GAS DEHYDRATION SYSTEM

High pressure gases from the Gas Compressors (CBA-4070/4020) flow to the Glycol Contactor (MAF-1150). In the Contactor, gas flows through trays, contacting the lean glycol that is flowing across the trays and down within the Contactor. The lean glycol, having a greater affinity for water than the gas, absorbs the water. The dehydrated gas then supplies the Departing Gas Lift/Supply Pipelines, with excess being sold down the Departing Sales Gas Pipeline (KAH-7200).

Rich Glycol from the bottom of the Glycol Contactor is directed through still column of the Glycol Reboiler (BBC-3200), through the tube side of the Glycol/Glycol Heat Exchanger (HGB-3220) and into the Glycol/Hydrocarbon Separator (MBD-1160).

The Glycol/Hydrocarbon Separator separates the glycol, condensate, and gas. The Glycol Separator uses a pressure control valve to maintain backpressure with flash gas. The condensate is dumped to the Treater. The glycol is dumped through the Glycol Filters (MAJ-6090/6120) and the tube side of the Glycol/Glycol Heat Exchanger (HGB-3210) and into the Glycol Reboiler (BBC-3200).

The Reboiler uses the Fuel Gas to supply sufficient heat to strip the absorbed water, which is vented out the top of the still column as steam. The lean glycol is directed through the shell side of both Glycol/Glycol Heat Exchangers (HGB-3210, 3220) to the Glycol Surge Tank (BBJ-1170). The glycol then feeds the suction of the Glycol Pumps (PBE-2010/2020).

The Glycol Pumps pump lean glycol through the Glycol/Gas Heat Exchanger (HGB-3220) back into the Glycol Contactor (MAF-1150).
A. PRE-STARTUP PROCEDURES

NOTICE: Refer to Preliminary Considerations in SECTION 3, PART A before beginning any start-up procedures.

GLYCOL CONTACTOR:

1. Evaluate the situation and determine whether or not the Glycol Contactor should be bypassed
   a. Bypass the Contactor if the facility is being started up and the Glycol Re-concentration System is not in service
   b. Bypass the Contactor if the facility is being started up and approval is granted to send wet gas to the Gas Sales Pipeline (due to extended Glycol Re-concentration System shut-down)

NOTICE: The Glycol Re-concentration System should be circulating glycol through the Contactor before gas is allowed to flow through the Contactor.

2. Verify that all vent and drain valves are closed on the system components
   a. Glycol Contactor, MAF-1150

3. Verify manual control valves are aligned to correctly direct flow
   a. If Contactor is bypassed, verify all valves are aligned so that only inlet/outlet and bypass valves need to be opened/closed when ready for startup (Note: it may be necessary to leave the inlet valve open during bypass for dump pressure)
   b. Verify gas flow stream is directed through the Contactor
   c. Verify gas flow stream is directed from the Contactor to the Departing Gas Pipeline
4. Verify that the liquid level controllers, pressure controllers, temperature controllers and control valves are ready for flow
   a. Glycol Contactor
      - Gas outlet BPV at ANR Meters
      - Condensate dump LC/LCV
      - Glycol dump LC/LCV

5. Reset the Glycol Contactor safety devices
   a. Verify that no safety devices are bypassed beyond those that must be bypassed for start-up (flag device as appropriate) on the MCP
   b. Pull to reset the “Contactor Group” relay on the MCP
   c. Monitor and place safety devices in service as they clear

WARNING: Any operating parameter that is monitored by a safety device must be continuously monitored at all times while the safety device(s) are in bypass. The bypassed safety devices (indicators) must be flagged while in bypass and reset as they come in-service. REFER TO Section 3 Part A for further details on bypassed devices.
B. START-UP PROCEDURES

GLYCOL RE-CONCENTRATION SYSTEM:

**WARNING:** THERE ARE ALSO HEALTH HAZARDS ASSOCIATED WITH COMING INTO CONTACT WITH GLYCOL AND SOME OF THE HYDROCARBONS THAT MAY HAVE BEEN ABSORBED BY THE GLYCOL. AVOID CONTACT WITH GLYCOL AND CONSULT THE MSDS CAS #112-27-6 FOR DETAILED INFORMATION.

1. Verify that all vent and drain valves are closed through-out system
   - a. MBD-1160, Glycol/Hydrocarbon Separator
   - b. MAJ-6090, Cartridge Glycol Filter
   - c. MAJ-6120, Charcoal Glycol Filter
   - d. BBC-3200, Glycol Reboiler
   - e. BBJ-1170, Glycol Surge Tank
   - f. PBE-2010/2020, Glycol Pumps

2. Verify manual valves are open or closed as necessary to correctly direct flow through the system
   - a. Verify that the Glycol Separator condensate dump is open to the Treater
   - b. Verify that the Contactor glycol outlet is opened through the Glycol Heat Exchanger into the Glycol Separator
   - c. Verify that the Glycol Separator glycol outlet is opened through the Cartridge Glycol Filter, Charcoal Glycol Filter, and into the Glycol Reboiler
   - d. Verify that the Glycol Reboiler glycol outlet is open through the shell side of the Heat Exchangers to Glycol Surge Tank
   - e. Verify that the Glycol Surge Tank outlet is opened to the Glycol Pumps
   - f. Verify that the Glycol Pump flow path is opened through the Glycol/Gas Heat Exchanger and into the Contactor

3. Verify that the liquid level controllers, temperature controllers and control valves are ready for flow
   - a. Glycol/Hydrocarbon Separator
     - Pad gas relief to Vent System
     - Flash gas supply to Fuel Gas PCV
     - Condensate dump LC/LCV
     - Glycol dump LC/LCV
4. Verify that the level in the Glycol Surge Tank is sufficient to avoid tripping the LSL

**WARNING:** Do not overfill surge tank with glycol. Expansion of glycol as it is heated will cause the system to overflow.

5. Reset Glycol Systems at the Master Control Panel
   a. Verify that no safety devices are bypassed beyond those that must be bypassed for start-up (flag device as appropriate) on the MCP
   b. Pull to reset the “Glycol/Hydrocarbon Separator Group” relay on the MCP
      - Insure Glycol/Hydrocarbon Separator, MBD1160 Blanket Gas SDV is open
   c. Pull to reset the “Glycol Surge Tank Group” relay on the MCP
   d. Monitor and place safety devices in service as they clear

**WARNING:** Any operating parameter that is monitored by a safety device must be continuously monitored at all times while the safety device(s) are in bypass. The bypassed safety devices (indicators) must be flagged while in bypass and reset as they come in-service. 
**REFER TO:** Section 3 Part A for further details on bypassed devices.

6. Light the Reboiler Fired Component (Burner)
   a. If there is not sufficient fuel gas available, it may be necessary to wait until production is established before lighting the burner
   b. Verify that no safety devices are bypassed beyond those that must be bypassed for start-up (flag device as appropriate) on the local Glycol Panel
   c. Pull to reset the “Burner Start” relay on the local Glycol Panel
   d. Monitor as “Pilot Valve” and “Main Burner Valve” indicators flag red and clear to green
   e. Reset the Burner Start relay on the glycol panel
   f. Monitor and place safety devices in service as they clear

**WARNING:** Any operating parameter that is monitored by a safety device must be continuously monitored at all times while the safety device(s) are in bypass. The bypassed safety devices (indicators) must be flagged while in bypass and reset as they come in-service. 
**REFER TO:** Section 3 Part A for further details on bypassed devices.
7. Verify that the Contactor Glycol Outlet SDV is open

8. Start the desired Glycol Pump(s)
   a. Turn the local speed control to zero and slowly increase
   b. Push and hold the “Stop” button for 10 seconds
   c. Push and hold “Start” button until motor starts
   d. Turn the local speed control to “10”

9. Monitor the Reboiler temperature as it heats up to normal operating temperature (verify temperature controls are operational)

10. Monitor and reset any bypassed safety devices as they come in-service

11. Monitor Contactor glycol level and verify that the Contactor glycol dump is functioning

12. Verify glycol flow through the system by monitoring pressure differential across filters

13. Monitor Glycol Separator levels and verify that the dumps are functioning

14. Monitor the Reboiler to verify the temperature stabilizes at normal operating range

15. Continue to monitor the glycol level in the Reboiler to avoid tripping LSL

16. Continue facility start-up
   REFER TO: SECTION 3, PART B (step 14)

GLYCOL CONTACTOR:

17. If the Contactors are not bypassed, continue to monitor as facility is restored to full production
18. Take the Contactor out of bypass  
   a. If necessary, SLOWLY open the inlet valve to the Contactor  
   b. Open the gas discharge on Contactor  
   c. SLOWLY close bypass valve to isolate flow to Contactor

   WARNING: Care should be taken to start the gas flow through the Contactors slowly. Flow surges will cause glycol to exit the Contactors out the gas outlet.

19. Continue to monitor the Gas & Glycol Dehydration System

20. Once facility is at full production, and the Gas & Glycol Dehydration System is at full operational temperature, verify there is adequate glycol level in the Reboiler

21. Immediately begin using the Normal Operating Procedures to continue to monitoring the system

REFER TO: SECTION 5, PART I
C. SHUT-DOWN PROCEDURES

NOTICE: Refer to Preliminary Considerations in SECTION 4, PART A before beginning any shut-down procedures.

1. If shutdown of the Gas Dehydration System will result in unapproved wet gas sales, facility shutdown may be required
   REFER TO: SECTION 4 (Facility Shutdown Procedure)

   NOTICE: Shutting down the Gas Dehydration System will result in gas sales with higher moisture content than may be allowed by contract requirements.

2. Place the Glycol Contactor in bypass
   a. Open the Gas bypass valve
   b. Close the gas outlet valve from the Contactor

3. Push to shut-down the “Burner Start” relay on the local Glycol Panel

4. Monitor the system as Glycol continues to circulate and cool down
   a. Monitor all system levels to ensure safe operating parameters

5. Close the inlet valve to Contactor

6. Place the Contactor safety devices that are likely to cause a shutdown in bypass (flag device as appropriate) at the Master Control Panel

7. Isolate systems
   a. Close the manual valves on Contactor glycol inlets and outlets
   b. Close the manual valves on Glycol Condensate Separator glycol and condensate dump lines
8. Open manual vent and drain valves as necessary to vent and drain components

NOTE: If it is necessary to drain glycol from the system, store the glycol in clean containers for re-use.

NOTICE: If shut-down was performed as preparation for maintenance work, or if the cause of the shutdown requires corrective action/repair, continue with Lock Out/Tag Out (LO/TO) Procedures

REFER TO: Fieldwood Safe Work Practices for LO/TO (Section D Chapter 5)
(can be found on the Fieldwood SEMS Portal)