

AS-SUBMITTED EXAMINATION
BRAIDWOOD STATION INITIAL EXAMINATION
DECEMBER 2007
IN PLANT JPMS

TASK TITLE: 2B Rod Drive MG Set Startup and Paralleling with Auto Synch Failure

JPM No.: IP-100

REV: 20070301

Task No.: R-RD-014

K/A No.: 001000 2.1.23

Objective No.: 4.C.RD-03

K/A IMP: 3.9/4.0

EXAMINEE: _____

RO SRO (Circle One)

EVALUATOR: _____

DATE: _____

The Examinee: PASSED _____ this JPM.
FAILED _____

TIME STARTED: _____

TIME FINISHED: _____

JPM TIME: _____ MINUTES

CRITICAL ELEMENTS: (*) 4, 7, 10

APPROX COMPLETION TIME: 45 MINUTES

EVALUATION METHOD:

LOCATION:

PERFORM

IN PLANT

SIMULATE

SIMULATOR

GENERAL REFERENCES:

1. BwOP RD-5, CONTROL ROD DRIVE MG SET STARTUP AND PARALLELING TO OPERATING MG SET, Rev. 9.

MATERIALS:

1. Copy of BwOP RD-5, Rev. 9.

TASK STANDARDS:

1. Startup the 2B rod drive MG set.
2. Determine 2B rod drive MG set will not automatically synchronize to 2A rod drive MG.
3. Perform alternate synchronization of 2B rod drive MG set to 2A rod drive MG set.

TASK CONDITIONS:

1. You are an extra NSO.
2. Unit 2 start up is in progress per 2BwGP 100-2, PLANT STARTUP.
3. 2A Rod Drive MG Set is running.

INITIATING CUES:

3. The Unit 2 US has directed you to start up and parallel the 2B Rod Drive MG Set per BwOP RD-5, CONTROL ROD DRIVE MG SET STARTUP AND PARALLELING TO OPERATING MG SET.
CUE: Hand examinee copy of BwOP RD-5.
4. Inform the Unit 2 US when you have completed starting up and paralleling 2B Rod Drive MG Set.

CONTROL ROD DRIVE MG SET START UP AND PARALLELING TO OPERATING MG SET

A. STATEMENT OF APPLICABILITY

This procedure describes the method to be used to start a second Control Rod Drive MG set and paralleling it to an already running MG set.

B. REFERENCES

1. Station Procedure: BwOP RD-1, Control Rod Drive MG Set Startup.
2. Vendor Manual: Westinghouse Rod Control Power Supply Manual (2702-386, Book 4).

C. PREREQUISITES

One Control Rod Drive MG Set is operating per BwOP RD-1, Control Rod Drive MG Set Startup.

D. PRECAUTIONS

1. VERIFY there is no rod motion while paralleling.
2. DO NOT synchronize the MG Sets unless the Reactor Trip Breakers are closed and the Local Stationary Disconnects above the Rod Drive Power Cabinets in _RD02JA, 3JA, 4JA, 5JA, and 6JA are closed (the ON position).

E. LIMITATIONS AND ACTIONS

1. The Control Rod Drive MG Sets will trip on the following:
 - a. Generator Overvoltage.
 - b. Generator Reverse Current.

NOTE

If the breaker trips on Overcurrent, then the breaker will need to be racked out and racked in to recharge the closing spring prior to attempting to close the breaker.

- c. Overcurrent.

RECORD START TIME: _____

	PERFORMANCE STEP	STANDARD	CIRCLE APPLICABLE
1.	Refer to BwOP RD-5. CUE: All Prerequisites, Precautions, Limitations and Actions have been met.	Refer to BwOP RD-5.	SAT UNSAT N/A Comments:
2.	Lineup the 2B Rod Drive MG Set Control Cabinet. CUE: Voltage Adjust Potentiometer is set same as 2A MG set. CUE: Motor breaker is tripped, GREEN (open) light is LIT. CUE: Synchronizer Switch is as seen (OFF). CUE: Generator breaker is tripped, GREEN (open) light is LIT. CUE: Ammeter selector switch is as seen. CUE: Voltmeter selector switch is as seen.	Perform the following at 2RD03E: <ul style="list-style-type: none"> • VERIFY/SET the Voltage Adjust Potentiometer to approximately the same position as the 2A MG set. • VERIFY the Motor Breaker is Tripped and the OPEN light ENERGIZED. <ul style="list-style-type: none"> ○ VERIFY/PLACE the Synchronizer Switch in the OFF position. • VERIFY the Generator Breaker is Tripped and the OPEN light ENERGIZED. <ul style="list-style-type: none"> ○ VERIFY/PLACE 2RD03E-B-1RV-A, Ammeter Selector Switch, in position A, B, or C. ○ VERIFY/PLACE 2RD03E-B-1RV-C, Voltmeter Selector Switch, in position 1-2, 2-3, or 3-1. 	SAT UNSAT N/A Comments:

	PERFORMANCE STEP	STANDARD	CIRCLE APPLICABLE
3.	<p>Verify 2A Rod Drive MG Set Control Cabinet aligned.</p> <p>CUE: Synchronizer Switch is as seen (OFF).</p> <p>CUE: Ammeter selector switch is in same position as 2B MG set.</p> <p>CUE: Voltmeter selector switch is in same position as 2B MG set.</p>	<p>Perform the following at 2RD03E:</p> <ul style="list-style-type: none"> • Verify Synchronizer Switch is in OFF position. • Verify 2RD03E-A-1RV-A, 2A MG Set Ammeter Selector Switch, is in same position as 2RD03E-B-1RV-A, 2B MG Set Ammeter Selector Switch, • Verify 2RD03E-A-1RV-C, 2A MG Set Voltmeter Selector Switch, is in same position as 2RD03E-B-1RV-C, 2B MG Set Voltmeter Selector Switch. 	<p>SAT UNSAT N/A</p> <p><u>Comments:</u></p>
*4.	<p>Start the 2B Rod Drive MG Set.</p> <p>CUE: Relays are as seen (No Targets are up).</p> <p>NOTE: If examinee depresses the relay reset pushbutton, provide the following cue:</p> <p>CUE: Reset pushbutton has been depressed, and released.</p> <p>CUE: 2B MG Set Motor Breaker is closed, RED (closed) light is LIT, MG set is spinning up.</p> <p>CUE: 15 secs have elapsed, MG set is at rated speed.</p>	<p>Perform the following at 2RD03E:</p> <ul style="list-style-type: none"> ○ Ensure no targets indicating on the following relays: <ul style="list-style-type: none"> ○ Common Generator Ground Relay for both MG ○ 2B MG Set Phase A Dir Overcurrent. ○ 2B MG Set Phase C Dir Overcurrent. ○ Depress the Reset pushbutton. • Place 2B MG Set Motor Breaker control switch to CLOSE. ○ Allow 15 secs for 2B MG Set to reach rated speed. 	<p>SAT UNSAT N/A</p> <p><u>Comments:</u></p>

EVALUATOR NOTE: DO NOT ALLOW EXAMINEE TO OPEN REACTOR TRIP BREAKER CABINET DOORS. Photos of the Reactor Trip and Bypass Breakers are attached on JPM pages 7 & 8.

	PERFORMANCE STEP	STANDARD	CIRCLE APPLICABLE
5.	<p>Ensure locally the Reactor Trip Breakers are closed.</p> <p>NOTE: Provide examinee with photo of RTA and RTB (page 7) and provide the following cue:</p> <p>CUE: RTA and RTB are as shown in photo.</p> <p>NOTE: Provide trainee with photo of BYA and BYB (page 8) and provide the following cue.</p> <p>CUE: BYA and BYB are as shown in photo.</p>	<p>Perform the following at the Reactor Trip Switchgear:</p> <ul style="list-style-type: none"> • Determine RTA and RTB closed. ○ Determine BYA and BYB are open. 	<p>SAT UNSAT N/A</p> <p><u>Comments:</u></p>
6.	<p>Verify stationary disconnects are closed.</p> <p>CUE: All switches are as seen (closed).</p>	<p>Above the Rod Drive Cabinets, ENSURE the following Stationary Disconnects are CLOSED (in ON position):</p> <ul style="list-style-type: none"> • 2RD02JA • 2RD03JA • 2RD04JA • 2RD05JA • 2RD06JA 	<p>SAT UNSAT N/A</p> <p><u>Comments:</u></p>
*7.	<p>Perform field flash of 2B MG Set.</p> <p>CUE: Field Flash Pushbutton is depressed.</p> <p>CUE: 2B MG Set voltage is ~235 volts.</p> <p>CUE: Field Flash Pushbutton is released.</p>	<p>Perform the following at 2RD03E:</p> <ul style="list-style-type: none"> • Depress and hold the 2B MG Set Generator Field Flash pushbutton until voltage is steady at ~235 volts. 	<p>SAT UNSAT N/A</p> <p><u>Comments:</u></p>
8.	<p>Check the range of control of the MG Set Voltage Adjuster.</p> <p>CUE: As voltage adjust pot is adjusted up, voltage rises. As pot is adjusted down, voltage lowers. Range of control is 230-300 volts.</p>	<p>Perform the following at 2RD03E:</p> <ul style="list-style-type: none"> • Rotate the 2B MG Set Voltage Adjust Pot and CHECK the range of control ~230 to 300 volts.) 	<p>SAT UNSAT N/A</p> <p><u>Comments:</u></p>

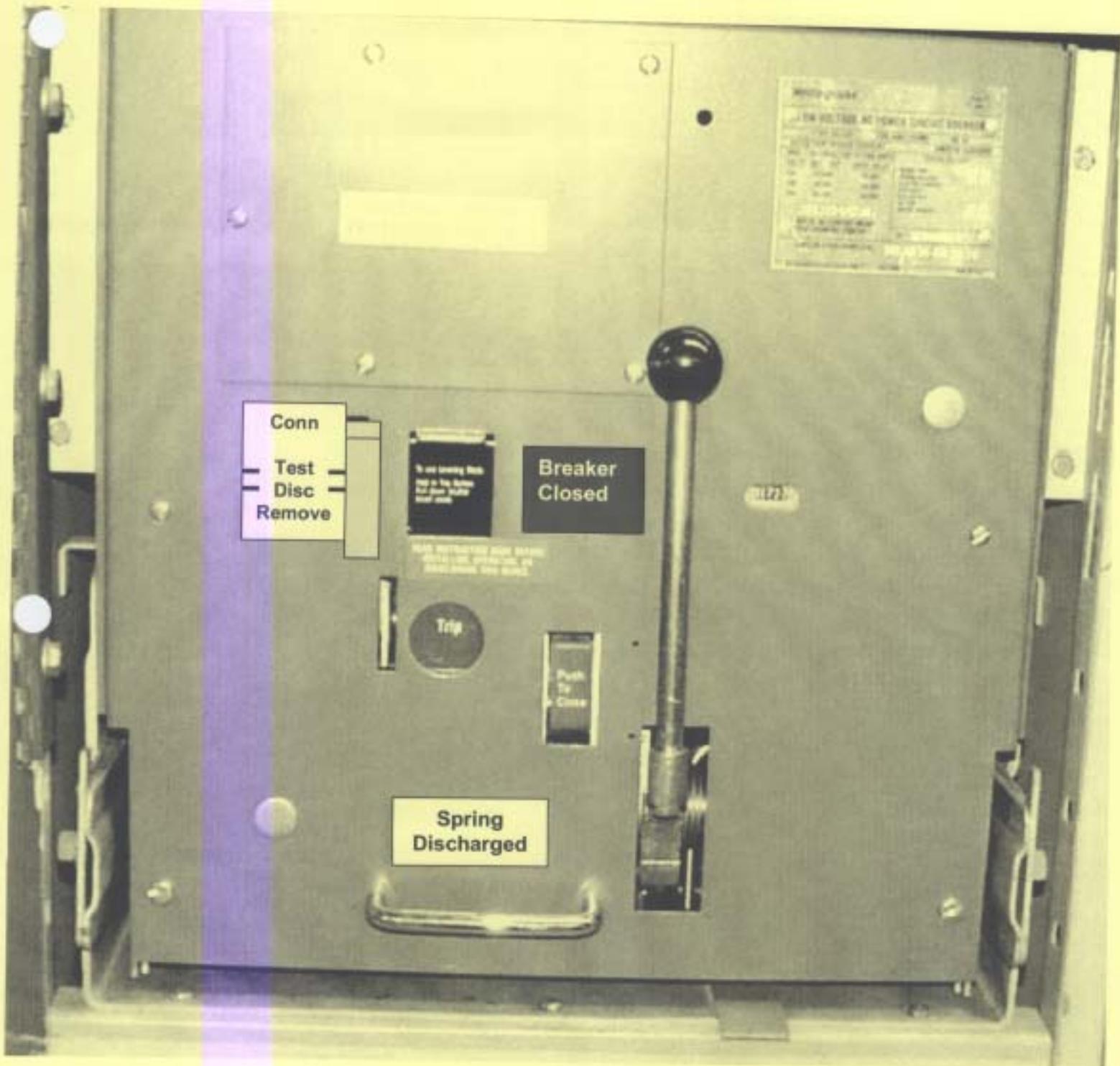
	PERFORMANCE STEP	STANDARD	CIRCLE APPLICABLE
9.	<p>Adjust 2B MG Set voltage slightly higher than 2A MG Set.</p> <p>CUE: 2B MG set voltage is 1V higher than 2A voltages after adjustment of 2B MG set pot.</p>	<p>Perform the following at 2RD03E:</p> <ul style="list-style-type: none"> Adjust 2B MG Set voltage 0-2.5V higher than 2A MG Set by adjusting the 2B MG set potentiometer. 	<p>SAT UNSAT N/A</p> <p><u>Comments:</u></p>
10.	<p>Attempt automatic paralleling of 2A and 2B MG Sets.</p> <p>CUE: 2B MG Set Synch Switch is in ON position.</p> <p>CUE: 2B Generator Output breaker GREEN (open) light is LIT.</p> <p>CUE: 40 seconds have elapsed, 2B Generator Output breaker GREEN (open) light is LIT.</p> <p>CUE: Synch Switch is in OFF position.</p> <p>NOTE: Examinee may attempt auto parallel 2B MG set again. If examinee attempts auto parallel, repeat cues. A maximum of 3 auto parallel attempts is allowed per note prior to step F.11. Intent is for examinee to perform alternate synchronization loading method.</p>	<p>Perform the following at 2RD03E:</p> <ul style="list-style-type: none"> Place 2B Synchronizer Switch to ON. Check for closure of the 2B Generator Output Breaker. Determine 2B MG Set Generator Output Breaker did not close. Place 2B Synchronizer Switch to OFF. 	<p>SAT UNSAT N/A</p> <p><u>Comments:</u></p>
EVALUATORS NOTE: Alternate path begins here.			
11.	<p>Obtain Shift Supervisor's permission to use the alternate synchronizing and loading method.</p> <p>CUE: Unit Supervisor authorizes use of alternate method of synchronizing and loading 2B MG set.</p>	<p>Perform the following:</p> <ul style="list-style-type: none"> Obtain Shift Supervisor's permission to use the alternate synchronizing and loading method. 	<p>SAT UNSAT N/A</p> <p><u>Comments:</u></p>

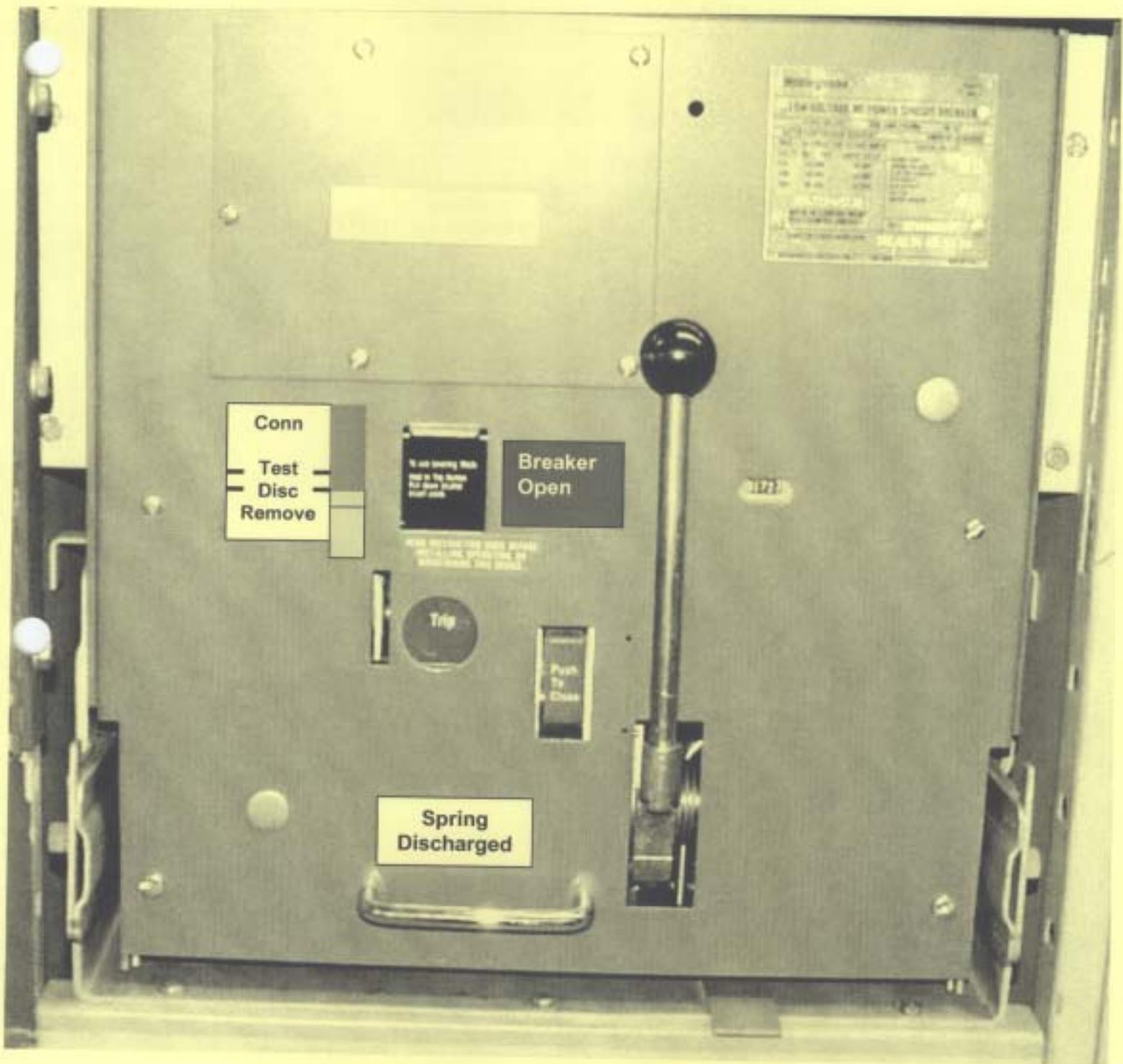
	PERFORMANCE STEP	STANDARD	CIRCLE APPLICABLE
*12.	<p>Parallel the 2A and 2B Rod Drive MG Sets using the alternate synchronizing and loading method.</p> <p>CUE: 2B synch switch is in ON position.</p> <p>CUE: 2B MG Set Motor Breaker is tripped. Green (open) light is energized.</p> <p>CUE: 2B MG set motor and generator breakers RED (closed) lights immediately LIGHT.</p>	<p>Perform the following at 2RD03E:</p> <ul style="list-style-type: none"> Place 2B MG Set Synchronizer Switch to ON. Place 2B MG Set Motor Breaker control switch to TRIP. Verify the 2B Motor and Generator Breakers BOTH CLOSE within 5-6 seconds. 	<p>SAT UNSAT N/A</p> <p><u>Comments:</u></p>
13.	<p>Complete switch alignment on 2B MG Set Control Cabinet.</p> <p>CUE: 2B synch switch is in OFF position.</p> <p>CUE: 2B MG set generator breaker control switch is in after closed.</p> <p>CUE: 2B MG set motor breaker control switch is in after closed.</p> <p>CUE: As Unit 2 US, acknowledge report</p>	<p>Perform the following at 2RD03E:</p> <ul style="list-style-type: none"> Place 2B MG Set Synchronizer Switch to OFF. Place 2B MG Set Generator Breaker control switch to AFTER CLOSED. Place 2B MG Set Motor Breaker control switch to AFTER CLOSED. Notify Unit 2 US 2B MG set is paralleled. 	<p>SAT UNSAT N/A</p> <p><u>Comments:</u></p>

CUE: THIS COMPLETES THIS JPM.

RECORD STOP TIME: _____

COMMENTS:





F. MAIN BODY

1. PERFORM the following on the incoming Rod Drive MG Set Control Cabinet:
 - a. VERIFY/SET the Voltage Adjust Potentiometer to approximately the same position as the running MG set.
 - b. VERIFY the Motor Breaker is Tripped and the OPEN light ENERGIZED.
 - c. VERIFY/PLACE the Synchronizer Switch in the OFF position.
 - d. VERIFY the Generator Breaker is Tripped and the OPEN light ENERGIZED.
 - e. VERIFY/PLACE Ammeter Selector Switch in position A, B, or C.
 - f. VERIFY/PLACE the Voltmeter Selector Switch in position 1-2, 2-3, or 3-1.
2. VERIFY the following on the running Rod Drive MG Set Control Cabinet:
 - a. The Synchronizer Switch is in the OFF position.
 - b. Ammeter is SELECTED to the same position as the incoming MG Set.
 - c. Voltmeter is SELECTED to the same position as the incoming MG Set.
3. VERIFY no targets indicating on the common ground relay for both MG sets and the over current relays for the incoming MG Set cabinet.
4. DEPRESS the reset pushbutton as needed.
5. CLOSE the Motor Breaker for the incoming MG Set.
6. ALLOW 15 seconds for the Control Rod Drive MG Set to reach rated speed.
7. VERIFY locally the Reactor Trip Breakers or Bypass Breakers are closed.
8. VERIFY locally the Stationary Disconnects above the Rod Drive Power Cabinets in _RD02JA, 3JA, 4JA, 5JA, and 6JA are closed (the ON position).
9. DEPRESS and HOLD the incoming MG Set GENERATOR FIELD FLASH pushbutton UNTIL voltage is steady between 230 and 300 volts.
10. ROTATE the incoming MG Set Voltage Adjust Potentiometer and CHECK the range of control (~ 230 to 300 volts).

NOTE

If the breaker trips on Overcurrent, then the breaker will need to be racked out and racked in to recharge the closing spring prior to attempting to close the breaker.

NOTE

Repeat Steps F.11 and F.12 no more than 2 times.

- F. 11. ADJUST output voltage slightly higher, (0-2.5 volts) than that of the running MG Set.

NOTE

The following step will parallel the A and B MG Sets. If the MG Sets do not parallel within 40 seconds, turn the Synchronizer Switch OFF.

12. TURN ON the Synchronizer Switch for the incoming MG Set. The incoming and running MG Sets should parallel automatically as indicated by closure of the incoming Generator Output Breaker.
13. PROCEED to Step F.16 if the MG Sets failed to parallel after three attempts.
14. AFTER the incoming Generator Output Breaker CLOSES, TURN the Synchronizer Switch OFF.
15. MATCH C/S targets on the MG Generator Output Breakers.

NOTE

The following steps should be used if the Control Rod Drive MG Set is carrying a load which causes too great a speed difference to allow auto synchronizing.

16. OBTAIN Shift Supervisors permission to use the alternate synchronizing and loading method.

F. 17. With the incoming Control Rod Drive MG Set at rated speed and voltage, **PERFORM** the following:

a. **TURN ON** the Synchronizer Switch for the incoming MG Set.

NOTE

The Control Rod Drive MG Set Motor Breaker automatically recloses when the MG Set synchronizes.

b. **TRIP** the incoming MG Set Motor Breaker.

NOTE

Synchronization should occur in 5 or 6 seconds. No more than three attempts at synchronization using Step F.17 should be performed.

c. **MG set paralleling:**

- **TURN OFF** the Synchronizer Switch for the incoming MG Set if it is paralleled (both MG Set Motor and Generator Output Breakers are closed).
- **RECLOSE** the MG Set Motor Breaker and **REPEAT** Step F.17, if synchronization did not occur after 5 or 6 seconds.

d. **MATCH C/S targets** on the MG Generator Output Breakers.

e. **PLACE** the incoming MG Set Motor Breaker Control Switch to the **AFTER START** position to **ENABLE** the Rod Drive MG Set Trouble Alarm.

f. **IF Synchronization does not occur after three attempts, NOTIFY** the Shift Supervisor.

(Final)

JOB PERFORMANCE MEASURE

TASK CONDITIONS:

1. You are an extra NSO.
2. Unit 2 start up is in progress per 2BwGP 100-2, PLANT STARTUP.
3. 2A Rod Drive MG Set is running.

INITIATING CUES:

1. The Unit 2 US has directed you to start up and parallel the 2B Rod Drive MG Set per BwOP RD-5, CONTROL ROD DRIVE MG SET STARTUP AND PARALLELING TO OPERATING MG SET.
2. Inform the Unit 2 US when you have completed starting up and paralleling 2B Rod Drive MG Set.

TASK TITLE: Local Start of 2B AF Pump with Failure of Battery Bank

JPM No.: IP-400S

REV: 20070301

Task No: R-AF-012

K/A No.: 061000A2.03

Objective No: 4.C.AF-02

K/A Imp: 3.1/3.4

EXAMINEE: _____

RO SRO (Circle One)

EVALUATOR: _____

DATE: _____

The Examinee: PASSED _____ this JPM.
FAILED _____

TIME STARTED: _____

TIME FINISHED: _____

JPM TIME: _____ MINUTES

CRITICAL ELEMENTS: (*) 2, 6, 7

APPROX COMPLETION TIME: 35 MINUTES

CRITICAL TIME: NA

EVALUATION METHOD:

LOCATION:

___ PERFORM

X IN PLANT

X SIMULATE

___ SIMULATOR

GENERAL REFERENCES:

1. BwOP AF-7, Rev. 28, Auxiliary Feedwater Pump B (Diesel) Startup on Recirc.
2. BwOP AF-7T1, Rev. 4, Diesel Driven Auxiliary Feedwater Pump Operating Log.

MATERIALS:

1. Copy of BwOP AF-7, Rev. 28.
2. Copy of BwOP AF-7T1, Rev. 4.

TASK STANDARDS:

1. Start 2B AF pump lube oil system.
2. Determine 2B AF pump battery bank has failed.
3. Align alternate 2B AF pump battery bank.
4. Start 2B AF pump.

TASK CONDITIONS:

1. You are an extra NSO.
2. Unit 2 is undergoing a loss of heat sink event.
3. Main control room HVAC is operating in makeup mode.
4. An EQUIPMENT OPERATOR is standing by at the 2B AF pump to monitor governor linkages during startup.

INITIATING CUES:

1. The Unit 2 Unit Supervisor directs you to locally start the 2B Auxiliary Feedwater pump in accordance with BwOP AF-7, Auxiliary Feedwater Pump B (Diesel) Startup on Recirc.
CUE: Hand examinee copy of BwOP AF-7 and BwOP AF-7T1.
2. BwOP AF-7 steps F.1 thru F.10 are complete.

RECORD START TIME: _____

	PERFORMANCE STEP	STANDARD	CIRCLE APPLICABLE
1.	<p>Refer to BwOP AF-7</p> <p>CUE: All precautions, prerequisites and limitations and actions are complete.</p>	<p>Perform the following:</p> <ul style="list-style-type: none"> Refer to BwOP AF-7 to step F.9. 	<p>SAT UNSAT N/A</p> <p><u>Comments:</u></p>
*2.	<p>Start Lube Oil systems: (steps F.11 – F.14)</p> <p>NOTE: 2B AF Pump lube oil pump panels are located behind 2AF01J.</p> <p>CUE: Gearbox lube oil pump control switch is in START.</p> <p>CUE: Aux lube oil pump control switch is in START.</p> <p>CUE: Lube oil is within sightglass.</p> <p>NOTE: After examinee locates inlet and outlet pressure gages, provide the following cue:</p> <p>CUE: Inlet pressure is 28 psig, and the outlet pressure is 26 psig.</p>	<p>Perform the following to START Auxiliary Lube Oil Systems:</p> <ul style="list-style-type: none"> At Aux FW Pump 2B Lube Oil Pump 2AF01PB-C local control panel, place 2HS-AF152, Aux FW Pp 2B Gear Box Lube Oil Pp, L/C/S, to START At Aux FW Pump 2B Lube Oil Pump 2AF01PB-A Local Control Panel, place 2HS-AF120, Aux FW Pp 2B Lube Oil Pp, L/C/S to START. Verify pump lube oil inventory is within the sightglass Verify Lube Oil Filter Differential Pressure is < 4 psid 	<p>SAT UNSAT N/A</p> <p><u>Comments:</u></p>
3.	<p>Verify/Place VC in M/U mode per BwOP VC-5: (step F.15)</p> <p>CUE: From initiating cue, VC is operating in makeup mode.</p>	<p>Verify/Place VC in M/U mode per BwOP VC-5, at SM discretion.</p> <ul style="list-style-type: none"> From initiating cue, VC is operating in makeup mode. 	<p>SAT UNSAT N/A</p> <p><u>Comments:</u></p>

	PERFORMANCE STEP	STANDARD	CIRCLE APPLICABLE
4.	<p>Align AFW system discharge flowpath (steps F.16 – F.17)</p> <p>CUE: If asked, as US, direct that step 16a and 16b will not be performed.</p> <p>CUE: Equipment Operator is standing by to monitor governor linkage.</p>	<p>ALIGN 2B AFW pump discharge flowpath as applicable:</p> <ul style="list-style-type: none"> • Determine AF pump is being started to inject into the SGs during emergency condition ○ Contact US to determine if CLOSURE of B Train 2MOV-AF013s or 2AOV-AF004B will be necessary ○ Verify Equipment Operator standing by to monitor the governor linkage during start of the engine 	<p>SAT UNSAT N/A</p> <p><u>Comments:</u></p>
5.	<p>Attempt to start 2B AF Pump: (step F.18.a & b.)</p> <p>CUE: Engine Start Selector Switch is in MANUAL.</p> <p>CUE: If asked, the Engine Ready light is NOT lit.</p> <p>CUE: Start pushbutton is depressed and held.</p> <p>CUE: Engine cranking sounds are NOT present.</p> <p>CUE: Engine Starting Light NOT LIT.</p> <p>CUE: Start pushbutton released.</p>	<p>Perform the following at 2AF01J:</p> <ul style="list-style-type: none"> • Place the Engine Start Selector Switch to MANUAL. • Depress and Hold the start pushbutton. ○ Check the engine cranking indicator ○ Release the Start Pushbutton. • Determine engine did not start. 	<p>SAT UNSAT N/A</p> <p><u>Comments:</u></p>
<p>EVALUATOR NOTE: Alternate path begins here.</p>			
*6.	<p>Select alternate battery bank for 2B AF pump (step F.18.c)</p> <p>NOTE: When examinee locates Battery Bank Selector Switch, provide the following cue:</p> <p>CUE: Battery Selector Switch is in POS 1.</p> <p>NOTE: When examinee repositions Battery Bank Selector Switch, provide the following cue:</p> <p>CUE: Battery Selector Switch is in POS 2.</p> <p>NOTE: If examinee investigates AF pump batteries and/or chargers, provide the following cues:</p> <p>CUE: Battery and/or chargers are as seen.</p>	<p>Perform the following at 2AF01J:</p> <ul style="list-style-type: none"> • Select alternate battery bank by rotating the Battery Selector Switch to POS 2 	<p>SAT UNSAT N/A</p> <p><u>Comments:</u></p>

	PERFORMANCE STEP	STANDARD	CIRCLE APPLICABLE
*7.	<p>Start 2B AF Pump (step F.18.c.1 – F.18.f)</p> <p>CUE: RESET pushbutton has been depressed and released.</p> <p>CUE: If asked, Engine Ready light is as seen (BLUE light LIT).</p> <p>CUE: Start pushbutton is being depressed and held.</p> <p>CUE: Engine start noises are heard.</p> <p>CUE: Engine starting light is lit.</p> <p>CUE: 2SI-AF8002, Engine Speed, is rising and Engine Running (GREEN) light is LIT at 350 rpm</p> <p>CUE: Start pushbutton is released</p> <p>CUE: 2SI-AF8002, Engine Speed, is 1805 rpm</p> <p>CUE: If examinee reports start of 2B AF pump to US, as US acknowledge report and direct examinee to continue BwOP AF-7.</p>	<p>Perform the following at 2AF01J:</p> <ul style="list-style-type: none"> • Momentarily depress the RESET pushbutton. ○ Verify the Ready to Start light is LIT. • Depress and Hold the Start Pushbutton ○ VERIFY Engine Starting Light indicates starting sequence is in process ○ VERIFY Engine Running Light is ILLUMINATED when speed indicates 350 RPM ○ RELEASE the START pushbutton ○ CHECK Speed between 1795-1845 RPM 	
8.	<p>Check Auxiliary Feedwater Pump recirc flow: (step F.18.g)</p> <p>NOTE: Recirc flow gauge is large black gauge located on wall to left of pump room door</p> <p>CUE: 2FI-AF096 indicates 120 gpm</p>	<p>Perform the following at 2FI-AF096:</p> <p>Verify AF recirc flow \geq 85 gpm.</p>	<p>SAT UNSAT N/A</p> <p><u>Comments:</u></p>

	PERFORMANCE STEP	STANDARD	CIRCLE APPLICABLE
9.	<p>Ensure SX Cooling is supplied to the engine: (step F.18.h)</p> <p>NOTE: Valves are in overhead above 2AF01J. After identifying limit switches, provide the following cues:</p> <p>CUE: 2SX173 limit switch is made up (valve is open)</p> <p>CUE: 2SX178 limit switch is made up (valve is open)</p>	<p>Verify the following valves open:</p> <ul style="list-style-type: none"> • 2SX173 SX Supply Isolation valve • 2SX178 SX Return Isolation valve 	<p>SAT UNSAT N/A</p> <p><u>Comments:</u></p>
10.	<p>Monitor 2B AF Pump temperatures: (steps F.18.i – F.18.k)</p> <p>CUE: As US acknowledge report of 2B AF pump running.</p> <p>CUE: US informs you that another operator will complete step F.18 of BwOP AF-7.</p>	<p>Monitor 2B AF Pump temperatures:</p> <ul style="list-style-type: none"> • Inform Unit 2 Unit Supervisor 2B AF pump is running. 	<p>SAT UNSAT N/A</p> <p><u>Comments:</u></p>

CUE: THIS COMPLETES THIS JPM.

RECORD STOP TIME: _____

COMMENTS:

US
Today

AUXILIARY FEEDWATER PUMP 2B (DIESEL) STARTUP ON RECIRC

A. STATEMENT OF APPLICABILITY

This procedure outlines the steps necessary for startup of the Diesel Auxiliary Feedwater Pump.

B. REFERENCES

1. Station Procedures:
 - a. BwOP VC-5, Placing the Control Room HVAC System Makeup Filter Train and Recirculation Charcoal Absorber in Operation.
 - b. BwOP AF-3, Filling and Venting the Auxiliary Feedwater System.
 - c. BwOP AF-7T1, Diesel Driven Auxiliary Feedwater Pump Operating Log.
 - d. _BwOSR 3.7.5.3-2, Unit _ Diesel Driven Auxiliary Feedwater Pump Monthly Surveillance.
 - e. _BwOL 3.7.5, LCOAR - Plant Systems - Auxiliary Feedwater System.
2. Station Drawings:
 - a. M-37/122, Auxiliary Feedwater.
 - b. M-42-3, Essential Service Water.
 - c. 20E-1/2-4030AF01, 02, 03, 12, 13 & 17.
 - d. 20E-1/2-4030AF01, 05, 08, 11, & 60.
3. Tech Specs:
 - a. 3.7.5.
 - b. 3.7.6.
4. FSAR Chapter 10.4.9.
5. Stewart & Stevenson Operating Manual.

B. 6. Station Commitments:

- a. 020-251-83-171, Step E.1.
- b. 456-100-85-05304, Step F.18.c.
- c. 456-200-89-15203, Step F.15.
- d. 456-100-98-0020104, BwOP AF-7T1 AF Pump Recirc Flow.
- e. 454-506-87-05100, Step D.3.

C. PREREQUISITES

- AF* Auxiliary Feedwater System has been filled and vented in accordance with BwOP AF-3.
- AF* CST has sufficient level to support Auxiliary Feedwater Pump operation.
- AF* Essential Service Water System is operating.
- AF* Auxiliary Feedwater Pump Diesel Oil Day Tank has sufficient level to support 2 AF01PB, 2B Auxiliary Feedwater Pump, operation.
- AF* Demineralized water to the Jacket Water Standpipe is lined up and available for makeup.
- AF* Level in the Auxiliary Feedwater Diesel Driven Pump Jacket Water expansion tank should be maintained between the centerline of the tank and 2" from the top of the sightglass. The auto makeup switch actuates at about 4-1/2" inches below the top of the sightglass (1/2" below tank centerline) and resets at about 4" below the top of the sightglass (tank centerline).
- AF* Auxiliary Feedwater Pump Diesel Engine batteries are charged and the battery chargers are operating. This prerequisite is not applicable if performing 2 BwOSR 3.7.5.4-2, Unit 2 Diesel Driven Auxiliary Feedwater Pump Monthly Surveillance.
- AF* Obtain approved copy of BwOP AF-7T1, Diesel Driven Auxiliary Feedwater Pump Operating Log.

D. PRECAUTIONS

DM If speed indication is not received on the tachometer, TRIP the engine immediately.

DM AF Pump operation, at minimum flow rates, should be minimized, to prevent pump damage.

* *DM* Whenever the Diesel Driven Auxiliary Feedwater Pump is required to be Tagged Out for any activities that require work to be performed on any of the components on or inside the pump startup panel, the following electrical isolation points SHALL be used as a minimum to prevent inadvertent starts:

<u>Fuse</u>	<u>Location</u>	<u>Print</u>
F1	2_AF01J	20E-1/2-4030AF12
F2	2_AF01J	20E-1/2-4030AF12
F3	2_AF01J	20E-1/2-4030AF12
F4	2_AF01J	20E-1/2-4030AF13
F6	2_AF01J	20E-1/2-4030AF12
F7	2_AF01J	20E-1/2-4030AF12
FU-6P & N	2_PL05J	20E-1/2-4030AF02

DM At low S/G pressures, the Aux Feedwater Pump Discharge Valves to the S/Gs may not fully close. When the Aux Feedwater Pumps are started, water may enter the S/Gs.

DM If water is to be added to the S/Gs, VERIFY 2_AF013E/F/G/H OPEN prior to opening 2_AF004B to prevent possible pressure oscillations, which may trip the 2_B Aux Feed Pump.

DM If CST Level is less than 66% possible suction transients during pump startup could cause a pump trip or SX switchover.

DM During normal testing, secure the 2_B Aux Feed Pump if the Auxiliary Lube Oil and Gearbox Oil Pump run lights DO NOT extinguish within 5 seconds from getting RUN indication for the 2_B Aux Feed Pump.

E. LIMITATIONS AND ACTIONS

- * ~~AS~~ The Auxiliary Feedwater Pumps are not to be utilized for normal startup and shutdown of the unit.
- ~~AS~~ When pump is being operated in the recirculation MODE for test purposes, either ~~2~~AF004B, ~~2~~B AF Pp Disch Vlv, or ~~2~~AF013E/F/G and H, ~~2~~S/G A, B, C, and D Isol Vlvs, SHALL be used for discharge isolation. Closure of either ~~2~~AF004B or ~~2~~AF013E/F/G/H makes the AF Train INOPERABLE. Notify the Shift Manager to initiate LCOAR ~~2~~BwOL 3.7.5 when any of these valves are closed.
- ~~AS~~ The minimum level required by Tech Spec 3.7.6 in the Condensate Storage Tanks is 66%.
- ~~AS~~ The ~~2~~B Aux Feed Pump will Auto Start and ~~2~~AF004B, AF Pump ~~2~~B Dsch Test Valve, will open on any of the following:
 - ~~AS~~ Lo-Lo S/G level.
 - ~~AS~~ SI initiation.
 - ~~AS~~ Reactor Coolant Pump bus undervoltage.
 - ~~AS~~ AMS initiation.
- ~~AS~~ A low pump suction pressure of 18.1 psia, in coincidence with any of the following will open ~~2~~AF006B and ~~2~~AF017B, ~~2~~B Aux Feed Pump SX Suction Valves:
 - ~~AS~~ Lo-Lo S/G level.
 - ~~AS~~ SI initiation.
 - ~~AS~~ Reactor Coolant Pump bus undervoltage.
- ~~AS~~ A low low pump suction pressure of 16.5 psia will trip the ~~2~~B Aux Feed Pump. The pump will restart when pressure returns to normal if any auto start signal is still present.

E. *SM* The 2B Aux Feed Pump diesel will trip on any of the following and must be reset locally:

- SM* Engine overspeed - 1900 rpm.
- SM* Low engine lube oil pressure - 10 psig.
- SM* High engine jacket water temperature - 205°F.
- SM* Engine overcrank - greater than 55 seconds.

SM At least two independent Steam Generator Auxiliary Feedwater Pumps and associated flowpaths SHALL be operable, as per Tech Spec LCO 3.7.5 in MODES 1, 2, and 3 with:

- SM* ONE operable motor driven Aux Feed Pump.
- SM* ONE operable diesel driven Aux Feed Pump with an operable Diesel Fuel Supply System consisting of a day tank containing a minimum of 420 gallons (74% level in the day tank).

SM 2AF01PB, 2B Auxiliary Feedwater Pump, is started with Suction Pressure greater than LO-LO Suction Pressure Trip when 2HS-AF157 is taken to the START position at 2AF03J.

SM 2AF01PB, 2B Auxiliary Feedwater Pump, is started with Suction Pressure less than LO-LO Suction Pressure Trip when 2HS-AF157 is taken to the START WITH BYPASS position at 2AF03J.

SM The operation of 2AF01PB using the START with BYPASS position at Emergency Control Panel 2AF03J is necessary if the pump will not run when controlled either LOCALLY (2AF01J) or REMOTELY (2PM06J and 2PL04J) and there is a fire in the following plant areas:

- SM* Unit 1 Aux Electrical Equipment Room, Fire Zone 5.5-1 (1B AF Pp Only).
- SM* Aux Building General Area Elevation 426'-0", Fire Zone 11.6-0.
- SM* Aux Building General Area Elevation 401'-0", Fire Zone 11.5-0.
- SM* Aux Building General Area Elevation 383'-0", Fire Zone 11.4 (1B AF Pp Only).
- SM* Unit 2 Aux Electrical Equipment Room, Fire Zone 5.5-2 (2B AF Pp Only).

- E. ~~12~~ When starting the 2B Aux Feed Pump in MODES 4, 5, and 6, VERIFY that 2AF006B and 2AF017B, Auxiliary Feedwater Pp 2B SX Suction Valves, are DEENERGIZED CLOSED. This will prevent injecting SX water into the Steam Generators if a spurious Aux Feed Actuation occurs.
- ~~12~~ BwOP AF-7T1, Diesel Driven Auxiliary Feedwater Pump Operating Log, must be performed and forwarded to the AF System Engineer, SED Secondary Group, for ALL pump starts, regardless of run duration.
- ~~12~~ Starting duties for 2AF013E/F/G/H is a maximum of 5 times in a one minute period.
- ~~12~~ The following lists computer points and their maximum temperatures:
- ~~12~~ T2378, Pump Inboard Bearing Temp 155°F
 - ~~12~~ T2379, Pump Outboard Bearing Temp 155°F
 - ~~12~~ T2377, Pump Thrust Bearing Temp 155°F
- ~~12~~ The 2B AF Pump governor response should be monitored when starting the AF Diesel to aid in troubleshooting a failure of the diesel to start.
- ~~12~~ On a normal start, the governor linkage should move down applying a full fuel signal to the fuel racks.
 - ~~12~~ IF the diesel fails to start and the governor linkage moved as expected, this indicates a loss of fuel prime or fuel pump failure.
 - ~~12~~ IF the governor linkage does not move fully or oscillates, this indicates a governor malfunction.

F. MAIN BODY

PS VERIFY all Precautions, Prerequisites, and Limitations and Actions are completed.

Job PS VERIFY/PLACE 2AF01PB, 2B Aux FW Pp, Control Switch in the AFTER TRIP position, at 2PM06J.

NOTE

PS Level in the Auxiliary Feedwater Diesel Driven Pump Jacket Water expansion tank should be maintained between the centerline of the tank and 2" from the top of the sightglass while the pump is not running. The auto makeup switch actuates at about 4-1/2" inches below the top of the sightglass (1/2" below tank centerline) and resets at about 4" below the top of the sightglass (tank centerline).

PS VERIFY water Level in the Engine Jacket Water Reservoir is in the normal operating band (Refer to BwOP AF-13, Chemical Addition to the Auxiliary Diesel Driven Pump Jacket Water Expansion Tank, if tank needs draining).

PS VERIFY following Oil Levels are in the proper operating band:

PS Diesel Engine Crankcase.

PS 2B AF Pump.

PS Gearbox.

PS Power Take-off Unit.

PS Fan Drive Gearbox.

PS SX Booster Pump.

PS RECORD 2B AF Pump Governor Oil level on BwOP AF-7T1.

F. ~~✓~~ ✓ VERIFY/OPEN the following valves to ensure proper SX lineup:

~~✓~~ ✓ Pump Oil and Gearbox Oil Cooler valves.

~~✓~~ ✓ 2 SX2186, Aux FW Pp 2B Oil Clr SX Outlet Isol.

~~✓~~ ✓ 2 SX2103B, Aux FW Pp 2B Oil Clr SX Inlet Isol.

~~✓~~ ✓ Cubicle Cooler valves.

~~✓~~ ✓ 2 SX2167A, Aux FW Pp 2B Cub Clr Inlet Vlv.

~~✓~~ ✓ 2 SX2167B, Aux FW Pp 2B Cub Clr Inlet Vlv.

~~✓~~ ✓ 2 SX2185A, 2B Aux FW Pp Cub Clr Outlet Vlv.

~~✓~~ ✓ 2 SX2185B, 2B Aux FW Pp Cub Clr Outlet Vlv.

~~✓~~ ✓ Right Angle Gearbox Cooler valves.

~~✓~~ ✓ 2 SX2190, RT Angle Gear Lube Oil Cooler Inlet Vlv.

~~✓~~ ✓ 2 SX2191, RT Angle Gear Lube Oil Cooler Outlet Vlv.

~~✓~~ ✓ Engine Closed Cycle Hx, Jacket Water Cooler valves.

~~✓~~ ✓ 2 SX176, SX Inlet to Aux FW Pp 2B RT Angle Gear Lube Oil Cooler and Engine Closed Cycle HXs.

~~✓~~ ✓ 2 SX177, SX Outlet from Aux FW Pp 2B RT Angle Gear Lube Oil Cooler and Engine Closed Cycle HXs.

~~✓~~ ✓ VERIFY/THROTTLED 1/4 turn open 2 AF018B, SX Hdr. to AF Pump 2B Tell Tale Drain Isol.

~~✓~~ ✓ VERIFY/OPEN 2 AF022B, AF Pump 2B Cnds Recirc Vlv.

~~✓~~ ✓ VERIFY/LOCK OPEN 2 AF009B, Cnds Recirculating Man Isol for Pp 2B.

~~✓~~ ✓ At 2 AF01J, PERFORM the following:

~~✓~~ ✓ PUSH the Reset Pushbutton to clear circuit.

~~✓~~ ✓ IF Select Switch is in AUTO Position, VERIFY "Ready To Start" Light is LIT.

~~✓~~ ✓ VERIFY Diesel Governor Switch is in the OFF position.

- F. ~~10.7~~ VERIFY/RESET the Airbox Trip locally.

NOTE

The pump and gearbox lube oil pressure start interlocks are bypassed when 2AF01PB is started at 2AF01J or at 2AF03J (364'). If neither lube oil pump can be started, the 2B AF Pp. can still be started at 2AF01J per step F.18, or at 2AF03J per step F.21.

11. START 2AF01PB-C, Aux FW Pp 2B Gear Box Lube Oil Pp 2AF01PB-C, at the Local Control Panel.
12. START 2AF01PB-A, Aux FW PP 2B Lube Oil Pp 2AF01PB-A, at the Local Control Panel.
13. VERIFY lube oil inventory in the pump sump is within the sightglass.
14. VERIFY Lube Oil Filter differential pressure less than 4 psid.

NOTE

The Main Control Room Ventilation System (VC) will be placed in the Makeup MODE at the discretion of the Shift Manager or designee, prior to starting the Diesel Driven AF Pump. This will prevent clogging of the filters in the Main Control Room Ventilation System Process Radiation Monitors (0PR31J – 0PR34J), which results in a high vacuum alarm and subsequent Control Room vent isolation. The fan may be stopped, after the pump is started, at the discretion of the Shift Manager or designee.

- 15. VERIFY/PLACE the Main Control Room Ventilation System in the Makeup MODE of operation using BwOP VC-5 at the discretion of the Shift Manager or designee.

NOTE

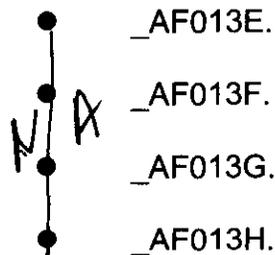
The Shift Manager must be notified to initiate LCOAR ~~2~~BwOL 3.7.5, when ~~2~~AF004B or ~~2~~AF013E/F/G/H is closed.

NOTE

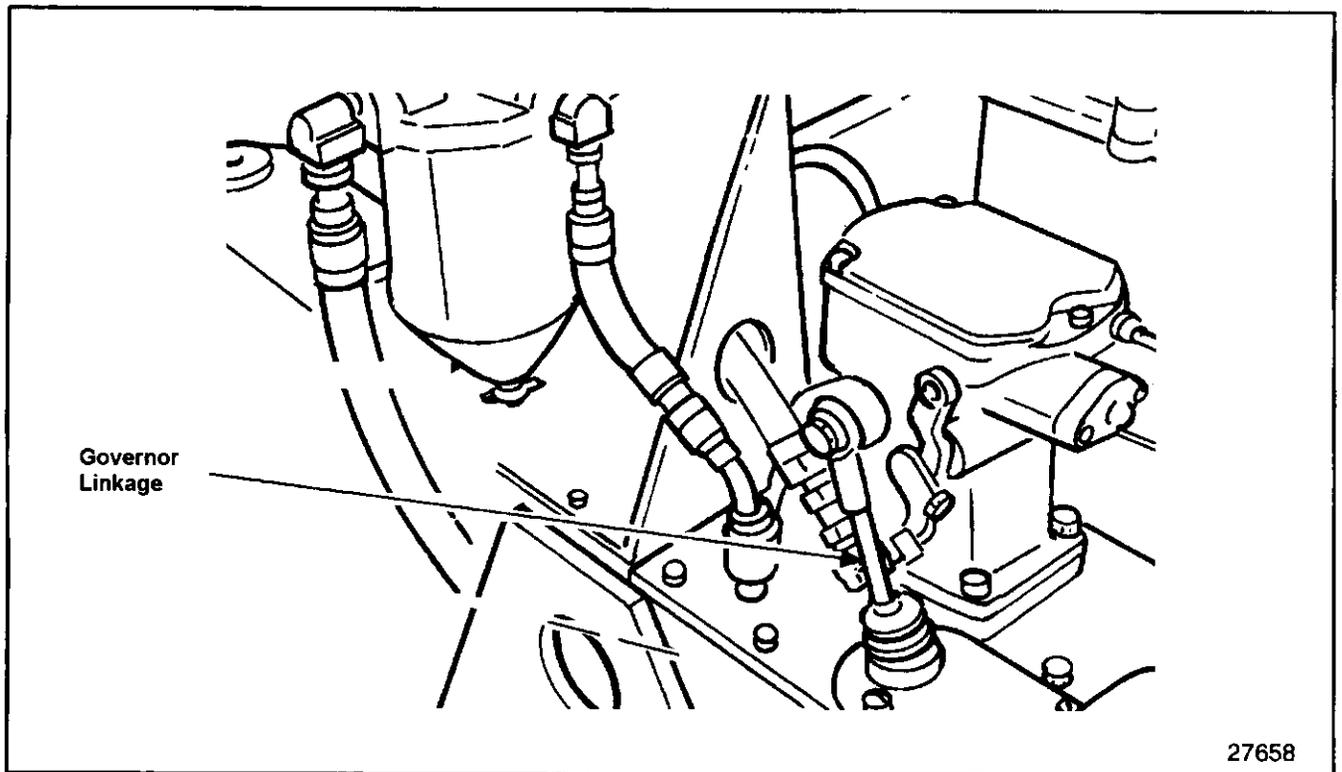
If the AF pump is being started to inject into the SGs during emergency conditions, then Step F.16 should NOT be performed. The Unit Supervisor should determine whether Step F.16.a. or F.16.b. will be performed. PERFORM Step F.16.a. only when it is desired to pressurize the entire Auxiliary Feedwater header. PERFORM Step F.16.b. for all other recirc operations. PERFORMING Step F.16.a. will result in a loss of all FW if a loss of all AC power occurs while the ~~2~~AF013 valves are closed.

F. ~~N/A~~ ALIGN the _B AF Pump discharge path by performing one of the following as applicable:

~~N/A~~ CLOSE Steam Gen Isol Valves at _PM06J.



~~N/A~~ LOCALLY CLOSE _AF004B, _B AF Pp Dsch Vlv.



NOTE

The governor linkage should move downward approximately 1/2" inch during the cranking cycle, and then relax approximately 1/4" when the engine is running.

- F. 17. VERIFY personnel in position at the front of the AF diesel to monitor the governor linkage while starting the engine.

CAUTION

If speed indication is not received on the $\frac{2}{B}$ Aux Feed Pump Tachometer, IMMEDIATELY trip the $\frac{2}{B}$ Aux Feed Pump and notify System Engineering for guidance prior to restarting the pump.

CAUTION

During normal testing, secure the $\frac{2}{B}$ Aux Feed Pump if the Auxiliary Lube Oil and Gearbox Oil Pump run lights DO NOT extinguish within 5 seconds from getting RUN indication for the $\frac{2}{B}$ Aux Feed Pump.



WARNING

If the 2B Aux Feed Pump cannot be REMOTELY started, under EMERGENCY CONDITIONS step F.18 should be performed to verify that both battery banks are utilized and that the trips are reset.



NOTE

The 2B Aux Feed Pump can be started from any of four locations:
Step F.18 Starts the pump from the Local Panel 2AF01J.
~~Step F.19 Starts the pump from the MCR (PM06J).~~
~~Step F.20 Starts the pump from the Remote Shutdown Panel.~~
~~Step F.21 Starts AF01PB, B Auxiliary Feedwater Pump, from AF03J, using HS-AF157, on the 364' elevation of the Aux Bldg.~~

- F. 18. To start 2AF01PB, 2B Auxiliary Feedwater Pump, from the Local Control Panel, PERFORM the following, at 2AF01J:

NOTE

The READY TO START light will not be lit in LOCAL (manual) MODE.

- a. PLACE the Engine Start Selector Switch to MANUAL.
- b. DEPRESS and HOLD the START pushbutton.
- c. IF engine fails to crank, THEN SELECT the alternate battery bank and:
 - 1) PUSH the RESET pushbutton.
 - 2) DEPRESS and HOLD the START pushbutton.
- d. VERIFY that the Engine Starting light indicates starting sequence is in process.
- e. VERIFY that the Engine Running Light is ILLUMINATED when engine speed has reached the minimum operating speed of 350 RPM.
- f. RELEASE the START pushbutton.

CAUTION

System Engineering must be notified if 2B Aux Feed Pump Diesel RPM is not at the desired value (1795-1845 RPM).

- F. 18. g. VERIFY Auxiliary Feedwater Pump Recirc Flow is ≥ 85 gpm, locally at 2_FI-AF096.
- h. VERIFY 2SX173 and SX178, SX Supply Vlv and Return Isol for _B AF Pp Cooling Water, OPEN.
- i. MONITOR the following temperatures locally to verify adequate cooling water flow:
- 1) Engine Oil Temp. \leq 220 degrees F.
 - 2) Oil Cooler Outlet Temp. 40-128 degrees F.
 - 3) Gear Changer Oil Cooler Outlet Temp. 40-130 degrees F.
- j. PERFORM BwOP AF-7T1, Diesel Driven Auxiliary Feedwater Pump Operating Log, at this time and every 30 minutes until the pump is secured.
- k. RECORD governor linkage response on BwOP AF-7T1.

~~NA~~ To start _AF01PB, _B Auxiliary Feedwater Pump, from _PM06J, PERFORM the following:

~~NA~~ DISPATCH an Operator to inspect _AF01PB, _B Auxiliary Feedwater Pump.

~~NA~~ START _AF01PB, _B Auxiliary Feedwater Pump, at _PM06J.

~~NA~~ VERIFY Auxiliary Feedwater Pump Recirc Flow is ≥ 85 gpm, locally at _FI-AF096.

~~NA~~ VERIFY _SX173 and _SX178, SX Supply Vlv and Return Isol for _B AF Pp Cooling Water, OPEN.

- F. 19. e. MONITOR the following temperatures locally to verify adequate cooling water flow:
- 1) Engine Oil Temp. \leq 220 degrees F.
 - 2) Oil Cooler Outlet Temp. 40-128 degrees F.
 - 3) Gear Changer Oil Cooler Outlet Temp. 40-130 degrees F.
- f. PERFORM BwOP AF-7T1, Diesel Driven Auxiliary Feedwater Pump Operating Log, at this time and every 30 minutes until the pump is secured.
- g. RECORD governor linkage response on BwOP AF-7T1.
20. To start _AF01PB, _B Auxiliary Feedwater Pump, from the Remote Shutdown Panel, PERFORM the following:
- a. DISPATCH an Operator to inspect _AF01PB, _B Auxiliary Feedwater Pump.
 - b. PLACE Remote/Local Selector Switch to LOCAL.
 - c. START _AF01PB, _B Auxiliary Feedwater Pump.
 - d. VERIFY Auxiliary Feedwater Pump Recirc Flow is \geq 85 gpm, locally at _FI-AF096.
 - e. VERIFY _SX173 and _SX178, SX Supply Vlv and Return Isol for _B AF Pp Cooling Water, OPEN.
 - f. MONITOR the following temperatures locally to verify adequate cooling water flow:
- 1) Engine Oil Temp. \leq 220 degrees F.
 - 2) Oil Cooler Outlet Temp. 40-128 degrees F.
 - 3) Gear Changer Oil Cooler Outlet Temp. 40-130 degrees F.
- g. PERFORM BwOP AF-7T1, Diesel Driven Auxiliary Feedwater Pump Operating Log, at this time and every 30 minutes until the pump is secured.
- h. RECORD governor linkage response on BwOP AF-7T1.

- F. 20. i. IF desired to transfer _AF01PB, _B Auxiliary Feedwater Pump back to the Control Room, PERFORM the following:
- 1) PLACE the _AF01PB, _B Auxiliary Feedwater Pump control switch in the AFTER-START position at _PM06J
 - 2) PLACE Remote/Local Selector Switch to REMOTE at _PL04J.
21. To start _AF01PB, _B Auxiliary Feedwater Pump, from _AF03J (364 M-16 or M-18), using _HS-AF157, PERFORM the following:
- a. DISPATCH an Operator to inspect _AF01PB, _B Auxiliary Feedwater Pump.

NOTE

Starting the pump at _AF03J will actuate alarm 1/2-3-B6, AF PUMP AUTO START, at _PM06J.

CAUTION

The START WITH BYPASS position should only be used if the _B Auxiliary Feedwater Pump cannot be started by any other means and there is a fire in one of the plant areas listed in Step E.11 of this procedure.

- b. VERIFY/PLACE the Engine Start Selector Switch to AUTO.
- c. START the _AF01PB, _B Auxiliary Feedwater Pump, by performing ONE of the following:
 - PLACE _HS-AF157 in the START Position.
 - PLACE _HS-AF157 in the START WITH BYPASS Position (This will Bypass the LO-LO Suction Pressure Trip).
- d. VERIFY the RUNNING Light at _HS-AF157 is LIT.
- e. VERIFY Auxiliary Feedwater Pump Recirc Flow is ≥ 85 gpm, locally at _FI-AF096.
- f. VERIFY _SX173 and _SX178, SX Supply Vlv and Return Isol for _B AF Pp Cooling Water, OPEN.

- F. 21. g. MONITOR the following temperatures locally to verify adequate cooling water flow:
- 1) Engine Oil Temp. \leq 220 degrees F.
 - 2) Oil Cooler Outlet Temp. 40-128 degrees F.
 - 3) Gear Changer Oil Cooler Outlet Temp. 40-130 degrees F.
- h. PERFORM BwOP AF-7T1, Diesel Driven Auxiliary Feedwater Pump Operating Log, at this time and every 30 minutes until the pump is secured.
- i. RECORD governor linkage response on BwOP AF-7T1.

(Final)

DIESEL DRIVEN AUXILIARY FEEDWATER PUMP OPERATING LOG

NOTE

Perform the applicable steps of this Data Sheet after the start of the pump and every 30 minutes thereafter until the pump is secured.

Forward the completed BwOP AF-7T1 to the AF System Engineer, SED Secondary Group. Notify the SM if engine cranks more than once upon starting. If pump has forward flow, recirculation flow may be less than 85 gpm, however, total flow shall be \geq 85 gpm to satisfy minimum pump flow requirement.

~~13~~ B AF Pump Governor Oil Level prior to start: 1/2

 B AF Pump Start Date/Time: / # of Cranks Before Start:

Governor Response: Moved Down Did Not Move Normal Start (Circle One)

EQUIPMENT DESCRIPTION									EXPECTED VALUES
TIME									N/A
INITIALS									N/A
DAY TANK LEVEL (LI-DO032)									\geq 50 %
SX COOLING VLVS (SX173 AND SX178)									BOTH OPEN
CUBICLE COOLER SX FLOW (FI-SX130)									N/A
ENGINE RPM (SI-AF8002)									1795-1845 RPM
PUMP DISCH PRESS (PI-AF058)									N/A
* PUMP RECIRC FLOW (FI-AF096)									85-96 GPM (U-1) 85-99 GPM (U-2)
PUMP THRUST BRG OIL TEMP (TI-AF111)									\leq 155°F
PUMP LUBE OIL FILTER OUTLET PRESS (PI-AF106)									10-15 PSIG
PUMP OIL FILTER DIFF PRESS									< 4 PSIG

* NRC Commitment: 456-100-98-0020104

DIESEL DRIVEN AUXILIARY FEEDWATER PUMP OPERATING LOG (Cont.)

EQUIPMENT DESCRIPTION									EXPECTED VALUES
TURN PUMP OIL FILTER									YES
TIME									N/A
INITIALS									N/A
PP LUBE OIL COOLER OUTLET TEMP (_TI-AF112)									< 128 °F
TURN GEAR BOX OIL FILTER									YES
GEAR BOX LUBE OIL TEMP (_TI-AF125)									< 130 °F
GEAR BOX LUBE OIL PRESS (_PI-AF124)									15 – 25 PSIG
PUMP OIL COOLER, SX OUTLET TEMP (_TI-SX067)									N/A
ENGINE OIL PRESS (_PI-AF139)									46 – 72 PSIG
ENGINE OIL TEMP (_TI-AF140)									< 225 °F
ENGINE WATER TEMP (_TI-AF148)									< 185°F
FAN GEAR OIL PRESS (_PI-AF8001)									15 - 30 PSIG

___ B AF Pump Governor Oil Level after shutdown: _____

(Final)

JOB PERFORMANCE MEASURE

TASK CONDITIONS:

1. You are an extra NSO.
2. Unit 2 is undergoing a loss of heat sink event.
3. Main control room HVAC is operating in makeup mode.
4. An Equipment Operator is standing by at the 2B AF pump to monitor governor linkages during startup.

INITIATING CUES:

1. The Unit 2 Unit Supervisor directs you to locally start the 2B Auxiliary Feedwater pump in accordance with BwOP AF-7, Auxiliary Feedwater Pump B (Diesel) Startup on Recirc.
2. BwOP AF-7 steps F.1 thru F.10 are complete.

TASK TITLE: Align the Fire Hazards Panel

JPM No.: IP-704

Task No.: R-OA-001

Objective No.: 4D.OA-27

REV: 20070301

K/A No.: 016000G2.1.30

K/A IMP: 3.9/3.9

EXAMINEE: _____

RO SRO (Circle One)

EVALUATOR: _____

DATE: _____

The Examinee: PASSED _____ this JPM.

TIME STARTED: _____

FAILED _____

TIME FINISHED: _____

JPM TIME: _____ MINUTES

CRITICAL ELEMENTS: (*) 2, 3

APPROX COMPLETION TIME: 20 MINUTES

CRITICAL TIME: NA

EVALUATION METHOD:

PERFORM
 SIMULATE

LOCATION:

IN PLANT
 SIMULATOR

GENERAL REFERENCES:

1. 2BWOA PRI-5, CONTROL ROOM INACCESSIBILITY, Rev. 103

MATERIALS:

1. Copy of 2BWOA PRI-5, CONTROL ROOM INACCESSIBILITY.

TASK STANDARDS:

1. Align the Unit 2 Fire Hazards Panel to the Division 22 Power Supply.
2. Align Unit 2 S/G Levels, S/G Pressures, PZR Level, and PZR Pressure instrumentation to the Unit 2 Fire Hazards Panel

TASK CONDITIONS:

1. You are an extra NSO.
2. A fire is ongoing in the Main Control Room and the Unit 2 AEER.
3. The Remote Shutdown Panels have been manned.
4. 1BWOA PRI-5 and 2BWOA PRI-5 are in progress.
5. Bus 241 is deenergized.
6. The 2HS-LV001, Fire Hazards Panel Power Switch, is in the Division 21 position.

INITIATING CUES:

1. The Unit 2 Unit Supervisor directs you to proceed to 2PL10J, Unit 2 Fire Hazards Panel and align 2PL10J to the Division 22 Power Supply.
2. After aligning 2PL10J to the Division 22 Power Supply, align the following instrumentation to the Unit 2 Fire Hazards panel per step 8.c. RNO of 2BWOA PRI-5:
 - a. 2A SG Pressure
 - b. 2B SG Pressures
 - c. PZR Level
 - d. PZR Pressure
3. Inform the Unit 2 Unit Supervisor when you have completed aligning the Unit Fire Hazards Panel.

RECORD START TIME: _____

	PERFORMANCE STEP	STANDARD	CIRCLE APPLICABLE
1.	<p>Refer to 2BwOA PRI-5 and proceed to 2PL10J, Fire Hazards Panel.</p> <p>CUE: When examinee locates 2BwOA PRI-5, provide copy.</p> <p>NOTE: If examinee asks for status of coincident instrumentation channels, provide the following cue:</p> <p>CUE: No other coincident instrumentation channels are in test or tripped.</p> <p>NOTE: 2PL10J is located in 426' Curved Wall Area, Grid S-24.</p>	<p>Perform the following:</p> <ul style="list-style-type: none"> • Locate and obtain 2BwOA PRI-5, step 8.c RNO. • Proceed to 2PL10J, Unit 2 Fire Hazards Panel. (426' S.7-24 electrical penetration area) 	<p>SAT UNSAT N/A</p> <p><u>Comments:</u></p>
*2.	<p>Align the Fire Hazards Panel to Division 22 Power Supply:</p> <p>NOTE: If asked for indications on 2PL10J, provide the following cues:</p> <p>CUE: Division 21 Power Available Light AND Power Light are NOT LIT. Division 22 Power Available Light is LIT.</p> <p>CUE: All instrumentation indicates off scale low.</p> <p>NOTE: After examinee places 2HS-LV001 to Position 3 (Division 22), provide the following cue:</p> <p>CUE: Division 21 Power Available Light is NOT LIT. Power light and Division 22 Power Available Lights are BOTH LIT.</p>	<p>Perform the following at 2PL10J:</p> <ul style="list-style-type: none"> ○ Verify the Division 22 Power Available light is LIT. • Place 2HS-LV001, Fire Hazards Panel Power Switch, in Position 3 (Division 22 Bus 232X2). ○ Verify the Power Light is LIT. 	<p>SAT UNSAT N/A</p> <p><u>Comments:</u></p>

	PERFORMANCE STEP	STANDARD	CIRCLE APPLICABLE
*3.	<p>Align the Fire Hazards Panel.</p> <p>NOTE: As examinee aligns instrumentation, provide the following cues:</p> <p>CUE: 2HS-FW309 is in FIRE position and 2A SG WR is 60%.</p> <p>CUE: 2HS-FW310 is in FIRE position and 2B SG WR is 60%.</p> <p>CUE: 2HS-MS193 is in FIRE position and 2A SG pressure is 1080 psig.</p> <p>CUE: 2HS-MS194 is in FIRE position and 2B SG pressure is 1080 psig.</p> <p>CUE: 2HS-RY033 is in FIRE position and PZR pressure is 2220 psig.</p> <p>CUE: 2HS-RY034 is in FIRE position and PZR level is 30%.</p>	<p>Perform the following at 2PL10J:</p> <ul style="list-style-type: none"> • Place the following panel switches to the FIRE position: <ul style="list-style-type: none"> • 2HS-FW309 – SG 2A WR Level. • 2HS-FW310 – SG 2B WR Level. • 2HS-MS193 – SG 2A Pressure. • 2HS-MS194 – SG 2B Pressure. • 2HS-RY033 – PZR Pressure. • 2HS-RY034 – PZR Level. 	<p>SAT UNSAT N/A</p> <p>Comments:</p>
4	<p>Inform Unit Supervisor Unit 2 Fire Hazards Panel is aligned.</p> <p>CUE: As Unit 2 Unit Supervisor, acknowledge report.</p>	<p>Inform Unit Supervisor Unit 2 Fire Hazards Panel is aligned.</p>	

CUE: THIS COMPLETES THIS JPM.

RECORD STOP TIME: _____

COMMENTS:

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

Taking ANY control switch on the Fire Hazards Panel to the FIRE position:

- Removes ALL indications from the RSP and MCR.
- Feeds a low signal to the affected loop.
- May cause ESF actuations if another channel is already tripped OR in test.

8 ACTIVATE RSP:

- a. Unit Supervisor and NSO go to RSP
- b. Align RSP per ATTACHMENT A (Page 48)
- c. Check following indications - AVAILABLE:
 - Source Range NI
 - Intermediate Range NI
 - SG pressures
 - SG wide range levels
 - PZR pressure
 - PZR level
 - RCS hot leg temperatures
 - RCS cold leg temperatures
- c. Dispatch an operator to the Fire Hazards Panel (426' S24 CWA) to align needed instrumentation.
- d. Maintain log of:
 - All jumpers installed
 - All local actions taken

JOB PERFORMANCE MEASURE

TASK CONDITIONS:

1. You are an extra NSO.
2. A fire is ongoing in the Main Control Room and the Unit 2 AEER.
3. The Remote Shutdown Panels have been manned.
4. 1BwOA PRI-5 and 2BwOA PRI-5 are in progress.
5. Bus 241 is deenergized.
6. The 2HS-LV001, Fire Hazards Panel Power Switch, is in the Division 21 position.

INITIATING CUES:

1. The Unit 2 Unit Supervisor directs you to proceed to 2PL10J, Unit 2 Fire Hazards Panel, and align 2PL10J to the Division 22 Power Supply.
2. After aligning 2PL10J to the Division 22 Power Supply, align the following instrumentation to the Unit 2 Fire Hazards panel per step 8.c. RNO of 2BwOA PRI-5:
 - a. 2A SG Pressure
 - b. 2B SG Pressures
 - c. PZR Level
 - d. PZR Pressure
3. Inform the Unit 2 Unit Supervisor when you have completed aligning the Unit Fire Hazards Panel.