supply transfer switch may be transferred at a time.
2. This procedure may cause a Reactor Trip if performed incorrectly..

3. IF transferring Clutch Power Supply to 120 Volt AC Instrument Bus C, THEN perform the following:
 - a. Ensure Instrument Bus C is not cross-tied to Instrument Bus A. _____
 - b. Bypass Inverter C per Attachment 3. _____
 - c. Verify Clutch Power Supply Breaker RPS/CB-AB is closed. _____

NOTE

Breaker RPS/CB-CD may go to the trip free position when Clutch Power Supply Transfer Switch RPS/TS-CD is placed in the Bus C position due to momentary undervoltage.

- d. Place Clutch Power Supply Transfer Switch RPS/TS-CD in the Instrument Bus C position #3. _____
- e. Verify Clutch Power Supply breaker RPS/CB-CD is closed. _____
- f. IF Breaker RPS/CB-CD is in the trip free position, THEN reset and close Breaker RPS/CB-CD. _____
- g. Verify all four Clutch Power Supply ammeters read upscale. _____
- h. Verify proper indicating lights in Clutch Power Supply Cabinet are energized. _____



Attachment 7 - Clutch Power Supplies

PROCEDURE (continued)

(✓) INITIALS

- 3 i. Place Inverter C in normal operation per Attachment 3.

CAUTIONS

1. Only one power supply transfer switch may be transferred at a time.
2. This procedure may cause a Reactor Trip if performed incorrectly..

4. IF transferring Clutch Power Supply to 120 Volt AC Instrument Bus D,
THEN perform the following:

- a. Ensure Instrument Bus D is not cross-tied to Instrument Bus B.
- b. Bypass Inverter D per Attachment 4.
- c. Verify Clutch Power Supply breaker RPS/CB-AB is closed.

NOTE

Breaker RPS/CB-CD may go to the trip free position when Clutch Power Supply Transfer Switch RPS/TS-CD is placed in the Bus D position due to momentary undervoltage.

- d. Place Clutch Power Supply Transfer Switch RPS/TS-CD in the Instrument Bus D position #4.
- e. Verify Clutch Power Supply breaker RPS/CB-CD is closed.
- f. IF Breaker RPS/CB-CD is in the trip free position,
THEN reset and close Breaker RPS/CB-CD.
- g. Verify all four Clutch Power Supply ammeters read upscale.
- h. Verify proper indicating lights in Clutch Power Supply Cabinet are energized.
- i. Place Inverter D in normal operation per Attachment 4.

Completed by _____ Date/Time _____ / _____

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0387

JPM Title: AFW Functional Test of Circuits and Components

Location: Simulator

Approximate Time: 25 minutes Actual Time: _____

Reference(s): OP-ST-AFW-3007 R12
NRC K/A 061000 K4.02 (RO 4.5 / SRO 4.6)

JPM Prepared by: Jerry Koske Date: 05/05/05

JPM Reviewed by: _____ Date: _____

JPM Approved by: _____ Date: _____

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0387

JPM Title: AFW Functional Test of Circuits and Components

Operators' Name: _____ Employee # _____

All Critical Steps (shaded) must be performed or simulated in accordance
with the standards contained in this JPM

The Operator's performance was evaluated as (circle one):

SATISFACTORY

UNSATISFACTORY

Evaluator's Signature: _____ Date: _____

Reason, if unsatisfactory:

Tools & Equipment: AI-66 Keys

Safety Considerations: None

Comments:

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0387

JPM Title: AFW Functional Test of Circuits and Components

INITIATING CUE: The plant is in cold shutdown. You have been directed to perform a portion of Attachment 1 of OP-ST-AFW-3007, “Auxiliary Feedwater Functional Test of Circuits and Components” starting with step 3 and ending at step 11.

All prerequisites are met. The keys required for this test have been placed in the appropriate switches. The required jumpers and blocks have been placed on relay A1/RC-2A/AFWS

START

Critical Steps shown in gray

STEP	ELEMENT	STANDARD
1 (3.1)	Reset HCV-1107A	<u>AI-66A</u> HCV-1107A CS to RESET then to AUTO
2 (3.2)	Reset HCV-1107B	<u>AI-66A</u> HCV-1107B CS to RESET then to AUTO
3 (3.3)	Place FW-6 recirculation valve, FCV-1368 in auto	<u>AI-66A</u> FCV-1368 CS in AUTO
4 (3.4)	Place S/G RC-2A Chan “A” auto Sig Override SW AFW Pumps FW-6/FW-10 control switch to normal	<u>AI-66A</u> S/G RC-2A Chan “A” auto Sig Override SW AFW Pumps FW-6/FW-10 control switch to NORMAL
5 (3.5)	Place S/G RC-2B Chan “A” auto Sig Override SW AFW Pumps FW-6/FW-10 control switch to normal	<u>AI-66A</u> S/G RC-2B Chan “A” auto Sig Override SW AFW Pumps FW-6/FW-10 control switch to NORMAL

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0387

JPM Title: AFW Functional Test of Circuits and Components

STEP	ELEMENT	STANDARD
6 (3.6)	Place S/G RC-2A Chan A Auto Sig Override Relay Test SW to NORM	<u>AI-66A</u> S/G RC-2A Chan A Auto Sig Override Relay Test SW to NORM
7 (3.7)	Place S/G RC-2B Chan A Auto Sig Override Relay Test SW to NORM	<u>AI-66A</u> S/G RC-2B Chan A Auto Sig Override Relay Test SW to NORM
8 (3.8)	Place Chan A AFW Auto Sig Override S/G Feed Valves switch to Normal	<u>AI-66A</u> Chan A AFW Auto Sig Override S/G Feed Valves switch to NORMAL
9 (4.1)	Reset HCV-1108A	<u>AI-66B</u> HCV-1108A CS to RESET then to AUTO
10 (4.2)	Reset HCV-1108B	<u>AI-66B</u> HCV-1108B CS to RESET then to AUTO
11 (4.3)	Reset YCV-1045	<u>AI-66B</u> YCV-1045 CS to RESET then to AUTO
12 (4.4)	Place FW-10 Auto Start Relay Test Switch to Normal	<u>AI-66B</u> FW-10 Auto Start Relay Test Switch to NORMAL
13 (4.5)	Place FW-10 recirculation valve, FCV-1369, in auto	<u>AI-66B</u> FW-10 recirculation valve, FCV-1369, in AUTO
14 (4.6)	Place YCV-1045A Isolation valve override switch to normal	<u>AI-66B</u> YCV-1045A Isolation valve override switch to NORMAL

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0387

JPM Title: AFW Functional Test of Circuits and Components

STEP	ELEMENT	STANDARD
15 (4.7)	Place YCV-1045A CS to close then normal	<u>AI-66B</u> YCV-1045A CS to CLOSE then to NORMAL
16 (4.8)	Place YCV-1045B Isolation valve override switch to normal	<u>AI-66B</u> YCV-1045B Isolation valve override switch to NORMAL
17 (4.9)	Place YCV-1045B CS to close then normal	<u>AI-66B</u> YCV-1045B CS to close then NORMAL
18 (4.10)	Place S/G RC-2A Chan "B" auto Sig Override SW AFW Pumps FW-6/FW-10 control switch to normal	<u>AI-66B</u> S/G RC-2A Chan "B" auto Sig Override SW AFW Pumps FW-6/FW-10 control switch to NORMAL
19 (4.11)	Place S/G RC-2B Chan "B" auto Sig Override SW AFW Pumps FW-6/FW-10 control switch to normal	<u>AI-66B</u> S/G RC-2B Chan "B" auto Sig Override SW AFW Pumps FW-6/FW-10 control switch to NORMAL
20 (4.12)	Place S/G RC-2A Chan B Auto Sig Override Relay Test SW to NORM	<u>AI-66B</u> S/G RC-2A Chan B Auto Sig Override Relay Test SW to NORM
21 (4.13)	Place S/G RC-2B Chan B Auto Sig Override Relay Test SW to NORM	<u>AI-66B</u> S/G RC-2B Chan B Auto Sig Override Relay Test SW to NORM
22 (4.14)	Place Chan B AFW Auto Sig Override S/G Feed Valves switch to Normal	<u>AI-66B</u> Chan B AFW Auto Sig Override S/G Feed Valves switch to NORMAL

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0387

JPM Title: AFW Functional Test of Circuits and Components

STEP	ELEMENT	STANDARD
23 (5)	Place FW-6 control switch in AFTER STOP	<u>CB-10</u> HC-1367, FW-6 CS [laced in AFTER STOP (Green flag)
24 (6)	Initiate and AFW actuation from AI-66A	<u>AI-66A</u> Place and HOLD S/G RC-2A Chan A Auto Sig Override Relay Test Switch in TEST
25 (7)	Verify actions/indications <ul style="list-style-type: none"> • HCV-1107A and B open • FW-6 starts • YCV-1045 opens • YCV-1045A and B open • AFW flow to RC-2A • AFWS STEAM GEN RC-2A CHANNEL A ACTUATED alarm • AFWS RC-2A CH A MATRIX TS-A/RC-2A/AFWS TEST SWITCH OFF NORMAL alarm • S/G RC-2A Chan A light • S/G RC-2A Chan A1 light 	<u>AI-66A</u> While holding switch in TEST, verify: <ul style="list-style-type: none"> • RED lights lit • RED and WHITE lights lit • RED light lit • RED lights lit • Flow indicated on FI-1109-1 • Annunciator A66A, 44 lit • Annunciator A66A, 24 lit • AMBER light lit • AMBER light lit
26 (8)	Record values:	CUE: Provide flows from CB-10 FI-1109 = 295 gpm FW-6 amp = 34 amps FI-1368 = 300 gpm

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0387

JPM Title: AFW Functional Test of Circuits and Components

STEP	ELEMENT	STANDARD
		<u>AI-66</u> Reads and records flow from FI-1109-1 (should read approximately 300 gpm)
27 (8.1)	Verifies flow is at least 200 gpm for ISI requirement	Initials procedure step 8.1
29 (9)	Place S/G RC-2A Chan A auto sig Override relay test SW to NORM	<u>AI-66A</u> S/G RC-2A Chan A auto sig Override relay test SW to NORM
30 (10.1)	Place FW-6 CS in pull-to-lock	<u>CB-10</u> HC-1367, FW-6 CS placed in PULL-TO-LOCK
31 (10.2)	Reset HCV-1107A	<u>AI-66A</u> HCV-1107A CS to RESET then to AUTO
32 (10.3)	Reset HCV-1107B	<u>AI-66A</u> HCV-1107B CS to RESET then to AUTO
33 (10.4)	Reset YCV-1045	<u>AI-66A</u> YCV-1045 CS to RESET then to CLOSE then to RESET then to AUTO
34 (10.5)	Reset YCV-1045A	<u>AI-66A</u> YCV-1045A CS to CLOSE then to NORMAL
35 (10.6)	Reset YCV-1045B	<u>AI-66A</u> YCV-1045B CS to CLOSE then to NORMAL
36 (10.7)	Verify AFWS STEAM GEN RC-2A CHANNEL A ACTUATED	<u>AI-66A</u> Annunciator A66A, 44 OFF

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0387

JPM Title: AFW Functional Test of Circuits and Components

STEP	ELEMENT	STANDARD
	alarm is clear	
37 (10.8)	Verify AFWS RC-2A CH A MATRIX TS-A/RC-2A/AFWS TEST SWITCH OFF NORMAL alarm is clear	<u>AI-66A</u> Annunciator A66A, 24 OFF
38 (10.9)	Verify S/G RC-2A Chan A amber light is off	<u>AI-66A</u> S/G RC-2A Chan A amber light is OFF
39 (10.10)	Verify S/G RC-2A Chan A1 amber light is off	<u>AI-66A</u> S/G RC-2A Chan A1 amber light is OFF CUE: Electricians have removed the jumpers and blocks from relay A1/RC- 2A/AFWS

Termination Criteria: OP-ST-AFW-3007, Attachment 1, has been
completed through step 11

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0387

INITIATING CUE: The plant is in cold shutdown. You have been directed to perform a portion of Attachment 1 of OP-ST-AFW-3007, “Auxiliary Feedwater Functional Test of Circuits and Components” starting with step 3 and ending at step 11.

All prerequisites are met. The keys required for this test have been placed in the appropriate switches. The required jumpers and blocks have been placed on relay A1/RC-2A/AFWS

START

Fort Calhoun Station
Unit No. 1

OP-ST-AFW-3007

SURVEILLANCE TEST

Title: AUXILIARY FEEDWATER FUNCTIONAL TEST OF CIRCUITS AND COMPONENTS

FC-68 Number: EC 34913

Reason for Change: Add power supplies

Requestor: Christopher Verdoni

Preparer: Daniel A Hochstein

Correction (a): Page 1 (03-08-05)

AUXILIARY FEEDWATER FUNCTIONAL TEST OF CIRCUITS AND COMPONENTS

SAFETY RELATED

1. PURPOSE

- 1.1 This test is to verify operability of FW-6, through its normal flow paths, in order to satisfy the requirements of Technical Specifications 2.5(1), 2.5(2) and 3.9(5).
- 1.2 This test shall be performed each Cold Shutdown in accordance with the Fort Calhoun Station (FCS) Inservice Inspection (ISI) Program Plan.
- 1.3 This test verifies the operability of Auxiliary Feedwater Check Valves FW-163, FW-164 and FW-173 as required in USAR 4.5.6.5.
- 1.4 The test satisfies the requirements of Technical Specifications 3.1, Table 3-2 Item 23b(1) and 24a, for functional testing of Auxiliary Feedwater initiation circuits each refueling.

2. REFERENCES/COMMITMENT DOCUMENTS

- 2.1 Technical Specifications
 - 2.5, Steam and Feedwater Systems
 - 2.15, Instrumentation and Control Systems
 - 3.1, Table 3-2: Minimum Frequencies for Checks, Calibrations and Testing of Engineered Safety Features, Instrumentation and Controls
 - 3.9, Auxiliary Feedwater System
- 2.2 USAR 4.5.6.5: In-service Inspection of ASME Code Class 1, Class 2, and Class 3 Components
- 2.3 Fort Calhoun Station ISI Program Plan

3. DEFINITIONS

None

4. EQUIPMENT LIST

- 4.1 Tools
 - Electrical Jumpers (2)
 - Mechanical Blocks (2) (Suitable for preventing HFA relay contact from closing.)
 - Digital Multimeter (1)

5. PRECAUTIONS AND LIMITATIONS

- 5.1 All anomalies and deficiencies shall be reported immediately to the immediate Supervisor and the Shift Manager, and noted on the Comment Sheet. An immediate check shall be made to verify Limiting Conditions for Operation, per Technical Specifications, have not been exceeded.
- 5.2 The System Engineer shall be notified within 24 hours of the completion of this test, of any marginal, unexpected or unacceptable results.
- 5.3 If this test cannot be completed by the end of shift, and will not be continued by the next shift, the loop must be placed in a condition as directed by the Shift Manager. All actions taken for temporarily stopping and for resuming the test shall be documented in detail (including SO-O-25 as applicable) on the Comment Sheet.
- 5.4 The following may alarm during this Surveillance Test.
- **AFWS RC-2A CH A MATRIX TS-A/RC-2A/AFWS TEST SWITCH OFF NORMAL** (AI-66A, A66A, 24)
 - **AFWS RC-2B CH A MATRIX TS-A/RC-2B/AFWS TEST SWITCH OFF NORMAL** (AI-66A, A66A, 25)
 - **AFWS STEAM GEN RC-2A CHANNEL A ACTUATED** (AI-66A, A66A, 44)
 - **AFWS STEAM GEN RC-2B CHANNEL A ACTUATED** (AI-66A, A66A, 45)
 - **AFWS RC-2A CH B MATRIX TS-B/RC-2A/AFWS TEST SWITCH OFF NORMAL** (AI-65B, A65B, 21)
 - **AFWS RC-2B CH B MATRIX TS-B/RC-2B/AFWS TEST SWITCH OFF NORMAL** (AI-65B, A65B, 22)
 - **AFWS STEAM GEN RC-2A CHANNEL B ACTUATED** (AI-65B, A65B, 41)
 - **AFWS STEAM GEN RC-2B CHANNEL B ACTUATED** (AI-65B, A65B, 42)
 - **FW-10 TURBINE DRIVEN FEEDWATER PUMP TROUBLE** (AI-66B, A66B, 18)

6. PREREQUISITES

INITIALS/DATE

- 6.1 Procedure Revision Verification.

Revision No. _____

_____ / _____

- 6.2 A Lead Person qualified to a minimum of Electrician category E08C is available for the performance of this test.

_____ / _____
EM Supv/ Crew
Leader

- 6.3 There is sufficient volume available in the Steam Generators to accept AFW flow.

_____ / _____

- 6.4 There is sufficient volume in the Emergency Feedwater Storage Tank to support operation of FW-6. _____ /
- 6.5 Electrical power is available to FW-6 via 4160 V Bus 1A3. _____ /
- 6.6 Ensure that BKR 1A3-16, Breaker Unit Auxiliary Feedwater Pump FW-6, is properly racked up. _____ /
- 6.7 Ensure the 69 Permissive Switch is red flagged with Red or Green light indication and Amber light lit. _____ /

NOTE: During the performance of this test, YCV-1045A and YCV-1045B are actuated open.

- 6.8 Verify steam is not available to FW-10. _____ /
- 6.9 Applicable portions of OI-AFW-1-CL-A and OI-AFW-1-CL-B are completed. _____ /
- 6.10 A prejob briefing has been conducted prior to the start of this test. _____ /
- 6.11 No other test is in progress which could potentially affect this test, or if this test were performed, could have an effect on that test. _____ /
- 6.12 The Shift Manager has authorized the performance of this test.

Shift Manager _____ Date/Time _____ /

7. PROCEDURE

NOTE: Step 7.1 can be performed at anytime and repeated as necessary.

- 7.1 IF this Surveillance Test is turned over, a prejob briefing must be conducted prior to the continuation of this test. _____ /
- 7.2 Perform Attachment 1 as required.

ATTACHMENT

PAGE

1 - Aux Feedwater Functional Test of Circuits/Components 5 _____ /

8. RESTORATION

8.1 Shift Manager has been notified this test has been completed.

Shift Manager _____ Date/Time _____ / _____

9. ACCEPTANCE CRITERIA

9.1 All components and indications functioned as described in the body of this procedure.

10. TEST RECORD

10.1 This entire procedure

11. PERFORMANCE AND REVIEW

11.1 Test data shall be evaluated by the Shift Technical Advisor (STA) and reviewed by the Shift Manager for acceptability within 24 hours of the completion of this test.

Evaluated by _____ Date/Time _____ / _____
STA Signature

Reviewed by _____ Date/Time _____ / _____
Shift Manager

11.2 The ISI Coordinator is responsible for reviewing the test for compliance with the FCS ISI Program Plan. This test has been reviewed and found acceptable or the deficiencies have been noted in the Comment Sheet.

ISI Coordinator _____ / _____
Signature Date Time

11.3 The System Engineer is responsible for reviewing this Surveillance Test. Test data has been evaluated and found to be acceptable, or deficiencies identified and actions taken have been noted on the Comment Sheet.

System Engineer _____ / _____
Signature Date Time

Attachment 1 - Aux Feedwater Functional Test of Circuits/Components

PROCEDURE

(v) INITIALS

1. Obtain appropriate keys, as required for the manipulation of AI-66A and AI-66B switches, from the Shift Managers key lockbox. _____
2. Place the following jumpers and blocks on relay A1/RC-2A/AFWS (Device 25) in AI-66A:
 - Jumper Contact 1-2

 EM

 Con Verif
 - Block Open Contact 3-4

 EM

 Con Verif
 - Jumper Contact 5-6

 EM

 Con Verif
 - Block Open Contact 11-12

 EM

 Con Verif
3. Align AI-66A as follows:
 - 3.1 Place HCV-1107A, Aux FW to S/G RC-2A Isolation Valve Inbd, control switch to RESET, then to AUTO. _____
 - 3.2 Place HCV-1107B, Aux FW to S/G RC-2A Isolation Valve Outbd control switch to RESET, then to AUTO. _____
 - 3.3 Place FCV-1368, Aux FW Pump FW-6 Recirculation Valve control switch to AUTO. _____
 - 3.4 Place S/G RC-2A Chan "A" Auto Sig Override SW AFW Pumps FW-6/FW-10 control switch to NORMAL. _____

Attachment 1 - Aux Feedwater Functional Test of Circuits/Components

<u>PROCEDURE</u> (continued)	<u>(√)</u>	<u>INITIALS</u>
3.5 Place S/G RC-2B Chan A Auto Sig Override SW AFW Pumps FW-6/FW-10 control switch to NORMAL.		_____
3.6 Place S/G RC-2A Chan A Auto Sig Override Relay Test SW to NORM.		_____
3.7 Place S/G RC-2B Chan A Auto Sig Override Relay Test SW to NORM.		_____
3.8 Place Chan A AFW Auto Sig Override S/G Feed Valves switch to NORMAL.		_____
4. Align AI-66B as follows:		
4.1 Place HCV-1108A, Aux FW to S/G RC-2B Isolation Valve Inbd control switch to RESET, then to AUTO.		_____
4.2 Place HCV-1108B, Aux FW to S/G RC-2B Isolation Valve Outbd control switch to RESET, then to AUTO.		_____
4.3 Place YCV-1045, STM to Pump FW-10 Control Valve control switch to RESET, then to AUTO.		_____
4.4 Place Pump FW-10 Auto Start Relay Test Switch to NORMAL.		_____
4.5 Place FCV-1369, Aux FW Pump FW-10 Recirculation Valve control switch to AUTO.		_____
4.6 Place YCV-1045A, Isolation Valve Override switch to NORMAL.		_____
4.7 Place YCV-1045A, S/G RC-2A STM to FW-10 HDR A Isolation Valve control switch to CLOSE, then to NORMAL.		_____
4.8 Place YCV-1045B Isolation Valve Override switch to NORMAL.		_____
4.9 Place YCV-1045B, S/G RC-2B STM to FW-10 HDR B Isolation Valve control switch to CLOSE, then to NORMAL.		_____
4.10 Place S/G RC-2A Chan B Auto Sig Override SW AFW Pumps FW-6/FW-10 switch to NORMAL.		_____

Attachment 1 - Aux Feedwater Functional Test of Circuits/Components

<u>PROCEDURE</u> (continued)	<u>(√)</u>	<u>INITIALS</u>
4.11 Place S/G RC-2B Chan B AFWS Auto Sig Override SW AFW Pumps FW-6/FW-10 switch to NORMAL.		_____
4.12 Place S/G RC-2A Chan B Auto Sig Override Relay Test SW to NORM.		_____
4.13 Place S/G RC-2B Chan B Auto Sig Override Relay Test SW to NORM.		_____
4.14 Place Chan B AFW Auto Sig Override SG Feed Valves switch to NORMAL.		_____
5. Place HC-1367, FW-6 Control Switch to AFTER STOP. (CB-10)		_____
NOTE: The test switch must be held in the test position until component status is verified.		
6. Initiate an AFW actuation from AI-66A by placing and holding the S/G RC-2A Chan A Auto Sig Override Relay Test Switch to TEST.		_____
7. Verify the following action/indications occur:		
● HCV-1107A and B open.	_____	
● FW-6 starts.	_____	
● YCV-1045 opens.	_____	
● YCV-1045A and B open.	_____	
● AFW flow to RC-2A is indicated on FI-1109-1.	_____	
● AFWS STEAM GEN. RC-2A CHANNEL A ACTUATED (AI-66A, A66A, 44) is in alarm.	_____	
● AFWS RC-2A CH A MATRIX TS-A/RC-2A/AFWS TEST SWITCH OFF NORMAL (AI-66A, A66A, 24) is in alarm	_____	
● S/G RC-2A Chan A amber light is on.	_____	
● S/G RC-2A Chan A1 amber light is on.	_____	_____
8. Record following values:		
_____gpm FI-1109 (CB-10)	_____gpm FI-1109-1 (AI-66)	
_____gpm FW-6 Amps (CB-10)	_____gpm FI-1368 (CB-10)	_____

Attachment 1 - Aux Feedwater Functional Test of Circuits/Components

<u>PROCEDURE</u> (continued)	<u>(√)</u>	<u>INITIALS</u>
8.1 Flow of 200 gpm satisfies the ISI requirement for opening of AFW check valve FW-164 and FW-173.		_____
9. Place S/G RC-2A Chan A Auto Sig Override Relay Test SW to NORM.		_____
10. Restore AFW system as follows:		
10.1 Place HC-1367, FW-6 Control Switch in PULL TO LOCK (CB-10).		_____
10.2 Place HCV-1107A control switch to RESET, then to AUTO.		_____
10.3 Place HCV-1107B control switch to RESET, then to AUTO.		_____
10.4 Place YCV-1045 control switch to RESET, CLOSE, RESET, and then to AUTO.		_____
10.5 Place YCV-1045A control switch to CLOSE, then to NORMAL.		_____
10.6 Place YCV-1045B control switch to CLOSE, then to NORMAL.		_____
10.7 Verify AFWS STEAM GEN. RC-2A CHANNEL A ACTUATED is clear (AI-66A, A66A, 44)		_____
10.8 Verify AFWS RC-2A CH A MATRIX TS-A/RC-2A/AFWS TEST SWITCH OFF NORMAL is clear (AI-66A, A66A, 24)		_____
10.9 Verify S/G RC-2A Chan A amber light is off.		_____
10.10 Verify S/G RC-2A Chan A1 amber light is off.		_____

Attachment 1 - Aux Feedwater Functional Test of Circuits/Components

PROCEDURE (continued)

(v) INITIALS

11. Remove the following jumpers and blocks on relay A1/RC-2A/AFWS
(Device 25) in AI-66A:

- Jumper Contact 1-2

EM

Ind Verif

- Block Contact 3-4

EM

Ind Verif

- Jumper Contact 5-6

EM

Ind Verif

- Block Contact 11-12

EM

Ind Verif

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0613A

JPM Title: Shutdown a Reactor Coolant Pump

Location: Simulator Control Room

Approximate Time: 8 minutes Actual Time: _____

Reference(s): OI-RC-9, Attachment 2 (R56)
K/A 003000 A4.06 (RO 2.9 / SRO2.9)

JPM Prepared by: Jerry Koske Date: 05/05/05

JPM Reviewed by: _____ Date: _____

JPM Approved by: _____ Date: _____

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0613A

JPM Title: Shutdown a Reactor Coolant Pump

Operators' Name: _____ Employee # _____

All Critical Steps (shaded) must be performed or simulated in accordance with the standards contained in this JPM

The Operator's performance was evaluated as (circle one):

SATISFACTORY

UNSATISFACTORY

Evaluator's Signature: _____ Date: _____

Reason, if unsatisfactory:

Tools & Equipment: Zero Power Mode Bypass Keys

Safety Considerations: None

Comments: Fail RC-3D's 90% speed switch COP JOB3171L As is
This is an Alternate Path JPM

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0613A

JPM Title: Shutdown a Reactor Coolant Pump

INITIATING CUE: The reactor is in Hot Shutdown and is being cooled down to go into refueling. The RCS T-cold is 505°F and lowering approximately 30°F per hour.

You, the LO, are directed to shutdown Reactor Coolant Pump RC-3D. You are to verify that the prerequisites are met. The procedure revision has been verified.

START

Critical Steps shown in gray

STEP	ELEMENT	STANDARD
1 (prereq 2)	Ensure the reactor is shutdown prior to stopping a RCP.	<u>CB-4</u> Verify all trippable rods are inserted
2 (prereq 3)	Ensure Zero Power Mode Bypass switches are in Bypass	<u>AI-31 A/B/C/D</u> Keys installed and AMBER lights lit
3 (1)	Stop Reactor Coolant Pump RC-3D	<u>CB-1,2,3</u> RC-3D CS to AFTER-STOP position and release GREEN light lit
4 (2)	Ensure the Oil Lift Pump starts automatically as pump speed lowers.	<u>CB-1,2,3</u> Determines pump did not start. Manually starts lift oil pump by placing Oil Lift Pump CS, RC-3D-1, in START position and verifying RED light on.

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0613A

JPM Title: Shutdown a Reactor Coolant Pump

STEP	ELEMENT	STANDARD
5 (2)	Holds Oil Lift Pump control switch in the START position	If the control switch is released, the lift pump will stop. It should then be returned to the START position. The control switch should be held in the START position until the zero speed light comes on. (approximately 2 minutes)
6 (3)	Ensure Reverse Rotation Annunciator is clear.	<u>CB-1,2,3, A6 D-5</u> Annunciator is OFF
7 (5)	Confirm Zero Speed light is on	<u>CB-1,2,3</u> RC-3D GREEN light on
8 (4)	Confirm RCP tachometer indicates zero	CUE: Local Operator reports RC-3D speed is zero rpm.
9 (6)	Stop oil lift pump.	<u>CB-1,2,3</u> Control switch to AFTER-STOP GREEN light lit

Termination Criteria: Reactor Coolant Pump RC-3D is secured and its Oil Lift pump has been stopped

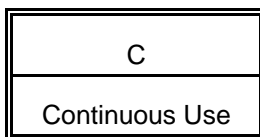
Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0613A

INITIATING CUE: The reactor is in Hot Shutdown and is being cooled down to go into refueling. The RCS T-cold is 505°F and lowering approximately 30°F per hour.

You, the LO, are directed to shutdown Reactor Coolant Pump RC-3D. You are to verify that the prerequisites are met. The procedure revision has been verified.

START



Attachment 2 - Shutdown Reactor Coolant Pumps (Coupled)

PREREQUISITES

(✓) INITIALS

1. Procedure Revision Verification

Revision No. _____ Date: _____

2. The Reactor is Shutdown (Mode 3, Mode 4 or Mode 5).

3. The Zero Power Mode Bypass Switches on AI-31A/B/C/D are in bypass to disable the RPS Low Flow Trip before the first RCP is stopped.

PROCEDURE

NOTES

1. The order for stopping the RCPs is at the discretion of the Shift Manager.
2. When an RCP is shutdown its seal Bleedoff temperature will rise.

1. Secure the selected RCP by placing its Control Switch to AFTER STOP:

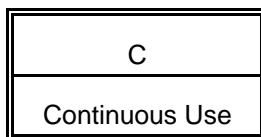
- RC-3A, RC Pump
- RC-3B, RC Pump
- RC-3C, RC Pump
- RC-3D, RC Pump

NOTES

1. Oil Lift Pumps start at less than 90% of full speed.
2. If RCP Lift Pump fails to start , it will be necessary to hold the RCP Oil Lift Control Switch in START until the RCP is verified stopped.

2. Ensure Oil Lift Pump starts (Red indicating light is ON):

- RC-3A-1, Oil Lift Pump
- RC-3B-1, Oil Lift Pump
- RC-3C-1, Oil Lift Pump
- RC-3D-1, Oil Lift Pump



Attachment 2 - Shutdown Reactor Coolant Pumps (Coupled)

PROCEDURE (continued)

(✓) INITIALS

3. For the selected RCP verify the following Annunciator is clear:

- RC-3A **REACTOR COOLANT PUMP RC-3A REVERSE ROTATION**
(CB-1/2/3, A6, A5)
- RC-3B **REACTOR COOLANT PUMP RC-3B REVERSE ROTATION**
(CB-1/2/3, A6, B5)
- RC-3C **REACTOR COOLANT PUMP RC-3C REVERSE ROTATION**
(CB-1/2/3, A6, C5)
- RC-3D **REACTOR COOLANT PUMP RC-3D REVERSE ROTATION**
(CB-1/2/3, A6, D5)

4. Confirm that the RCP tachometer (AI-270, Room 57) indicates zero:

- RC-3A 129-1 ZS Tach
- RC-3B 149-1 ZS Tach
- RC-3C 169-1 ZS Tach
- RC-3D 189-1 ZS Tach

5. Confirm that the Zero Speed Light is ON:

- Pump RC-3A Zero Speed
- Pump RC-3B Zero Speed
- Pump RC-3C Zero Speed
- Pump RC-3D Zero Speed

6. WHEN selected RCP has been verified stopped,
THEN place the Oil Lift Pump for the selected RCP to AFTER STOP:

- RC-3A-1
- RC-3B-1
- RC-3C-1
- RC-3D-1

7. IF other RCPs are to be stopped,
THEN repeat Steps 1 through 6 for each RCP to be stopped.

Completed by _____ Date/Time _____ / _____

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0627

JPM Title: Reduce RCS Pressure using Aux Spray

Location: Simulator

Approximate Time: 12 minutes Actual Time: _____

Reference(s): OI-RC-7 attachments 2 and 3 R10
NRC K/A 010000 A4.01 (RO 3.7 / SRO 3.5)

JPM Prepared by: Jerry Koske Date: 05/10/05

JPM Reviewed by: _____ Date: _____

JPM Approved by: _____ Date: _____

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0627

JPM Title: Reduce RCS Pressure using Aux Spray

Operators' Name: _____ Employee # _____

All Critical Steps (shaded) must be performed or simulated in accordance with the standards contained in this JPM

The Operator's performance was evaluated as (circle one):

SATISFACTORY

UNSATISFACTORY

Evaluator's Signature: _____ Date: _____

Reason, if unsatisfactory:

Tools & Equipment: None

Safety Considerations: None

Comments: Fail the normal pressurizer spray valves in the closed position. Ensure only B/U heater Bank 2 ON

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0627

JPM Title: Reduce RCS Pressure using Aux Spray

INITIATING CUE: The Plant is in hot shutdown. The CRS has directed you to reduce RCS pressure to 1900 psia using pressurizer spray.

All prerequisites are met

START

Critical Steps shown in gray

STEP	ELEMENT	STANDARD
1 (2.a)	Verify PC-103Y is in automatic	<u>CB-1,2,3</u> PC-103Y controller in AUTO
2 (2.b)	Ensure proportional heaters control switches are in auto.	<u>CB-1,2,3</u> Group 6 and Group 7 switches in AUTO
3 (2.c)	Ensure backup heater switches in auto	<u>CB-1,2,3</u> Bank 1 Group 1/2/3, Bank 3 Group 8/9 and Bank 4 Group 10/11/12 switches in AUTO
4 (2.d)	Ensure pressurizer spray valves in auto	<u>CB-1,2,3</u> PCV-101-1 and PCV-103-2 control switches in AUTO
5 (2.e)	Lower RCS pressure by adjusting setpoint pushbuttons on PC-103Y	<u>CB-1,2,3</u> Adjust setpoint push buttons in small increments to lower pressure setpoint
6	Determines the pressurizer spray valves are not responding	<u>CB-1,2,3</u> PCV-101-1 and PCV-103-2 GREEN lights lit

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0627

JPM Title: Reduce RCS Pressure using Aux Spray

STEP	ELEMENT	STANDARD
7 (optional)	May attempt to use PC-103X in automatic to lower pressure	<u>CB-1,2,3</u> Place channel selector switch in "X" position and repeat step 5 using PC-103X
8 (optional)	May attempt to use manual mode to lower RCS pressure	<u>CB-1,2,3</u> Place controller PC-103Y and/or PC-103X in Manual and move the manual control lever to the right so that the output increases to greater than 67%
9	Lower pressure using Aux spray	<u>CB-1,2,3</u> Perform one or both of the following: <ul style="list-style-type: none"> • Place HCV-240 in the OPEN position. • Place HCV-249 in the OPEN position
10		<u>CB-1,2,3</u> May place loop charging valves in CLOSE position as needed to divert adequate flow to Aux Spray line <ul style="list-style-type: none"> • HCV-247 • HCV-238 • HCV-248 • HCV-239
11	When pressure reaches 1900 psia, close the aux spray valves.	<u>CB-1,2,3</u> HCV-240 and HCV-249 both in CLOSE position.

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0627

JPM Title: Reduce RCS Pressure using Aux Spray

STEP	ELEMENT	STANDARD
12	Reopen loop charging valves that may have been closed in step 10	<u>CB-1,2,3</u> ENSURE at least one loop charging valve is open to provide loop charging flow <ul style="list-style-type: none">• HCV-247• HCV-238• HCV-248• HCV-239

Termination Criteria: The RCS is at 1900 psia and the Aux Spray valves are closed

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0627

INITIATING CUE: The Plant is in hot shutdown. The CRS has directed you to reduce RCS pressure to 1900 psia using pressurizer spray.

All prerequisites are met

START

Fort Calhoun Station
Unit No. 1

OI-RC-7

OPERATING INSTRUCTION

Title: REACTOR COOLANT SYSTEM PRESSURE CONTROL NORMAL
OPERATION

FC-68 Number: EC 34293

Reason for Change: Clarify Attachments for taking pressure control to automatic.

Requestor: Joseph Braun

Preparer: Daniel A Hochstein

REACTOR COOLANT SYSTEM PRESSURE CONTROL NORMAL OPERATION

SAFETY RELATED

<u>ATT</u>	<u>PURPOSE</u>	<u>PAGE</u>
1	- Pressurizer Steam Bubble Formation	4
2	- Manual RCS Pressure Control with a Steam Bubble in the Pressurizer	8
3	- Automatic RCS Pressure Control with a Steam Bubble in the Pressurizer	12
4	- Maximum Pressurizer Spray for Mixing	15
5	- Pressurizer Pressure Control MANUAL to AUTOMATIC Transfer for the Selected Channel	18
6	- Pressurizer Pressure Control MANUAL to AUTOMATIC Transfer for the Non-Selected Channel	20
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8	- Pressurizer Pressure Controlling Channel Transfer in AUTOMATIC	22
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10	- Pressurizer Spray Operation when the Difference between Spray Line Temperature and Pressurizer Temperature is Greater Than 200°F	26

PRECAUTIONS

1. Whenever the Pressurizer Heaters are to be energized, the water level in the Pressurizer shall be above an actual level of 41.5%.
2. Reactor Coolant System allowable pressure versus temperature conditions shall be in compliance with Technical Specifications 2.1.2 or TDB-III.7.a and TDB-III.7.d, whichever is more conservative.
3. Power Operated Relief Valve Set points shall be within the limits established in TDB-III.7.a.
4. Pressurizer maximum heat up rate is 100°F/hour and the maximum cooldown rate is 200°F/hour.

PRECAUTIONS (continued)

5. When the differential temperature between the Pressurizer and the Spray Line is greater than 200°F, refer to Attachment 10 of this Operating Instruction.
6. Reactor Coolant System Pressure shall meet the requirements of TDB-III.7.a and/or TDB-III.7.d for Reactor Coolant Pump Operation to satisfy NPSH requirements and less than 250 psia for Shutdown Cooling System operation.
7. Reactor Coolant System pressure of 2750 psia shall not be exceeded with fuel in the Reactor.
8. Reactor Coolant System pressure of 2500 psia shall not be exceeded for Reactor Coolant Pump operation.
9. Any deviations or discrepancies shall be immediately reported to the Shift Manager.
10. Main PZR Spray flow will be reduced with less than four-pump operation. Pressure should be controlled using Main and Auxiliary PZR Spray whenever less than four Reactor Coolant Pumps are in operation.

REFERENCES/COMMITMENTS

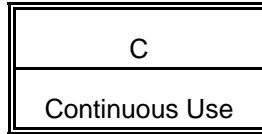
1. Technical Specifications:
 - Section 1.2, Safety Limit, Reactor Coolant System Pressure
 - Section 2.1.2, LCO, Reactor Coolant System, Heat up and Cooldown
 - Section 2.1.6, LCO, Reactor Coolant System, Pressurizer and Steam System Safety Valves
 - Section 2.1.7, LCO, Reactor Coolant System, Pressurizer Operability
2. USAR:
 - Section 4.3.7, Reactor Coolant System, Pressurizer
 - Section 7.4.1, Regulating Systems, Reactor Coolant Pressure Regulating System
 - Section 7.4.2, Regulating Systems, Pressurizer Level Regulating System
 - Section 7.5.1, Instrumentation Systems, Process Instrumentation
 - Figure 4.6.1, Reactor Coolant System Pressure-Temperature Limitations During Plant Cooldown and Heat up After 40 Years Integrated Neutron Flux

REFERENCES/COMMITMENTS (continued)

- | | | | |
|----|-----------------|-------|---|
| 3. | Drawings | File | Description |
| | Figure 8.1-1 | 12234 | Simplified One Line Diagram Plant Electrical System |
| | E-23866-210-110 | 44479 | Reactor Coolant System Diagram |
4. Technical Data Book:
- Figure III.6: Pressurizer Pressure Control Program
 - Figure III.7.a: RCS Pressure and Temperature Limits
 - Figure III.7.d: RCS Pressure and Temperature Limits
5. I&C Equipment List:
- EM-103: Pressurizer Pressure Controls (File No. 1567-1568)

APPENDICES

Table 1 - Calculational Procedure for Pressurizer Spray Nozzle Usage Factor 28



Attachment 1 - Pressurizer Steam Bubble Formation

PREREQUISITES

(✓) INITIALS

1. Procedure Revision Verification

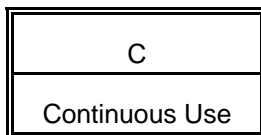
Revision Number _____ Date: _____

2. 120 VAC Instrument Power is operable from A and B Instrument Buses.

3. Pressurizer Heater Power is operable from the following MCC Panels:

- MCC-3B1 to Proportional Heater Groups
- MCC-4A1 to Proportional Heater Groups
- MCC-3A1 to Heater Groups 1, 2 and 3
- MCC-3C1 to Heater Groups 4 and 5
- MCC-4B1 to Heater Groups 8 and 9
- MCC-4C1 to Heater Groups 10, 11 and 12

4. Instrument Air is available to Pressurizer Spray Valves PCV-103-1 and PCV-103-2.



Attachment 1 - Pressurizer Steam Bubble Formation

PROCEDURE

(✓) INITIALS

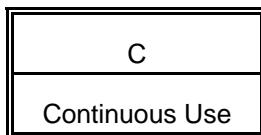
NOTES

1. When the manual control lever is moved toward close to less than 17% output the proportional heaters will come on.
2. When the manual control lever is moved toward open to greater than 67% output, the Spray Valves will begin to open (when Spray Valve Switches are in AUTO).
3. The Output meter will read approximately 50% when neither Proportional Heaters or Spray Valves receive action signals.

CAUTION

Extreme caution shall be exercised when the RCS is solid in the Pressurizer.

1. IF raising RCS pressure,
THEN perform the following steps:
 - a. Verify the Selected Controller is in MANUAL.
 - PC-103X, Pressurizer Press Controller _____
 - PC-103Y, Pressurizer Press Controller _____
 - b. Ensure the following RC-4 Spray Valve Control Switches are in CLOSE:
 - PCV-103-1, PZR Spray Valve From Loop 2A _____
 - PCV-103-2, PZR Spray Valve From Loop 1B _____
 - c. Ensure the following Proportional Heater Control Switches are in AUTO:
 - 75 KW Proportional Htrs Bank P1 Group 6 _____
 - 75 KW Proportional Htrs Bank P2 Group 7 _____
 - d. Move the Manual Control Lever for the selected controller, PC-103X or PC-103Y, left to raise Proportional Heater Output. _____

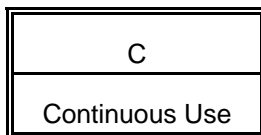


Attachment 1 - Pressurizer Steam Bubble Formation

PROCEDURE (continued)

(✓) INITIALS

- 1
 - e. Energize the Backup Heaters as desired by placing the following Control Switches in ON:
 - 225 KW Backup Htrs Bank 1 Group 1/2/3 _____
 - 150 KW Backup Htrs Bank 2 Group 4/5 _____
 - 150 KW Backup Htrs Bank 3 Group 8/9 _____
 - 225 KW Backup Htrs Bank 4 Group 10/11/12 _____
 - f. WHEN the desired RCS pressure is attained AND if required, THEN place the following Backup Heater Switches in OFF:
 - 225 KW Backup Htrs Bank 1 Group 1/2/3 _____
 - 150 KW Backup Htrs Bank 2 Group 4/5 _____
 - 150 KW Backup Htrs Bank 3 Group 8/9 _____
 - 225 KW Backup Htrs Bank 4 Group 10/11/12 _____
 - g. Adjust manual control lever as necessary on the selected controller, PC-103X or PC-103Y, to maintain RCS pressure. _____
2. IF lowering the RCS pressure, THEN perform the following steps:
 - a. Verify the Selected Controller is in MANUAL.
 - PC-103X, Pressurizer Press Controller _____
 - PC-103Y, Pressurizer Press Controller _____
 - b. Ensure the following RC-4 Spray Valve Control Switches are in CLOSE:
 - PCV-103-1, PZR Spray Valve From Loop 2A _____
 - PCV-103-2, PZR Spray Valve From Loop 1B _____
 - c. IF the Backup Heaters are energized, THEN place the following Backup Heater Control Switches in OFF:
 - 225 KW Backup Htrs Bank 1 Group 1/2/3 _____
 - 150 KW Backup Htrs Bank 2 Group 4/5 _____
 - 150 KW Backup Htrs Bank 3 Group 8/9 _____
 - 225 KW Backup Htrs Bank 4 Group 10/11/12 _____



Attachment 1 - Pressurizer Steam Bubble Formation

PROCEDURE (continued)

(✓) INITIALS

2 d. Ensure the Proportional Heater Control Switches are in AUTO OR OFF, as required by one of the following conditions:

1) IF the RCS is to remain pressurized,
THEN place the following Proportional Heater Control Switches for RC-4 in AUTO:

- 75 KW Proportional Htrs Bank P1 Group 6
- 75 KW Proportional Htrs Bank P2 Group 7

2) IF the RCS is to be depressurized,
THEN place the following Proportional Heater Control Switches for RC-4 in OFF:

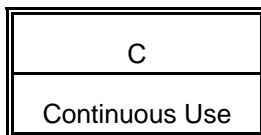
- 75 KW Proportional Htrs Bank P1 Group 6
- 75 KW Proportional Htrs Bank P2 Group 7

e. IF the RCS is to be depressurized OR a rapid depressurization is required,
THEN depressurize the RCS by raising Letdown flow per OI-CH-1 Attachment 3, Increasing Charging and Letdown Flows.

f. Move the Manual Control lever on the selected controller, PC-103X or PC-103Y, right until the Proportional Heaters are OFF.

g. WHEN the desired pressure is attained,
THEN adjust the Manual Control Lever as necessary on the selected controller, PC-103X or PC-103Y, to maintain RCS pressure.

Completed by _____ Date/Time _____ / _____



Attachment 2 - Manual RCS Pressure Control with a Steam Bubble in the Pressurizer

PREREQUISITES

(✓) INITIALS

1. Procedure Revision Verification

Revision Number _____ Date: _____

2. 120 VAC Instrument Power is operable from A and B Instrument Buses.

3. Pressurizer Heater Power is operable from the following MCC Panels:

- MCC-3B1 to Proportional Heater Groups
- MCC-4A1 to Proportional Heater Groups
- MCC-3A1 to Heater Groups 1, 2 and 3
- MCC-3C1 to Heater Groups 4 and 5
- MCC-4B1 to Heater Groups 8 and 9
- MCC-4C1 to Heater Groups 10, 11 and 12

4. Instrument Air is available to Pressurizer Spray Valves PCV-103-1 and PCV-103-2.

PROCEDURE

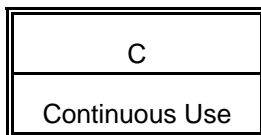
NOTES

1. When the manual control lever is moved toward close to less than 17% output the proportional heaters will come on.
2. When the manual control lever is moved toward open to greater than 67% output AND the Spray Valve Switches are in AUTO, the Spray Valves will begin to open.
3. The Output meter will read approximately 50% when neither Proportional Heaters or Spray Valves receive action signals.

1. IF raising RCS pressure,
THEN perform the following steps:

- a. Verify the Selected Controller is in MANUAL.

- PC-103X, Pressurizer Press Controller
- PC-103Y, Pressurizer Press Controller



Attachment 2 - Manual RCS Pressure Control with a Steam Bubble in the Pressurizer

PROCEDURE (continued)

(✓) INITIALS

1 b. Ensure the following RC-4 Spray Valve Control Switches are in AUTO:

- PCV-103-1, PZR Spray Valve From Loop 2A
- PCV-103-2, PZR Spray Valve From Loop 1B

c. Ensure the following Proportional Heater Control Switches for RC-4 are in AUTO:

- 75 KW Proportional Htrs Bank P1 Group 6
- 75 KW Proportional Htrs Bank P2 Group 7

d. Place the Backup Heater Bank Control Switches in ON as desired:

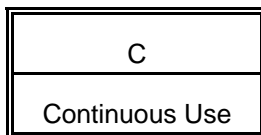
- 225 KW Backup Htrs Bank 1 Group 1/2/3
- 150 KW Backup Htrs Bank 2 Group 4/5
- 150 KW Backup Htrs Bank 3 Group 8/9
- 225 KW Backup Htrs Bank 4 Group 10/11/12

e. Move the Manual Control Lever for the selected controller, PC-103X or PC-103Y, left to raise the Proportional Heater Output.

f. WHEN the desired RCS pressure is attained,
THEN place the Backup Heater Control Switches as required by one of the following:

1) IF the RCS is at normal operating pressure,
THEN place the following switches in AUTO or ON:

- 225 KW Backup Htrs Bank 1 Group 1/2/3
- 150 KW Backup Htrs Bank 2 Group 4/5
- 150 KW Backup Htrs Bank 3 Group 8/9
- 225 KW Backup Htrs Bank 4 Group 10/11/12



Attachment 2 - Manual RCS Pressure Control with a Steam Bubble in the Pressurizer

PROCEDURE (continued)

(✓) INITIALS

- 1.f 2) IF the RCS is at less than normal operating pressure,
THEN place the following switches in OFF:

- 225 KW Backup Htrs Bank 1 Group 1/2/3
- 150 KW Backup Htrs Bank 2 Group 4/5
- 150 KW Backup Htrs Bank 3 Group 8/9
- 225 KW Backup Htrs Bank 4 Group 10/11/12

- g. Adjust manual control lever as necessary on the selected controller,
PC-103X or PC-103Y, to maintain RCS pressure.

2. To lower the RCS pressure, then perform the following steps:

NOTE

Refer to Attachment 10 if the temperature differential between Pressurizer
and Spray Line is greater than 200°F.

- a. Verify the Selected Controller is in MANUAL.

- PC-103X, Pressurizer Press Controller
- PC-103Y, Pressurizer Press Controller

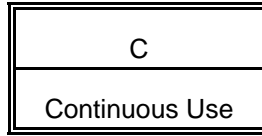
- b. Ensure the following Spray Control Switches are in AUTO:

- PCV-103-1, PZR Spray Valve From Loop 2A
- PCV-103-2, PZR Spray Valve From Loop 1B

- c. IF the RCS pressure is to be reduced below 2060 psia,
THEN place the following Backup Heater Switches in OFF:

- 225 KW Backup Htrs Bank 1 Group 1/2/3
- 150 KW Backup Htrs Bank 2 Group 4/5
- 150 KW Backup Htrs Bank 3 Group 8/9
- 225 KW Backup Htrs Bank 4 Group 10/11/12

- d. Move the Manual Control Lever right on the selected controller,
PC-103X or PC-103Y to greater than 67% to open the Spray Valves.



Attachment 2 - Manual RCS Pressure Control with a Steam Bubble in the Pressurizer

PROCEDURE (continued)

(✓) INITIALS

- 2 e. WHEN the desired RCS pressure is attained,
THEN place the Backup Heater Control Switches as required by one of
the following:

- 1) IF the RCS is at normal operating pressure,
THEN place the following switches in AUTO or ON:

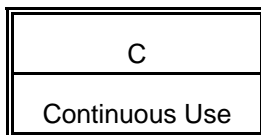
- 225 KW Backup Htrs Bank 1 Group 1/2/3
- 150 KW Backup Htrs Bank 2 Group 4/5
- 150 KW Backup Htrs Bank 3 Group 8/9
- 225 KW Backup Htrs Bank 4 Group 10/11/12

- 2) IF the RCS is at less than normal operating pressure,
THEN place the following switches in OFF:

- 225 KW Backup Htrs Bank 1 Group 1/2/3
- 150 KW Backup Htrs Bank 2 Group 4/5
- 150 KW Backup Htrs Bank 3 Group 8/9
- 225 KW Backup Htrs Bank 4 Group 10/11/12

- f. Adjust Manual Control Lever as necessary on selected controller,
PC-103X or PC-103Y, to maintain RCS pressure.

Completed by _____ Date/Time _____ / _____



Attachment 3 - Automatic RCS Pressure Control with a Steam Bubble in the Pressurizer

PREREQUISITES

(✓) INITIALS

1. Procedure Revision Verification

Revision Number _____ Date: _____

2. 120 VAC Instrument Power is operable from A and B Instrument Buses.

3. Pressurizer Heater Power is operable from the following MCC Panels:

- MCC-3B1 to Proportional Heater Groups _____
- MCC-4A1 to Proportional Heater Groups _____
- MCC-3A1 to Heater Groups 1, 2 and 3 _____
- MCC-3C1 to Heater Groups 4 and 5 _____
- MCC-4B1 to Heater Groups 8 and 9 _____
- MCC-4C1 to Heater Groups 10, 11 and 12 _____

4. Instrument Air is available to Pressurizer Spray Valves PCV-103-1 and PCV-103-2.

PROCEDURE

NOTE

RCS Pressure Control should automatically maintain setpoint for normal operation at 2100 (2080 to 2145) psia.

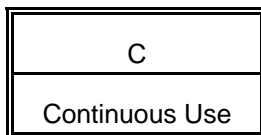
1. IF raising the RCS pressure,
THEN perform the following steps:

- a. Verify the Selected Controller is in AUTOMATIC.

- PC-103X, Pressurizer Press Controller _____
- PC-103Y, Pressurizer Press Controller _____

- b. Ensure the following Proportional Heater Control Switches are in AUTO:

- 75 KW Proportional Htrs Bank P1 Group 6 _____
- 75 KW Proportional Htrs Bank P2 Group 7 _____



Attachment 3 - Automatic RCS Pressure Control with a Steam Bubble in the Pressurizer

PROCEDURE (continued)

(✓) INITIALS

NOTE

During normal operation, one bank of pressurizer heaters is usually maintained in the ON position.

- 1 c. IF one Bank of Heaters is in ON,
THEN ensure the remaining Backup Heater Switches are in AUTO; OR
ensure all of the following switches are in AUTO:

- 225 KW Backup Htrs Bank 1 Group 1/2/3
- 150 KW Backup Htrs Bank 2 Group 4/5
- 150 KW Backup Htrs Bank 3 Group 8/9
- 225 KW Backup Htrs Bank 4 Group 10/11/12

- d. Ensure the following Spray Control Switches are in AUTO:

- PCV-103-1, PZR Spray Valve From Loop 2A
- PCV-103-2, PZR Spray Valve From Loop 1B

- e. Raise the RCS pressure by adjusting the Setpoint Push-button(s) on
selected controller, PC-103X or PC-103Y, to desired RCS pressure
setpoint.

- f. Ensure RCS pressure stabilizes at the desired setpoint.

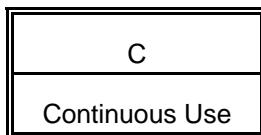
2. IF lowering the RCS pressure,
THEN perform the following steps:

NOTE

If the temperature differential between Pressurizer and Spray Line is
greater than 200°F, refer to Attachment 10.

- a. Verify the Selected Controller is in AUTOMATIC.

- PC-103X, Pressurizer Press Controller
- PC-103Y, Pressurizer Press Controller



Attachment 3 - Automatic RCS Pressure Control with a Steam Bubble in the Pressurizer

PROCEDURE (continued)

(✓) INITIALS

- 2 b. Ensure the following Proportional Heaters Control Switches are in AUTO:

- 75 KW Proportional Htrs Bank P1 Group 6
- 75 KW Proportional Htrs Bank P2 Group 7

NOTE

During normal operation, one bank of pressurizer heaters is usually maintained in the ON position.

- c. IF one (1) Bank of Heaters is in ON,
THEN ensure the remaining Backup Heater Switches are in AUTO;
OTHERWISE ensure all of the following switches are in AUTO:

- 225 KW Backup Htrs Bank 1 Group 1/2/3
- 150 KW Backup Htrs Bank 2 Group 4/5
- 150 KW Backup Htrs Bank 3 Group 8/9
- 225 KW Backup Htrs Bank 4 Group 10/11/12

- d. Ensure the following Spray Control Switches are in AUTO:

- PCV-103-1, PZR Spray Valve From Loop 2A
- PCV-103-2, PZR Spray Valve From Loop 1B

CAUTION

When reducing RCS pressure, decreasing pressure in small increments will prevent overshoot from selected setpoint.

- e. Lower RCS pressure by adjusting the Setpoint Push-button(s) on selected controller, PC-103X or PC-103Y, to the desired RCS pressure setpoint.

- f. Ensure RCS pressure stabilizes at the desired setpoint.

Completed by _____ Date/Time _____ / _____

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0225

JPM Title: Initiate Air Compressor Backup Cooling

Location: Room 19

Approximate Time: 8 minutes Actual Time: _____

Reference(s): EOP-20, MVA-IA R14
NRC K/A 078000 K1.04 (RO 2.6 / SRO 2.9)

JPM Prepared by: Jerry Koske Date: 05/10/05

JPM Reviewed by: _____ Date: _____

JPM Approved by: _____ Date: _____

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0225

JPM Title: Initiate Air Compressor Backup Cooling

Operators' Name: _____ Employee # _____

All Critical Steps (shaded) must be performed or simulated in accordance with the standards contained in this JPM

The Operator's performance was evaluated as (circle one):

SATISFACTORY

UNSATISFACTORY

Evaluator's Signature: _____ Date: _____

Reason, if unsatisfactory:

Tools & Equipment: None

Safety Considerations: 1. Observe local industrial safety postings
 2. Use caution around hot/warm piping
 3. DO NOT operate any actual plant equipment

Comments: Static In-plant JPM

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0225

JPM Title: Initiate Air Compressor Backup Cooling

INITIATING CUE: A loss of offsite power has occurred. You have been directed to line up the CA-1A local control switches for Control Room Start and then lineup backup cooling to Air Compressor CA-1A. The Control Room has placed the control switch for CA-1A in pull-to lock.

START

Critical Steps shown in gray

STEP	ELEMENT	STANDARD
1	Place the CA-1A controller switch in the Control Room Start position	<u>Room-19</u> 1SS switch in CS position
2	Ensure that the CA-1A load transfer switch is either position 1 or 2	<u>Room-19</u> Ensure Compressor load transfer switch in the 1 or 2 position
3 (2.1.a.1)	Isolate Bearing Water to CA-1A	CUE: CA-1A is not running <u>Room 19</u> CLOSE all of the following valves: <ul style="list-style-type: none">• AC-584• AC-588• AC-586• AC-589
4 (2.1.a.2)	Align Potable Water to CA-1A	<u>Room 19</u> OPEN all of the following valves: <ul style="list-style-type: none">• AC-1042• AC-1043• AC-1044• AC-1045• AC-583

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0225

JPM Title: Initiate Air Compressor Backup Cooling

STEP	ELEMENT	STANDARD
		CUE: The Control Room has started CA-1A
5 (2.1.a.4)	Verify cooling water flow	<u>Room-19</u> Read FI-1955 to verify flow

Termination Criteria: CA-1A is being cooled by potable water

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: jPM-0225

INITIATING CUE: A loss of offsite power has occurred. You have been directed to line up the CA-1A local control switches for Control Room Start and then lineup backup cooling to Air Compressor CA-1A. The Control Room has placed the control switch for CA-1A in pull-to lock.

START

12.0 MAINTENANCE OF VITAL AUXILIARIES - IA

MVA-IA

INSTRUCTIONS

CONTINGENCY ACTIONS

CAUTION

Do not allow Diesel Generator loads to exceed power and current rating limits.

2. **IF** any of the Air Compressors have tripped because of low Turbine Plant Cooling Water pressure,
THEN restore Turbine Plant Cooling Water by performing the following steps:
- a. Start **ONE** Bearing Water Pump, AC-9A/B.
 - b. Verify cooling water header pressure is approximately 70 psig.
 - c. Start at least one Air Compressor, CA-1A/B/C.

(continue)

- 2.1 **IF** Turbine Plant Cooling Water is **NOT** available,
THEN align Potable Water to the Air Compressors by performing the following steps:
- a. Align backup Potable Water cooling to CA-1A, Air Compressor, by performing the following steps:

(continue)

12.0 MAINTENANCE OF VITAL AUXILIARIES - IA

MVA-IA

INSTRUCTIONS

2. (continued)

(continue)

CONTINGENCY ACTIONS

2.1.a (continued)

1) Close **ALL** of the following
valves (Room 19):

- AC-584, "AIR
COMPRESSOR CA-1A
INTERCOOLER INLET
VALVE"
- AC-588, "AIR
COMPRESSOR CA-1A
OUTLET VALVE"
- AC-586, "AIR
COMPRESSOR CA-1A
AFTERCOOLER CA-2A
INLET VALVE"
- AC-589, "AIR
COMPRESSOR CA-1A
AFTERCOOLER CA-2A
OUTLET VALVE"

(continue)

12.0 MAINTENANCE OF VITAL AUXILIARIES - IA

MVA-IA

INSTRUCTIONS

2. (continued)

(continue)

CONTINGENCY ACTIONS

2.1.a (continued)

2) Open **ALL** of the following valves (Room 19):

- AC-1042, "AIR COMPRESSOR CA-1A INTERCOOLER POTABLE WATER INLET VALVE"
- AC-1043, "AIR COMPRESSOR CA-1A POTABLE WATER OUTLET VALVE"
- AC-1044, "AIR COMPRESSOR CA-1A AFTERCOOLER CA-2A POTABLE WATER INLET VALVE"
- AC-1045, "AIR COMPRESSOR CA-1A AFTERCOOLER CA-2A POTABLE WATER OUTLET VALVE"
- AC-583, "AIR COMPRESSOR CA-1A INTERCOOLER INLET PRESS INDICATOR PI-1942A ROOT VALVE"

3) Start CA-1A, Air Compressor.

(continue)

12.0 MAINTENANCE OF VITAL AUXILIARIES - IA

MVA-IA

INSTRUCTIONS

2. (continued)

(continue)

CONTINGENCY ACTIONS

2.1.a (continued)

4) Check for flow through
FI-1955A (Room 19).

b. Align backup Potable Water
cooling to CA-1B, Air Compressor,
by performing the following steps:

1) Close **ALL** of the following
valves (Room 19):

- AC-577, "AIR
COMPRESSOR CA-1B
INTERCOOLER INLET
VALVE"
- AC-581, "AIR
COMPRESSOR CA-1B
OUTLET VALVE"
- AC-582, "AIR
COMPRESSOR CA-1B
AFTERCOOLER CA-2B
OUTLET VALVE"
- AC-579, "AIR
COMPRESSOR CA-1B
AFTERCOOLER CA-2B
INLET VALVE"

(continue)

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0356

JPM Title: Emergency Start of Diesel-Generator D-1

Location: DG-1 Room

Approximate Time: 12 minutes Actual Time: _____

Reference(s): EOP/AOP Attachments, Attachment 12 R17
NRC K/A 064000 A4.06 (RO 3.9 / SRO 3.9)

JPM Prepared by: Jerry Koske Date: 05/10/05

JPM Reviewed by: _____ Date: _____

JPM Approved by: _____ Date: _____

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0356

JPM Title: Emergency Start of Diesel-Generator D-1

Operators' Name: _____ Employee # _____

All Critical Steps (shaded) must be performed or simulated in accordance with the standards contained in this JPM

The Operator's performance was evaluated as (circle one):

SATISFACTORY

UNSATISFACTORY

Evaluator's Signature: _____ Date: _____

Reason, if unsatisfactory:

Tools & Equipment: None

Safety Considerations: Observe Industrial Safety practices
DO NOT operate and plant equipment

Comments: In Plant alternate path JPM

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0356

JPM Title: Emergency Start of Diesel-Generator D-1

INITIATING CUE: A station blackout has occurred. D/G-1 did not start and attempts to start D/G-1 from the control room have been unsuccessful.

You have been directed to start D/G-1 using EOP/AOP Attachment 12.

START

Critical Steps shown in gray

STEP	ELEMENT	STANDARD
1 (3.a)	Place the “Engine Control 143/SS” switch to local	<u>AI-133A behind small door</u> 143/SS Switch to LOCAL
2 (3.b)	Press the “Normal Engine Start” push button	AI-133A Push NORMAL ENGINE START button CUE: D/G-1 did not start
3 (3.1.a)	Place the “Engine Control 143/SS” switch to EMERG	<u>AI-133A behind small door</u> 143/SS Switch to EMERG
4 (3.1.b)	Press the “Emergency Engine Start” push button	<u>AI-133A</u> Push EMERGENCY ENGINE START button CUE: D/G-1 did not start
5 (5)	Check primary air receiver tank and secondary air receiver tank pressures.	<u>AI-133A</u> Read indicators CUE: both pressure indicators “as read”

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0356

JPM Title: Emergency Start of Diesel-Generator D-1

STEP	ELEMENT	STANDARD
6 (14)	Ensure overspeed trip is reset	<u>West end of D/G-1</u> Ensure trip is reset
7 (15.a)	Place the Engine Control 143/SS switch in LOCAL	<u>AI-133A behind small door</u> Place 143/SS switch in the LOCAL position
8 (15.b)	Press the “Normal Engine Start” pushbutton	<u>AI-133A</u> Press NORMAL ENGINE START pushbutton CUE: D/G-1 did not start
9 (15.1)	Manually override SA-142, Diesel-Generator DG-1 Primary Air System Solenoid valve	<u>On top of valve</u> Open the “T” handled valve. CUE: D/G-1 has started
10 (16)	Ensure Engine Control 143/SS switch is in the EMERG	<u>AI-133A behind small door</u> 143/SS Switch in EMERG position
11 (17)	Check DG-1 speed	<u>AI-133A</u> CUE: speed reads 900 rpm

Termination Criteria: D/G-1 is running at full speed.

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0356

INITIATING CUE: **A station blackout has occurred. D/G-1 did not start and attempts to start D/G-1 from the control room have been unsuccessful.**

You have been directed to start D/G-1 using EOP/AOP Attachment 12.

START

Attachment 12

Emergency Start of Diesel Generator D-1

INSTRUCTIONS

1. Start D-1 by pressing the "DIESEL NORMAL START" push button.
2. **IF** D-1 is running,
THEN GO TO Step 17.
3. Start D-1 by performing the following steps (Engine Control Panel):
 - a. Place the "ENGINE CONTROL 143/SS" Switch in "LOCAL".
 - b. Press the "NORMAL ENGINE START" push button.
4. **IF** D-1 is running,
THEN GO TO Step 16.

CONTINGENCY ACTIONS

- 1.1 **IF** D-1 did **NOT** start,
THEN press the "EMERGENCY START" push button.
- 3.1 **IF** D-1 did **NOT** start,
THEN start D-1 by performing the following steps (Engine Control Panel):
 - a. Place the "ENGINE CONTROL 143/SS" Switch in "EMERG".
 - b. Press the "EMERGENCY ENGINE START" push button.

Attachment 12Emergency Start of Diesel Generator D-1INSTRUCTIONSCONTINGENCY ACTIONSNOTE

A minimum starting air pressure of 157 psig is required to start D-1.

5. **IF** "PRIMARY AIR RECEIVER TANK PRESSURE" or "SECONDARY AIR RECEIVER TANK PRESSURE" is greater than 157 psig (Engine Control Panel),
THEN GO TO Step 14.

6. **IF** the Primary Air Start System is available,
THEN align the Emergency Compressor to the Primary Air Receivers by performing the following steps (D-1 room):

- a. Ensure the "ENGINE CONTROL 143/SS" Switch is in "LOCAL".
- b. Place "SA-2-1 PRIMARY COMPRESSOR 43/AS2" Switch in "OFF".

(continue)

- 6.1 **IF** the Secondary Air Start System is available,
THEN align the Emergency Compressor to the Secondary Air Receivers by performing the following steps (D-1 room):

- a. Ensure the "ENGINE CONTROL 143/SS" Switch is in "LOCAL".
- b. Place "SA-23-1 SECONDARY COMPRESSOR 43/AS1" Switch in "OFF".

(continue)

Attachment 12Emergency Start of Diesel Generator D-1INSTRUCTIONS

6. (continued)

- c. Ensure **BOTH** of the following valves are closed:

- SA-214, "PRESSURE CONTROLLER PC-6040A SECONDARY AIR SYSTEM ROOT VALVE"
- SA-280, "EMERGENCY COMPRESSOR SA-1-1 SECONDARY AIR SYSTEM ISOLATION VALVE"

- d. Open **BOTH** of the following valves:

- SA-215, "PRESSURE CONTROLLER PC-6040A PRIMARY AIR SYSTEM ROOT VALVE"
- SA-204, "EMERGENCY COMPRESSOR SA-1-1 PRIMARY AIR SYSTEM ISOLATION VALVE"

CONTINGENCY ACTIONS

6.1 (continued)

- c. Ensure **BOTH** of the following valves are closed:

- SA-215, "PRESSURE CONTROLLER PC-6040A PRIMARY AIR SYSTEM ROOT VALVE"
- SA-204, "EMERGENCY COMPRESSOR SA-1-1 PRIMARY AIR SYSTEM ISOLATION VALVE"

- d. Open **BOTH** of the following valves:

- SA-214, "PRESSURE CONTROLLER PC-6040A SECONDARY AIR SYSTEM ROOT VALVE"
- SA-280, "EMERGENCY COMPRESSOR SA-1-1 SECONDARY AIR SYSTEM ISOLATION VALVE"

Attachment 12

Emergency Start of Diesel Generator D-1

INSTRUCTIONS

CONTINGENCY ACTIONS

7. Unload the compressor by turning the "SA-1-1 UNLOADER CONTROL ASSEMBLY" adjustment nut clockwise (behind compressor).
8. Ensure the "DECOMP SW" is in "STOP".
9. Cycle the priming lever a minimum of three times.
10. Press and hold the "PRE-HEAT SWITCH" push button for one minute.

Attachment 12

Emergency Start of Diesel Generator D-1

INSTRUCTIONS

CONTINGENCY ACTIONS

11. Start the Diesel Engine by performing the following steps:

- a. Press and hold the "PRE-HEAT SWITCH" push button.
- b. Press the "PUSH TO START" push button.
- c. **WHEN** the diesel reaches full cranking speed,
THEN release the "PRE-HEAT SWITCH" push button.
- d. Place the "DECOMP SW" in "RUN".

Attachment 12

Emergency Start of Diesel Generator D-1

INSTRUCTIONS

CONTINGENCY ACTIONS

12. **WHEN** Diesel Engine starts,
THEN release the "PUSH TO START"
push button.
13. Load the compressor by turning the
"SA-1-1 UNLOADER CONTROL
ASSEMBLY" adjustment nut
counterclockwise.
14. **WHEN** "PRIMARY AIR RECEIVER
TANK PRESSURE" or "SECONDARY
AIR RECEIVER TANK PRESSURE" is
greater than 157 psig (Engine Control
Panel),
THEN ensure the overspeed trip is
reset (West end of D-1).

Attachment 12

Emergency Start of Diesel Generator D-1

INSTRUCTIONS

15. Start D-1 by performing the following steps (Engine Control Panel):

a. Place the "ENGINE CONTROL 143/SS" Switch in "LOCAL".

b. Press the "NORMAL ENGINE START" push button.

CONTINGENCY ACTIONS

CAUTION

This step may damage the Air Start Motors if the manual override is not released after a few seconds.

15.1 **IF** D-1 did **NOT** start,
AND the Primary Air Receivers are pressurized,
THEN manually override SA-142, "DIESEL GENERATOR DG-1 PRIMARY AIR SYSTEM SOLENOID VALVE", using the "T" handle located on top of the valve.

15.2 **IF** D-1 did **NOT** start
AND the Secondary Air Receivers are pressurized,
THEN manually override SA-141, "DIESEL GENERATOR DG-1 SECONDARY AIR SYSTEM SOLENOID VALVE", using the "T" handle located on top of the valve.

Attachment 12

Emergency Start of Diesel Generator D-1

INSTRUCTIONS

CONTINGENCY ACTIONS

16. Ensure the "ENGINE CONTROL
143/SS" Switch in "EMERG" to return
D-1 start function to the Control Room.
17. Check that D-1 is operating at greater
than or equal to 900 rpm.

End of Attachment 12

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0719M

JPM Title: Startup Containment Hydrogen Purge and Makeup

Location: Aux Building (RCA)

Approximate Time: 15 min Actual Time: _____

Reference(s): OI-VA-1 Attachment 5A and 5B R55
NRC K/A 028000 A2.02 (RO 3.5 / SRO 3.9)

JPM Prepared by: Jerry Koske Date: 05/10/05

JPM Reviewed by: _____ Date: _____

JPM Approved by: _____ Date: _____

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0719M

JPM Title: Startup Containment Hydrogen Purge and Makeup

Operators' Name: _____ Employee # _____

All Critical Steps (shaded) must be performed or simulated in accordance with the standards contained in this JPM

The Operator's performance was evaluated as (circle one):

SATISFACTORY

UNSATISFACTORY

Evaluator's Signature: _____ Date: _____

Reason, if unsatisfactory:

Tools & Equipment: None

Safety Considerations: Observe industrial and radiological safety practices
DO NOT operate any plant equipment

Comments: This static JPM is conducted inside the RCA

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0719M

JPM Title: Startup Containment Hydrogen Purge and Makeup

INITIATING CUE: A major LOCA occurred several weeks ago. Containment hydrogen concentration has been slowly increasing and has now reached 3%. A release permit has been prepared and approved. You have been directed the Aux building steps of OI-VA-1 attachment 5A to purge hydrogen from containment using VA-80A and attachment 5B to use VA-80B to provide makeup air to containment.

CIAS and VIAS were initiated and have not been reset
OI-VA-1 is complete through step 6. HC-745 has been placed in HAND

START

Critical Steps shown in gray

STEP	ELEMENT	STANDARD
1	Ensure VA-411, VA-82 bypass is closed	<u>Corr. 26</u> IA-VA-411-B1 in FILTERED
2	Ensure VA-291/VA-279 combined remote operator is closed.	<u>Corr 26</u> VA-291/VA-279 CLOSED
3	Ensure VA-282/VA-284 combined remote operator is closed.	<u>Corr 26</u> VA-282/VA-284 CLOSED
4	Open hydrogen purge valves for VA-80A: <ul style="list-style-type: none">• VA-290• VA-292• VA-289:	<u>Corr 26</u> Unlock and OPEN valves
5	Contact Control Room	CUE: Control room reports procedure steps 8,9 and 10 have been completed

Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0719M

JPM Title: Startup Containment Hydrogen Purge and Makeup

STEP	ELEMENT	STANDARD
6	Start hydrogen purge fan, VA-80A	<u>AI-100</u> Place VA-80A control switch in PULL TO OVERRIDE Red Light ON Green Light OFF
7	Monitor DPI-899D	<u>Corr 26</u> CUE: DPI-899D indicates 10" w.g.
8	Ensure VA-281/VA-283 combined remote operator is closed.	<u>Corr 26</u> VA-281/VA-283 CLOSED
9	Open VA-282/VA-284 VA-80B suction from Aux Bldg/recirc valve	<u>Corr 26</u> VA-282/VA-284 OPEN
10	Open VA-280	<u>Corr 26</u> VA-280 OPEN
11	Start hydrogen purge fan, VA-80B	<u>AI-100</u> Place VA-80B control switch in PULL TO OVERRIDE Red Light ON Green Light OFF
12	Contact control room to place HCV-881 in override.	CUE: The control room has placed HCV-881 in OVERRIDE STOP

Termination Criteria: The hydrogen purge system is in operation with VA-80A purging hydrogen from containment and VA-80B supplying makeup air

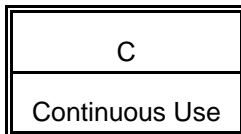
Fort Calhoun Station – Operations Training
JOB PERFORMANCE MEASURE

JPM No: JPM-0719M

INITIATING CUE: A major LOCA occurred several weeks ago. Containment hydrogen concentration has been slowly increasing and has now reached 3%. A release permit has been prepared and approved. You have been directed the Aux building steps of OI-VA-1 attachment 5A to purge hydrogen from containment using VA-80A and attachment 5B to use VA-80B to provide makeup air to containment.

CIAS and VIAS were initiated and have not been reset
OI-VA-1 is complete through step 6. HC-745 has been placed in HAND

START



Attachment 5A - Hydrogen Purge Release VA-80A & VA-80B

PREREQUISITES

(√) INITIALS

1. Procedure Revision Verification

Revision No. _____ Date: _____

2. Plant is in MODE 4 or 5.

3. OI-VA-1-CL-A has been completed per OP-1.

4. Containment Integrity is not required.

5. At least one VA-40 Fan (Aux Bldg Exhaust) is in operation.

6. Condenser evacuation discharge is aligned to the normal flow path (Turbine Building Roof).

7. No Waste Gas Decay Tank Release is in progress.

8. One Noble Gas Radiation Monitor is in operation monitoring the Auxiliary Building Exhaust Stack. (RM-062 or RM-052)(ODCM)

9. One Iodine/Particulate Sampler is in service on the Aux Bldg Stack or Auxiliary Sample Collection Equipment is in service. (RM-062 or RM-052 Filter)(ODCM).

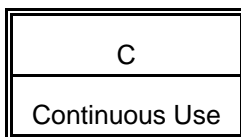
10. The following recorders are operable or readings will be taken per FC-212 Table I every four hours, per Off-site Dose Calculation Manual (ODCM):

- RR-049A, Process Rad Mon Rcdr (AI-31E) _____
- FR-758, Ventilation Stack Total Flow (AI-44) _____
- PR-745, Post Accident Cntmt Press (AI-44) _____
- HR-81A(B) H₂ Analyzer VA-81A(B) Recorder (AI-65) _____

11. Electrical power is available to the desired fan(s):

- VA-80A, Hydrogen Purge Blower, MCC-3C2-C04 _____
- VA-80B, Hydrogen Purge Blower, MCC-4A2-C01 _____

12. At least VA-81 or VA-81B, Containment Hydrogen Analyzer is in service sampling Containment per OI-VA-6. _____



Attachment 5A - Hydrogen Purge Release VA-80A & VA-80B

PREREQUISITES (continued)

(✓) INITIALS

13. Containment Release Permit # _____ is authorized.

SM/CRS

PROCEDURE

NOTE

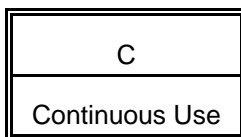
RM-051 and/or RM-052, Cntmt Noble Gas Radiation Monitor and the ERF Computer are not required to be operable during the hydrogen release but are used for conservative monitoring of Containment during the release.

1. Set the FC-212 count rate limit in the ERF Computer or the radiation monitor at the alert limit. (RM-051 or RM-052)

NOTE

The radiation monitor is considered inoperable during the check source. Remaining stationed at the monitor AND ensuring the monitor returns to normal before leaving the area administratively replaces the log entry.

2. Perform check source on all operational Auxiliary Building Exhaust Stack Noble Gas Radiation Monitors (RM-062 and/or RM-052).
3. Verify all operational RM-062 and/or RM-052, Auxiliary Building Exhaust Stack Noble Gas Radiation Monitors, alert and high alarm setpoints are per TBD-IV.7.
4. Ensure Aux Bldg stack flow rate is less than or equal to the FC-212 Value.
5. Record FC-212 initial readings and mark the following operable recorders with the date, time, and release number:
- RR-049A, Process Rad Mon Rcdr (AI-31E)
 - FR-758, Ventilation Stack Total Flow (AI-44)
 - PR-745, Post Accident Cntmt Press (AI-44)
 - HR-81A(B) H₂ Analyzer VA-81A(B) Recorder (AI-65)
6. Place HC-745, Post Accident Cntmt Press, to HAND.



Attachment 5A - Hydrogen Purge Release VA-80A & VA-80B

PROCEDURE (continued)

(✓) INITIALS

7. Perform the following (Corr 26):

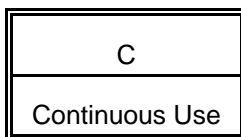
- a. Ensure VA-411, VA-82 Bypass, is closed (IA-VA-411-B1 in FILTERED). _____
- b. Ensure VA-291/VA-279, Cntmt Hydrogen Purge Fan VA-80A Suction Valve from Aux Building/Recirc Valve, combined remote operator is closed. _____
- c. Ensure VA-282/VA-284, Cntmt Hydrogen Purge Fan VA-80B Suction Valve from Aux Building/Recirc Valve, combined remote operator is closed. _____

CAUTION

Do not run both VA-80A and VA-80B in the hydrogen purge release mode at the same time.

- d. Open the Cntmt Hydrogen Purge valves for the desired unit:
 - VA-80A
 VA-290/VA-292, Cntmt Hydrogen Purge Fan VA-80A Suction Valve from Containment/Cntmt Hydrogen Purge Fan VA-80A Discharge Valve _____
 VA-289, Outboard Isolation Valve to Cntmt Hydrogen Purge Fan VA-80A _____
 - VA-80B
 VA-281/VA-283, Cntmt Hydrogen Purge Fan VA-80B Suction Valve from Containment/Cntmt Hydrogen Purge Fan VA-80B Discharge Valve _____
 VA-280, Outboard Isolation Valve to Cntmt Hydrogen Purge Fan VA-80B _____

8. Record initial hydrogen concentration and sample point in the CR Log. _____



Attachment 5A - Hydrogen Purge Release VA-80A & VA-80B

PROCEDURE (continued)

(✓) INITIALS

9. IF normal startup,
THEN place the H₂ Purge Blower Isolation Valve Inbd Control Switch for the
unit to be run to OPEN (AI-43A):

- HCV-882, VA-80A
- HCV-881, VA-80B

10. IF post accident (SIAS tripped) startup,
THEN place the H₂ Purge Blower Isolation Valve Inbd Control Switch for the
unit(s) to be run to OVRD (AI-43A):

- HCV-882, VA-80A
- HCV-881, VA-80B

11. Perform the following:

- a. IF normal startup,
THEN place the Hydrogen Purge Blower Control Switch to
AFTER START for the unit to be started (AI-100):

- VA-80A
- VA-80B

- b. IF post accident (SIAS tripped) startup,
THEN place the Hydrogen Purge Blower Control Switch in
PULL TO OVERRIDE for the unit to be started (AI-100):

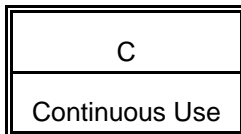
- VA-80A
- VA-80B

- c. Monitor DPI-899D, Filter Unit Va-82 Differential Pressure Indicator,
during the release (Corr 26).

- d. IF DPI-899D reading exceeds 25" w.g.,
THEN perform the following:

- 1) Notify the Control Room.

- 2) Obtain TSC permission to open VA-411.

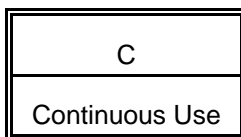


Attachment 5A - Hydrogen Purge Release VA-80A & VA-80B

PROCEDURE (continued)

(✓) INITIALS

- | | | | |
|------|---|-------|-------|
| 11.d | 3) Open VA-411, VA-82 Bypass. (IA-VA-411-B1 to NON-FILTERED) | _____ | _____ |
| 12. | IF RM-062 and/or RM-052, Auxiliary Building Exhaust Stack Noble Gas Radiation Monitors become inoperable,
THEN immediately secure the hydrogen release. | _____ | _____ |
| 13. | IF the ERF becomes inoperable AND the FC-212 count rate limit was set in the ERF,
THEN record RM-051 or RM-052, Contmt Noble Gas Radiation Monitor, reading hourly in FC-212 Table 1 and verify the FC-212 count rate limit is not exceeded until the FC-212 count rate limit is set in the radiation monitor. | _____ | _____ |
| 14. | IF the FC-212 Containment radiation monitor becomes inoperable,
THEN notify Chemistry to annotate the release permit. | _____ | _____ |
| 15. | IF RM-051 and/or RM-052 Containment Radiation Monitors become inoperable,
THEN secure the hydrogen release. | _____ | _____ |
| 16. | During the release, record the following data in FC-212: | | |
| a. | Table I inoperable recorder readings every four hours per Off-site Dose Calculation Manual (ODCM). | _____ | _____ |
| b. | Table II stop and start readings. | _____ | _____ |
| c. | Table III release flow readings every four hours by logging Containment pressure and stack flow. | _____ | _____ |
| 17. | Prior to the release expiration, place the running Hydrogen Purge Blower(s) Control Switch to AFTER STOP (AI-100): | | |
| • | VA-80A | _____ | _____ |
| • | VA-80B | _____ | _____ |



Attachment 5A - Hydrogen Purge Release VA-80A & VA-80B

PROCEDURE (continued)

(✓) INITIALS

18. Place the H₂ Purge Blower Isolation Valve Inbd control switches to CLOSE (AI-43A):

- HCV-882, VA-80A
- HCV-881, VA-80B

19. Record the FC-212 final readings and mark the following operable recorders with the date, time, and release number:

- RR-049A, Process Rad Mon Rcdr (AI-31E)
- FR-758, Ventilation Stack Total Flow (AI-44)
- PR-745, Post Accident Cntmt Press (AI-44)
- HR-81A(B) H₂ Analyzer VA-81A(B) Recorder (AI-65)

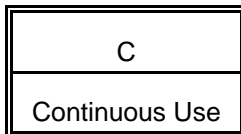
20. Place HC-745, Post Accident Cntmt Press, to AUTO.

21. Log the final hydrogen concentration and sample point in the CR Log.

22. Perform the following (Corr 26):

a. Close the following Cntmt Hydrogen Purge valves:

- VA-289, Outboard Isolation Valve to Cntmt Hydrogen Purge Fan VA-80A
- VA-290, VA-80A Suction Valve from Cntmt
- VA-292, VA-80A Discharge Valve
- VA-280, Outboard Isolation Valve to Cntmt Hydrogen Purge Fan VA-80B
- VA-281, VA-80B Suction Valve from Cntmt
- VA-283, VA-80B Discharge Valve
- VA-411, VA-82 Bypass (IA-VA-411-B1 to FILTERED)



Attachment 5A - Hydrogen Purge Release VA-80A & VA-80B

PROCEDURE (continued)

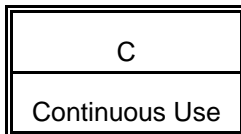
(✓) INITIALS

22 b. Lock closed the Cntmt Hydrogen Purge Outboard Isolation Valves to
Cntmt Hydrogen Purge Fans:

- VA-289, VA-80A
- VA-280, VA-80B

Ind Verif

Completed by _____ Date/Time _____ / _____



Attachment 5B - Supply of Auxiliary Building Air to Containment VA-80A & VA-80B

PREREQUISITES

(√) INITIALS

1. Procedure Revision Verification

Revision No. _____ Date: _____

2. Plant is in MODE 4 or 5.

3. OI-VA-1-CL-A has been completed per OP-1.

4. Containment Integrity is not required.

5. Electrical power is available to the desired fan:

- VA-80A, Hydrogen Purge Blower, MCC-3C2-C04
- VA-80B, Hydrogen Purge Blower, MCC-4A2-C01

6. VA-81A or VA-81B is in service per OI-VA-6.

PROCEDURE

NOTE

One VA-80 Blower may be run supplying Auxiliary Building air to Containment while the other is run for Hydrogen Purge Release.

1. Place HC-745, Post Accident Cntmt Press, to HAND.

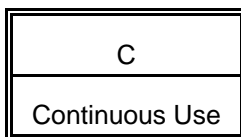
2. Ensure the following valves combined remote operator is closed, for the desired unit (Corr. 26):

- VA-80A

VA-290/VA-292, Cntmt Hydrogen Purge Fan VA-80A Suction Valve
from Containment/Cntmt Hydrogen Purge Fan VA-80A Discharge Valve

- VA-80B

VA-281/VA-283, Cntmt Hydrogen Purge Fan VA-80B Suction Valve
from Containment/Cntmt Hydrogen Purge Fan VA-80B Discharge Valve



Attachment 5B - Supply of Auxiliary Building Air to Containment VA-80A & VA-80B

PROCEDURE (continued)

(✓) INITIALS

3. Open the following valves for the desired unit (Corr. 26):

- VA-80A

VA-291/VA-279, Cntmt Hydrogen Purge Fan VA-80A Suction Valve
from Aux Building/recirc Valve

VA-289, Outboard Isolation Valve to Cntmt Hydrogen Purge Fan
VA-80A

- VA-80B

VA-282/VA-284, Cntmt Hydrogen Purge Fan VA-80B Suction Valve
from Aux Building/recirc Valve

VA-280, Outboard Isolation Valve to Cntmt Hydrogen Purge Fan
VA-80B

4. Record initial hydrogen concentration and sample point in the CR log.

CAUTION

Parts a and b of Step 5 must be performed in sequence and one immediately following the other to avoid a radiological release to Room 59 and possible damage to VA-80A or VA-80B.

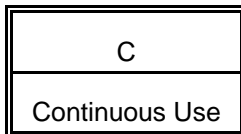
5. IF normal startup,
THEN:

a. Place the Hydrogen Purge Blower control switch to AFTER START for
the unit to be started (AI-100):

- VA-80A
- VA-80B

b. Place the H₂ Purge Blower Isolation Valve Inbd control switch for the
unit to be run to OPEN (AI-43A):

- HCV-882, VA-80A
- HCV-881, VA-80B



Attachment 5B - Supply of Auxiliary Building Air to Containment VA-80A & VA-80B

PROCEDURE (continued)

(✓) INITIALS

CAUTION

Parts a and b of Step 6 must be performed in sequence and one immediately following the other to avoid a radiological release to Room 59 and possible damage to VA-80A or VA-80B.

6. IF post accident (SIAS or CIAS tripped) startup,
THEN:

a. Place the Hydrogen Purge Blower Control Switch in PULL TO
OVERRIDE for the unit to be started (AI-100):

- VA-80A
- VA-80B

b. Place the H₂ Purge Blower Isolation Valve Inbd Control Switch for the
unit to be run to OVRD (AI-43A):

- HCV-882, VA-80A
- HCV-881, VA-80B

7. When termination is desired:

a. Place the H₂ Purge Blower Isolation Valve Inbd Control Switches to
CLOSE (AI-43A):

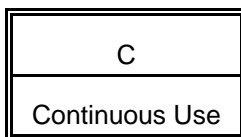
- HCV-882, VA-80A
- HCV-881, VA-80B

b. Place the affected Hydrogen Purge Blower Control Switch to AFTER
STOP (AI-100):

- VA-80A
- VA-80B

8. Place HC-745, Post Accident Cntmt Press, to AUTO.

9. Log the final hydrogen concentration and sample point in CR log.



Attachment 5B - Supply of Auxiliary Building Air to Containment VA-80A & VA-80B

PROCEDURE (continued)

(✓) INITIALS

10. Close the following valves for the affected unit (Corr. 26):

- VA-80A

VA-291/VA279, Cntmt Hydrogen Purge Fan VA-80A Suction Valve from
Aux Building/recirc Valve

- VA-80B

VA-282/VA-284, Cntmt Hydrogen Purge Fan VA-80B Suction Valve
from Aux Building/recirc Valve

11. Lock closed the Cntmt Purge Outboard Isolation Valves to Cntmt Hydrogen
Purge Fan:

- VA-289, VA-80A
- VA-280, VA-80B

Ind Verif

Completed by _____ Date/Time _____ / _____

Facility: Fort Calhoun		Scenario No: 2005 - 1		Op-Test No. _____	
Examiners: _____ _____ _____			Operators: _____ _____ _____		
Initial Conditions: 100% Power IC#1 { Preset malfunctions: COP RCAF2U1 0%, COP RCAF2U2 0%, MFP EHC02, MFP ESF02A OFF, MFP ESF02B OFF }					
Turnover: CCW-Pump, AC-3A and Diesel Driven AFW pump FW-54 are tagged out of service Maintain Power Operations					
Event No.	Malf No.	Event Type*	Event Description		
1 (3:00)	COP T:F212 160	I - ATC	Letdown flow transmitter fails high – letdown isolates		
2 (10:00)	COP T:L903X 0% 60 sec ramp	I - BOP	S/G “A” level transmitter fails low – manual FW flow control required		
3 (15:00)	COP NCAPCA1C TRIP	C - BOP	IA Compressor trips, standby does not load		
4 (20:00)	MFP CRD06 R1G1 Deenergized	C – ATC	Dropped CEA – T/S Entry		
5	N/A	R – ATC N - BOP	TS Required power reduction to 70%		
6 (35:00)	MFP EDS04B	C - ATC	Instrument Bus Fails – T/S Entry		
7 (45:00)	MSS01A 20% 2 min ramp	M - ALL	Main steam line break inside containment		
8	Preset	C - BOP	Turbine fails to trip		
9	Preset	I – ATC or BOP	CPHS Fails to Actuate		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

Op-Test No.: Scenario No.: 2005-1 Event No.:1 Page 2 of 9

Event Description: Letdown Flow Transmitter Fails High – letdown isolates

Time	Position	Applicant's Actions or Behavior
	SRO/ATC BOP	Responds to "Letdown High Flow" and "Intermediate Letdown Press HI-LO" alarms Acknowledges alarms
	ATC	Reviews ARP-CB-1,2,3/A2 BIL and A1L for appropriate actions
	ATC	Ensures HCV-204 has automatically closed
	ATC	Determines that Flow instrument FI-212 has failed high
	SRO	Directs ATC Operator to override flow interlock and restore letdown flow
	ATC	Place HC-204-1 "High Flow interlock Override switch" in DEFEAT
	ATC	Place HC-101-3, Limiter Bypass switch, in BYPASS
	ATC	Place HIC-101-1/1-1-2 in MANUAL
	ATC	Close LCV-101-1 and/or LCV-101-2
	ATC	Place PIC-210 in Manual and throttle to 10% open
	ATC	Open HCV-204 and (if needed) TCV-202
	ATC	Initiate letdown flow using HIC-101-1/101-2 while adjusting PCV-210 to maintain letdown pressure approximately 300 psig. Balance charging and letdown flows.
	ATC	Place HC-101-3 in NORMAL
	ATC	Place HIC-101-1/101-2 and PIC-210 in AUTO
	SRO	Notify Work Week Manager or I&C of failure with FI-212
	ATC	Monitor charging and letdown for proper operation

Op-Test No.:

Scenario No.: 2005-1

Event No.: 2

Page 3 of 9

Event Description: Steam Generator “A” level transmitter fails low – manual FW flow control required

[illegible]

Op-Test No.:

Scenario No.: 2005-1

Event No.: 3

Page 4 of 9

Event Description: Instrument Air compressor “C” trips. Standby (B) does not load.

[illegible]

Op-Test No.: Scenario No.: 2005-1 Event No.: 4 Page 5 of 9

Event Description: Dropped CEA – Tech Spec Entry

Time	Position	Applicant's Actions or Behavior
	ATC	Identify event from "Dropped Rod" and other alarms (CB-4 A20 E6, CB-4 A8 A5L, B1U, B1L, B2L, B5L, C1U, C2U, C5L)
	ATC	Determine that only one rod has dropped (rod #1, grp 4)
	SRO	Enter AOP-02 (CEDM Malfunction)
	SRO	Direct BOP Operator to adjust turbine load to match reactor power.
	BOP	Reduce turbine load to match reactor power using T-cold indication
	SRO	Direct ATC to control pressurizer pressure and level
	ATC	Monitor pressurizer pressure and level
	SRO	Direct ATC Operator to reset rod drop bistables
	ATC	Reset rod drop bistables
	SRO	Notify Work Week Manager or Reactor Engineer
	SRO	Enter Tech Spec Section 2.10.2 Reactor power must be reduced to less than 70% within one hour. The CEA must be realigned or declared inoperable within one hour following the power reduction. If the CEA is declared inoperable, the reactor must be in hot shutdown within an additional 5 hours.
	SRO	Inform ATC and BOP operators that Tech Specs require a power reduction to less than 70% within one hour.
	SRO	Notify energy marketing of the impending power reduction
	BOP	Continue manual control of S/G level.

Op-Test No.: Scenario No.: 2005-1 Event No.: 5 Page 6 of 9

Event Description: Tech Spec required power reduction to 70%

[illegible]

Op-Test No.: Scenario No.: 2005-1 Event No.: 6 Page 7 of 9

Event Description: Instrument Bus Failure – Tech Spec Entry.

Time	Position	Applicant's Actions or Behavior
	BOP/ATC	Identify loss of instrument bus "B" due to "Inverter B Trouble" and "Instrument bus B low voltage" alarms and RPS panel indication (dark panel).
	SRO	Enter AOP-16, Section III "Loss of AI-40B"
	SRO	Notify Manager-FCS, Manager-Operations or Supervisor-Operations that RPS trip units will be bypassed
	SRO	Provide RPS trip unit bypass keys to ATC and direct ATC operator to bypass all RPS Channel B Bistable trip units
	ATC	Bypass all RPS Channel B Bistable trip units
	SRO/ATC	Place HC-111/121 "Reactor REG System Channel selector switch in "A"
	ATC	<ul style="list-style-type: none"> Ensure at least 1 CCW pump running with pressure at least 60 psig. Ensure at least one Raw water pump running
	BOP	Ensure instrument air pressure at least 90 psig
	ATC	<ul style="list-style-type: none"> Select pressurizer pressure channel "X" using HC-103 Place HC-101-1 heater cutout switch in channel "X" position Manually control pressurizer heaters as needed Ensure pressure being controlled
	SRO	May direct ATC to close both PORV block valves
	ATC	If directed, close both PORV block valves
	ATC	Verify at least one RCP operating
	BOP	Ensure S/G levels within range. Control FW flow as needed.
	BOP	Confirm containment integrity: <ul style="list-style-type: none"> Containment sump Radiation monitors Containment pressure Containment temperature
	SRO	Refer to listed Tech specs and enter tech spec 2.7 One instrument bus may be inoperable for up to 8 hours as long as RPS and ESF functions on all 3 of the other instrument busses remain operable. If not repaired, the plant must be in hot shutdown within the next 12 hours.
	SRO	Notify Work Week Manager or Maintenance of the failure.

Op-Test No.: Scenario No.: 2005-1 Event No.: 7, 8 Page 8 of 9

Event Description: Main Steam Line Break inside Containment, turbine fails to trip

[illegible]

Op-Test No.: Scenario No.: 2005-1 Event No.: 8 Page 9 of 9

Event Description: CPHS fails to actuate

Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> Direct chemist to sample both S/G's Direct BOP to verify proper S/G isolation following SGIS signal
	BOP	Verify SGIS <ul style="list-style-type: none"> MSIV's and bypass valves FW reg and bypass valves FW reg block valves FW header isolation valves
	ATC/BOP	Monitor containment pressure and determine that CPHS did not actuate at setpoint
	SRO	Direct ATC or BOP to manually actuate CPHS
	ATC/BOP <C>	Manually actuate CPHS
	ATC	Verify ECCS and Containment Spray flows
	ATC <C>	When RCS pressure reaches 1350 psia, ensure no more than one RCP operating in each loop within 5 minutes
	SRO	Direct BOP to establish steam flow from intact S/G prior to dryout of faulted steam generator
	BOP	Establish steam flow from intact S/G prior to dryout of faulted steam generator
	ATC	Monitor subcooling and pressurizer level and report when "stop and throttle" criteria are met
	SRO	Direct ATC to throttle and/or stop HPSI flow
	ATC	Throttle and/or stop HPSI flow
	SRO	Direct ATC to monitor and control RCS pressure to maintain subcooling between 20° and 200°F.
	ATC	Monitor and control RCS pressure to maintain subcooling between 20° and 200°F.
		SCENARIO ENDS when "stop and throttle" criteria have been met and HPSI flow has been reduced.

Facility: Fort Calhoun		Scenario No: 2005 - 2		Op-Test No. _____	
Examiners: _____ _____ _____			Operators: _____ _____ _____		
Initial Conditions: 100% Power (IC#1) (PRESET MFP CRD05I untrip, MFP CRD05H untrip, COP T:R057 69, Start CH-1B, Stop CH-1C)					
Turnover: CCW-Pump, AC-3A and Diesel Driven AFW pump FW-54 are tagged out of service Maintain Power Operations					
Event No.	Malf No.	Event Type*	Event Description		
1 (3:00)	MFP NIS04C	I - ATC	Power Range NI Channel "C" Fails – T/S entry		
2 (10:00)	COP T:L906X 55%	I - BOP	S/G "B" level transmitter fails to 55%		
3 (16:00)	COP NBWPAC9 A trip	C - BOP	Bearing Water Pump AC-9A Trips		
4 (20:00)	T:T122H2 665°F	I -ATC	RCS T-hot fails – T/S entry		
5 (30:00)	MFP CVC16B	C - ATC	Charging Pump CH-1B degraded performance		
6 (40:00)	MFP SGN01A 25%	M - ALL	Steam Generator Tube Rupture		
7	Preset	R - ATC	2 CEAs fail to insert – Emergency Boration Required		
8	Preset	I - BOP	RM-057 (Condenser offgas radiation monitor) fails "as is" (Aux Steam Isolation valve, RC-978, does not get close signal)		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

Op-Test No.: Scenario No.: 2005-2 Event No.: 1 Page 2 of 8

Event Description: Power range NI Channel C Fails – Tech Spec Entry.

[illegible]

Op-Test No.:

Scenario No.: 2005-2

Event No.: 2

Page 3 of 8

Event Description: Steam Generator “B” level transmitter fails to 55%.

[illegible]

Op-Test No.: Scenario No.: 2005-2 Event No.: 3 Page 4 of 8

Event Description: Bearing water pump, AC-9A, trips.

[illegible]

Op-Test No.:

Scenario No.: 2005-2

Event No.: 4

Page 5 of 8

Event Description: RCS Hot Leg RTD fails – Tech Spec Entry

[illegible]

Op-Test No.: Scenario No.: 2005-2 Event No.: 5 Page 6 of 8

Event Description: Charging pump, CH-1B, degraded performance. Tech. Spec Entry

[illegible]

Op-Test No.: Scenario No.: 2005-2 Event No.: 6, 7 Page 7 of 8

Event Description: Steam Generator Tube Rupture, 2 CEAs fail to insert

[illegible]

Op-Test No.: Scenario No.: 2005-2 Event No.: 8 Page 8 of 8

Event Description: Condenser Offgas Radiation Monitor, RM-057, fails as is (Aux Steam Isolation valve, RC-978, does not get close signal)

Time	Position	Applicant's Actions or Behavior
	BOP	Determine that RCV-978 did not close
	SRO	Direct BOP to close RCV-978
	BOP<C>	Close RCV-978
	SRO	Direct RCS cooldown – T-hot less than 510°F
	BOP	Cooldown RCS T-hot to less than 510°F
	ATC	Identify and verify PPLS actuation
	ATC	When RCS pressure reaches 1350 psia, ensure no more than 1 RCP operating in each loop
	SRO/BOP	Identify most affected S/G as “A”
	SRO	Direct BOP to isolate S/G “A”
	BOP	Isolate S/G “A”. Close the following <ul style="list-style-type: none"> • HCV-1041A (A MSIV) • HCV-1041C (A MSIV bypass) • MS-291 (atmospheric steam safety valve) • FCV-1101 (FW reg valve) • HCV-1105 (FW reg bypass valve) • HCV-1386 (FW header isolation) • HCV-1103 (FW reg block valve) • HCV-1388A&B (blowdown isolation valves) • HCV-1107A&B (AFW isolation) • YCV-1045A (steam supply to AFW pump) Direct the turbine building to close: <ul style="list-style-type: none"> • MS-298 (MSIV packing leakoff)
	SRO	Direct ATC to maintain RCS pressure less than 1000 psia and within 50 psi of ruptured S/G
	ATC	Control RCS pressure less than 1000 psia and within 50 psi of ruptured S/G
		SCENARIO ENDS with S/G “A” isolated and RCS pressure reduction in progress

Facility: Fort Calhoun		Scenario No: 2005 - 3		Op-Test No. _____	
Examiners: _____ _____ _____			Operators: _____ _____ _____		
Initial Conditions: 49% Power (IC#4) {PRESET RFP CWS10N CLOSED} {Power 1A1 and 1A2 from 22KV, S/D CH-1A}					
Turnover: Heater Drain pumps FW- 5A and FW-5C are tagged out of service. Power held at 50% pending repair of at least one of the heater drain pumps.					
Event No.	Malf No.	Event Type*	Event Description		
1 (3:00)	MFP DSG06A 100%	C – ATC or BOP	D/G #1 Radiator Leak – T/S Entry		
2 (12:00)	COP T:P910 1000 psi	I - BOP	PT-910 Fails High		
3 (18:00)	COP T:T2897 50°F	I - ATC	Letdown heat exchanger temperature transmitter fails low		
4 (25:00)	MFP SWD02B	C - BOP	Loss of 161 KV – T/S Entry		
5 (35:00)	COP T:P103Y 2556 90 sec ramp	I - ATC	Pressurizer pressure transmitter PT-103X fails high		
6 (40:00)	COP T: L906Y 100% 60 sec ramp	I - BOP	S/G “B” level transmitter LT-906X fails high (Manual control using Aux controller required)		
7 (45:00)	MFP RWS01B 25%	C - ATC	Raw Water header leak		
8 (55:00)	MFP RCS01C 5%	M - ALL	LOCA with Loss of offsite power		
9	Preset	C-BOP	Circulating Water Pump Breaker does not open so the D/G breaker does not close.		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

Op-Test No.: Scenario No.: 2005-3 Event No.: 1 Page 2 of 9

Event Description: Diesel Generator #1 Radiator Water Leak – Tech Spec Entry

[illegible]

Op-Test No.: Scenario No.: 2005-3 Event No.: 2 Page 3 of 9

Event Description: Steam Header Pressure Transmitter, PT-910, Fails High causing turbine bypass valve to open.

[illegible]

Op-Test No.: Scenario No.: 2005-3 Event No.: 3 Page 4 of 9

Event Description: Letdown heat exchanger temperature transmitter, T-2897, fails low reducing CCW flow to letdown heat exchanger.

[illegible]

Op-Test No.: Scenario No.: 2005-3 Event No.: 4 Page 5 of 9

Event Description: Loss of 161 KV offsite power to plant – Tech Spec Entry

Time	Position	Applicant's Actions or Behavior
	BOP	Identify loss of 161 KV from numerous alarms on CB-20. (CB-20 A15 A1, A2, A3) (CB-20 A17 A2, C4, D2) Determine and report that busses 1A3 and 1A4 have fast transferred and are powered.
	SRO	Enter AOP-31, section II "All 4160 busses fed from 22 KV" Direct BOP to verify 1 FW pump, 1 Condensate pump and 1 Heater drain pump operating
	BOP	Verify 1 FW pump, 1 Condensate pump and 1, Heater drain pump operating
	SRO	Direct BOP to ensure Main Generator Terminal voltage less than 22,000 Volts
	BOP	Verifies Main Generator Terminal Voltage – no adjustment needed
	SRO	Direct BOP to align secondary pumps as needed.
	BOP	Align secondary pumps as directed
	SRO	Direct BOP to verify 480 bus voltages greater than 430 volts
	BOP	Verify voltages
	SRO	Direct BOP to match flags on breakers 110, 111, 1A31, 1A33, 1A42, 1A44
	BOP	Match flags on breakers 110, 111, 1A31, 1A33, 1A42, 1A44
	SRO	Direct that signs be placed at entrances to switchgear rooms Review EOP-02, EOP-07 and EOP-20
	SRO	Enter Tech Spec 2.7 Due to the loss of 161 KV and D/G-1 being inoperable, Tech Spec 2.0.1 must be entered which requires that the plant be placed in hot shutdown within 6 hours. However, taking the main generator off-line will result a loss of offsite power. The NRC Operations center must be notified within four hours due to the loss of 161 KV
	SRO	Report situation to station management.

Op-Test No.:

Scenario No.: 2005-3

Event No.: 5

Page 6 of 9

Event Description: Pressurizer Pressure Transmitter PT-103Y fails high
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[illegible]

Op-Test No.: Scenario No.: 2005-3 Event No.: 6 Page 7 of 9

Event Description: Steam Generator "B" Level Transmitter LT:906Y fails high

[illegible]

Op-Test No.: Scenario No.: 2005-3 Event No.: 7 Page 8 of 9

Event Description: Raw Water Header Leak

[illegible]

Op-Test No.: Scenario No.: 2005-3 Event No.: 8, 9 Page 9 of 9

Event Description: LOCA with a loss of all offsite power, Circulating Water pump breaker fails to open keeping D/G breaker from closing: Station Blackout

Time	Position	Applicant's Actions or Behavior
	ATC	Identify and communicate lowering pressurizer level and pressure
	SRO	May direct ATC to trip the reactor
	ATC	Manually trip the reactor
	ATC	Perform Standard Post-Trip Actions: <ul style="list-style-type: none"> Verify control rod insertion, power lowering, negative startup rate.
	BOP	<ul style="list-style-type: none"> Verify turbine and generator trip.
	BOP	<ul style="list-style-type: none"> Verify electrical status – 4160, D/G, instrument power, 125V DC Report that all 4160V busses are deenergized. D/G #2 is running at 900 RPM but it's breaker has not closed Verify Instrument air status
	ATC	<ul style="list-style-type: none"> Verify CCW and Raw water status Verify RCS inventory control Verify RCS pressure control Verify core heat removal
	BOP	<ul style="list-style-type: none"> Verify S/G feed Verify S/G pressure and T-cold Verify containment conditions
	ATC	Report PPLS actuated but no SI flow
	BOP <C>	Report that CW-1C breaker failed to trip. (This prevents D/G-2 breaker from closing)
	SRO	Direct EONT to manually trip the breaker for CW-1C
	SRO	Enter EOP-20. Go to MVA-AC
	SRO	When D/G-2 output breaker closes, Direct BOP to verify bus 1A4 voltage
	SRO	Direct ATC and BOP to ensure the following: <ul style="list-style-type: none"> CCW and Raw Water Pumps operating HPSI, LPSI and Containment Spray Pumps Operating Adequate HPSI and Containment Spray flow Containment Cooling Reactor Vessel Level
	ATC/BOP	Ensure the above parameters as directed
		SCENARIO ENDS with bus 1A4 energized and adequate SI flow being injected into RCS

Facility: Fort Calhoun		Scenario No: 2005 – 4 (spare)		Op-Test No. _____	
Examiners: _____ _____ _____			Operators: _____ _____ _____		
Initial Conditions: 49% Power {Preset MSS02F 100% E1 30 sec delay} { Place 1A1 and 1A2 on 22 KV, S/D CH-1A}					
Turnover: Heater Drain pumps FW- 5A and FW-5C are tagged out of service. Power held at 50% pending repair of at least one of the heater drain pumps.					
Event No.	Malf No.	Event Type*	Event Description		
1 (3:00)	COP JLB218LL Fail_set	I - ATC	VCT Level Transmitter Fails Low		
2 (8:00)	COP T:L903X 100% 45 sec ramp	I - BOP	S/G “A” Level transmitter fails high		
3 (15:00)	COP T:F114YA 0	I - ATC	RCS Flow transmitter failure – T/S Entry		
4 (22:00)	MFP AFW05A	I - BOP	Inadvertent AFAS actuation – T/S Entry		
5 (30:00)	COP RCAP 849A&B 0%	C - ATC	Instrument air to containment isolates		
6 (40:00)	MFP CND01 100% 300 sec ramp	C - BOP	Loss of condenser vacuum		
7	N/A	M - ALL	Reactor Trip – no steam dump and bypass valves		
8	Preset	C - BOP	S/G safety valve sticks open		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

Event Description: VCT Level Transmitter fails low CB-1,2,3 A2 B2L

[illegible]

Op-Test No.: Scenario No.: 2005-4 Event No.: 2 Page 3 of 8

Event Description: Steam Generator “A” level transmitter 903X fails high.

[illegible]

Op-Test No.: Scenario No.: 2005-4 Event No.: 3 Page 4 of 8

Event Description: RCS Flow transmitter failure. Tech Spec entry.

[illegible]

Op-Test No.: Scenario No.: 2005-4 Event No.:4 Page 5 of 8

Event Description: Inadvertent AFAS actuation – Tech Spec Entry

[illegible]

Op-Test No.:

Scenario No.: 2005-4

Event No.: 5

Page 6 of 8

Event Description: Instrument Air Containment Isolation valve fails closed.

[illegible]

Op-Test No.: Scenario No.: 2005-4 Event No.: 6, 7 Page 7 of 8

Event Description: Loss of Condenser Vacuum, Reactor Trip – no steam dump and bypass valves

Time	Position	Applicant's Actions or Behavior
	BOP	Identifies lowering condenser vacuum from "Condenser A/B pressure low" alarm and/or vacuum indication
	ATC/BOP	Refers to ARP-CB-10,11/A9 A4U, A4L, B6L
	SRO	Dispatches EONT and/or water plant operator to check vacuum pump operation and then look for vacuum leaks
	BOP	Ensures backup vacuum pump started
	SRO	Enters AOP-26
	SRO	Directs plant shutdown using AOP-05 or OP-4
	ATC	Begins boration of the RCS using method directed by SRO Must ensure charging pump is running
	BOP	Reduces turbine load as needed to control RCS T-cold
	SRO	May direct manual reactor trip
	ATC	Trip reactor if directed
	ATC	Perform Standard Post-Trip Actions: <ul style="list-style-type: none"> • Verify control rod insertion, power lowering, negative startup rate.
	BOP	<ul style="list-style-type: none"> • Verify turbine and generator trip. • Verify electrical status – 4160, D/G, instrument power, 125V DC • Verify Instrument air status
	ATC	<ul style="list-style-type: none"> • Verify CCW and Raw water status • Verify RCS inventory control • Verify RCS pressure control • Verify core heat removal
	BOP	<ul style="list-style-type: none"> • Verify S/G feed -Manually throttle FCV-1102 • Verify S/G pressure and T-cold • Verify containment conditions

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Event Description: Steam Generator Safety Valve sticks open

Time	Position	Applicant's Actions or Behavior
	ATC	Identify lowering pressurizer pressure
	BOP	Identify lowering T-cold and S/G pressure
	SRO	Enter EOP-05
	SRO	Provide EOP-05 floating steps to ATC and BOP
	ATC	Report approach to PPLS
	SRO	Direct ATC to verify proper operation of ESF
	ATC	Ensure proper safeguards operation and adequate SI flow
	ATC	If RCS pressure lowers to 1350 psia, ensure no more than one RCP operating in each loop
	ATC <C>	Ensure adequate emergency boration. Will have to reposition LCV-218-2 and LCV-218-3
	SRO/BOP	Identify affected S/G "B"
	SRO	Direct BOP to isolate affected S/G
	BOP	Isolate affected S/G
	BOP	Establish FW flow to good S/G. May need to manually start AFW pump
	SRO	Direct BOP to establish steam flow from good S/G prior to dryout of affected S/G
	BOP <C>	Begins steaming good S/G prior to dryout of affected S/G
	ATC	Report when "HPSI stop and throttle" criteria are met
	SRO	Direct ATC to perform "HPSI Stop and Throttle"
	ATC <C>	Throttle HPSI loop injection valves and/or stop HPSI pumps as needed Ensure HPSI "Stop and Throttle" criteria continue to be met (20°F subcooling)
		SCENARIO ENDS with HPSI stop and throttle and RCS pressure and temperature under control