

EH FLUID SYSTEM

RECORD

PROCEDURE VERIFIED CURRENT AND CHECKED FOR TEMPORARY CHANGES IF FIELD COPIES REQUIRED. USE PBF-00261 IAW NP 1.2.4 AND DO NOT COMPLETE THIS BLOCK

BY: _____ DATE: _____

1.0 PURPOSE

- 1.1 To ensure proper startup and operation of the EH fluid system. (5.1 and 5.2)
- 1.2 To allow gas charging of the EH high and low pressure accumulators. (5.3 and 5.4)
- 1.3 To check the EH pump standby features. (5.5)
- 1.4 To provide for filling of the EH reservoir. (5.6)
- 1.5 To establish guidelines for filter replacement. (5.7)
- 1.6 To provide instructions for unloader valve adjustment. (5.8)
- 1.7 To provide instructions for magnetic plug cleaning. (5.9)

2.0 REFERENCES

IR 96-006, NRC Inspection Report, NRC Commitment for Operations procedures PMT/QC reviews

3.0 PRECAUTIONS AND LIMITATIONS

- 3.1 Do not place the system in operation if fluid temperature is below 50°F. The fluid should not be circulated in the system if its temperature is below 70°F. Refer to Turbine Manual, Volume 1, Tab 11, Section C for operation with temperature between 50°F and 70°F.
- 3.2 Nitrogen is the charging gas.
- 3.3 Do not isolate, check gas pressure, or recharge more than one high pressure accumulator at a time during unit operation.
- 3.4 PBNP uses AKZO (Stauffer Chemical Co.) FYRQUEL EHC, Lot No. 913-9273 DO NOT MIX WITH OTHER BRANDS WITHOUT MANUFACTURER'S PERMISSION
- 3.5 The EH system requires a high degree of cleanliness for proper operation. Never pour any fluid directly into the reservoir because new fluid is not clean fluid. All fluid entering the reservoir must be pumped from the drums using the transfer pump, filter and hose section provided for this purpose.

EH FLUID SYSTEM

- 3.6 When not in actual use, the pump and hose assembly should be stored in some clean and protective container.
- 3.7 FYRQUEL EHC is a skin irritant and rubber gloves shall be worn (Reference W E C.H.E.S. Manual ID No. 0451).
- 3.8 Ensure only lint-free rags (diapers, No. 915-0620) are used for wiping down surfaces on the EH system.

4.0 INITIAL CONDITIONS

None

5.0 PROCEDURE

5.1 Startup and Operation

- 5.1.1 Place both EH pump control switches in pullout.
- 5.1.2 Complete checklist CL-14A if required.
- 5.1.3 Open all HP accumulator drain valves, EH-5, 6, 7 and 8.
- 5.1.4 Check the gas pressure when the accumulators are drained as indicated by constant gas pressure reading. If gas pressure in any one accumulator is less than 1150 psig, refer to Section 5.3 for gas charging procedures.
- 5.1.5 With gas pressure in all accumulators in the normal range 1150-1250 psig, shut all HP accumulator drain valves EH-5, 6, 7 and 8.
- 5.1.6 Start an EH pump. Observe header pressure and note pressure at which unloader unloads. Adjust as necessary to load and unload between 1550 psig and 1950 psig.
- 5.1.7 Manually open as many HP accumulator drain valves as necessary to control accumulator bleed rate and observe header pressure decrease. Observe unloader loading at 1550 psig and unloading at 1950 psig.
- 5.1.8 Stop the pump and allow control switch to return to "AUTO". Observe automatic pump start when header pressure decreases to between 1300 and 1400 psi.
- 5.1.9 Stop the pump and place the control switch in pullout.

EH FLUID SYSTEM

- 5.1.10 Repeat Steps 5.1.6 through 5.1.8 above for the other EH pump and associated unloader valve.
- 5.1.11 Observe reservoir fluid level. If level is less than 3/4, refer to Section 5.6 for filling instructions.
- 5.1.12 Match the flag on the running pump.
- 5.1.13 Shut all accumulator drain valves EH-5, 6, 7, and 8.
- 5.1.14 Slowly crack open drain valve EH-23 (located on top of reservoir) while observing the EH pressure gauge. Check that the EH supply system alarm is annunciated between 1330 and 1470 psig. Close valve EH-23.
- 5.1.15 Place the control switch of the pump presently in pullout to auto.
- 5.1.16 Allow fluid system to run, bringing the fluid temperature to the normal operating range 110-120°F.
- 5.1.17 Vent F-700A&B (EH Fluid Return Filters) (U-1 only) and F-701A&B (Cellulose Polishing and Fullers Earth Filters).
- 5.1.18 Check system for leaks.
- 5.1.19 Ensure EH low level lockout indicating light is on.

5.2 Shutdown of EH Fluid System

After turbine is tripped, stop and place the control switches of both EH pumps in pullout position. Pumps will automatically restart on low system pressure if they are not in pullout.

5.3 Checking and Charging EH High Pressure Accumulators

- 5.3.1 Shut the accumulator discharge valve.
- 5.3.2 Open the accumulator drain valve and allow the fluid pressure to decay, normal range 1150-1250 psig. If less than 1150 psig, recharge per the following steps.
- 5.3.3 Purge the nitrogen charging hose, then connect it to the accumulator gas valve. The valve stem will then be depressed by the air chuck for charging.
- 5.3.4 Recharge the accumulator to 1250 psig as indicated on the gauge.
- 5.3.5 Shut the accumulator drain valve.

EH FLUID SYSTEM

5.3.6 Slowly open the accumulator discharge valve to the full open position.

5.4 Check and Recharge the EH Low Pressure Accumulators

5.4.1 Read the gas pressure with a tire gauge, normal range 24-30 psig. If less than 24 psig, recharge per the following steps.

5.4.2 Set the regulator to 50 psig and purge the hose with nitrogen to remove any air.

5.4.3 Charge the accumulators to 30 psig.

5.5 Shifting EH Supply Pumps

CAUTION DO NOT ALLOW THE HEADER PRESSURE AT THE HIGH PRESSURE ACCUMULATORS TO DECREASE BELOW 1500 PSIG.

5.5.1 Establish communications between the operators at the EH reservoir and the control room.

5.5.2 Check that the standby EH supply pump control switch is in "Auto."

5.5.3 Slowly crack open drain valve EH-23 (located on top of reservoir) while observing the EH header pressure gauge. Check that the EH supply system alarm is annunciated between 1330 and 1470 psig and that the standby pump starts at 1300-1400 psig. Close valve EH-23.

NOTE: *If the standby pump starts prior to receiving the low pressure alarm, match flags on the pump to clear the "EH supply system" alarm and continue decreasing pressure until the low pressure part of the "EH supply system" alarm is received.*

5.5.4 Turn the control switch to the "ON" position to match the flag. Check that the alarm clears.

NOTE: *The system may need to complete one load/unload cycle to reset the standby pump start mercoid switch*

5.5.5 Stop the EH supply pump that had been running and place the control switch in the "AUTO" position.

EH FLUID SYSTEM

5.6 Filling the EH System Reservoir

NOTE: *Observe precautions and limitations Step 3.5.*

- 5.6.1 Assemble the portable transfer pump and hose sections. Install new filters on portable pump per Step 5.7.1
- 5.6.2 Clean the top of the fluid drum before removing caps
- 5.6.3 Insert the pump suction hose into the large opening and the discharge hose onto the small opening. Start the pump and circulate fluid, flushing hose sections and pump for 15 minutes.

NOTE: *Due to thermal expansion, filling to exactly three-quarters full with cold fluid could result in greater than three-quarters full level after fluid temperature stabilizes.*

- 5.6.4 Remove the reservoir breather - filler cap. Insert the pump discharge hose and fill the reservoir to the three-quarters full level.
- 5.6.5 Remove, clean and store the filling apparatus.
- 5.6.6 Remove filters from portable pump and dispose of them.

5.7 Filter Replacement At Power

NOTE: *If the unit is in a refueling shutdown, refer to RF-230 for Unit 1 and RF-235 for Unit 2 (F-700A, B, F-46E, F, G, H will only be changed via the RF)*

NOTE: *Observe Precautions and Limitations*

- 5.7.1 Portable transfer pump filters (2 each 911-8349)

Dip the element's gasket in EH fluid, then replace in groove. Screw element on threads until gasket makes contact, then tighten one-quarter turn only.

EH FLUID SYSTEM

- 5.7.2 F-701A cellulose polishing filter and F-701B fullers earth filter.

NOTE: *The cellulose polishing filter and the fullers earth filter should be changed at the same time when F-701A inlet pressure reaches 40 psig or F-701B ΔP reaches 25 psid.*

- a. Red tag shut EH-26 and EH-27.
- b. Obtain replacement filters, Lot No. 911-8918 (F-701A), Lot No. 911-8900 (F-701B).
- c. Obtain a 1-1/4 wrench.
- d. Wipe down the filter housings prior to opening (Ref. Precautions and Limitations).
- e. Open EH-40, F-701A vent (EH-42 for F-701B).

***CAUTION* FILTER HOUSING COVERS ARE SPRING LOADED**

- f. Remove filter housing covers.
- g. Clean and inspect filter housing cover seals. Replace as necessary.
 - Unit 1 uses a gasket, Lot No. 915-3025.
 - Unit 2 uses an O-ring, Lot No. 915-2130.
- h. Using a rotating motion, remove and dispose of old filter cartridges.
- i. Visually inspect inside of filter housings for excess dirt and debris. Ensure old filter cartridge O-ring is removed from each filter housing.
- j. Install new filter cartridges.
- k. Clean mating flange on filter housings and covers.
- l. Lightly lubricate filter cover gaskets or O-rings with EH fluid and reinstall.
- m. Reinstall filter housing covers.
- n. Close EH-40, F-701A vent (EH-42 for F-701B).
- o. Clear red tags.
- p. Vent F-701A and B.

EH FLUID SYSTEM

PMT

q. General leak check of filter housings at system pressure

5.7.3 F-46A&B EH pump P-75 discharge filters and F-46C&D EH pump P-76 discharge filters

NOTE: Pump discharge filters are replaced when ΔP reaches 100 psid.

- a. Red tag P-75 in pullout and EH-15 shut for F-46A&B replacement (P-76 and EH-16 for F-46C&D replacement).
- b. Obtain replacement filters, Lot No. 921-5646 and replacement filter O-rings, Lot No. 912-9995.
- c. Remove and discard the O-ring that is inside the inlet of the new filter.
- d. Install a new O-ring, Lot No. 912-9995, into the inlet of the new filter.
- e. Obtain the special wrench (located at either unit's reservoir)
- f. Wipe down filter block prior to opening (Ref. Precautions and Limitations).
- g. Remove filter block caps.
- h. Clean and inspect O-rings (No. 912-9944) and teflon protectors (No. 912-9952), replace as necessary.
- i. Remove and dispose of old filter cartridges.
- j. Visually inspect inside of filter block for excess dirt and debris.
- k. Install new filter cartridges.
- l. Clean mating flanges on filter caps and block.
- m. Lightly lubricate O-rings with EH fluid and reinstall with teflon protectors.
- n. Lightly lubricate filter cap threads with silver goop (No. 914-1600) ensuring no lubricant will come in contact the EH fluid.
- o. Reinstall filter caps ensuring that the cap recesses into block with no shoulder visible.

PMT

p. General leak check of filter housing at system pressure.

EH FLUID SYSTEM

5.8 Unloader Valve Adjustment

NOTE: *The operating 400 psid band is fixed and can only be changed by altering the internal parts of the valve.*

Cautiously turn unloader valve clockwise to raise the operating band and counterclockwise to lower it.

5.9 Magnetic Plug Cleaning

- 5.9.1 Loosen plugs (3) with 1-3/8" wrench.
- 5.9.2 Remove the plugs from reservoir, being careful not to go near the mercoid switches (magnetism operates the mercoids)
- 5.9.3 Place a temporary cover over holes to preclude dirt entering the reservoir.
- 5.9.4 Clean the magnetic plugs with a lint-free rag and reinstall.