5.19 LP FLASH GAS COMPRESSION

The relating PFS and PEFS are as follows:
PFS : D-00-1223-006
PEFS : D-20-1225-101
D-55-1225-101
D-56-1225-101/102/103

5.19.1 Start-up

5.19.1.1 First time start-up (after pre commissioning)

The first time start-up should be done in the following sequence:

(1) Preparation for Start-up
(2) System line-up
(3) Purge of LP Flash gas compressor
(4) Start of LP Flash gas compressor

The detailed procedure is described below.

(1) Preparation for Start-up

The operator shall check that the preparation work described in Para.5.3 has been completed. Prior to start-up operation, confirm or perform the following items:

(a) All process lines are full of nitrogen under slightly positive pressure.

(b) Utilities are in service or available.
The operator shall read through the operation manual of the following required utility systems and start-up them.

(d) Feed gases, HP AG from Soku/Ekulama flowstation and/or Nembe Creek flowstation are available.

(e) The AG/Flash gas compressor units (21/22/23) and gas processing units (31/32 unit) are already operated or will be operated when the compressor is started-up.

(2) System Line-up

(a) Ensure that line up is in compliance with PEFS.

Valve line up differs from PEFS are as follows:

- All ESD valves are closed.
- All control valves are in manual mode and closed except all minimum flow valves of pumps are kept open.

(3) Purge of LP Flash Gas Compressor

(a) Firstly confirm the following :

- Anti-surge valve (56UIC-003) is open.
- The block valves at the inlet of Suction Scrubber (V-5601) and at the outlet of

Discharge Scrubber (V-5602) are closed.

(b) Start-up lube oil system for the compressors according to the vendor's manual.

(c) Open the block valve upstream of the 56UZ-001 at the suction of Suction Scrubber (V-5601). Then purge nitrogen in each scrubber and all anti-surge loops by opening the 2" manual flaring globe valve on V-5602.

(d) Purge nitrogen in K-5601 and Aftercooler (E-5601) by closing 56UIC-003 (K-5601 antisurge control valve) manually.

(e) After confirming that purging is completed, close the 2" manual flaring valve on V-5602 and open the antisurge control valve 56UIC-003.

(4) Start-up of LP Flash gas compressor

Prior to the start-up of compressor, read through the operation manual for the compressor supplied by the vendor.

After purge of LP Flash gas compressor is completed, start-up the compressor as follows:

(a) Start all fans of the aftercooler (E-5601)

(b) Confirm that lube oil system is operated.

(c) Start-up compressors by pushing the start button of the compressor. Then the compressor and driver motor will be started-up automatically.

5.19.1.2 Start-up from total shutdown

The procedures are the same as Para.5.19.1.1.

5.19.1.3 Start from standby condition.

This start-up assumes that the LP flash gas compressor system is in pressurized condition.
After confirming followings, start-up compressor according to the procedure described in Para. 5.19.1.1 (4) "Start-up of LP Flash gas compressor":

(a) LP flash gas from Condensate Processing trains are available.

(b) Block valves at the B.L. which will be operated are open.

5.19.2 Operating

The compressor antisurge controller 56UIC-003 will control the load of the compressor automatically.

5.19.3 Shutdown

5.19.3.1 Maintenance shutdown

Maintenance shutdown occurs when part of the facilities is to be taken out of service for maintenance or inspection.

For the shut down of LP Flash Gas Compressor, read through the shut-down section of compressor operation manual for the supplied by the vendor.

And the operator shall check that the preparation work described in Para.5.3 have been completed.

The shutdown should be done in the following order:

(1) Stop of LP flash gas feed
(2) Stop of the LP flash gas compressor
(3) Depressuring of LP flash gas compressor train
(4) Draining of liquid in equipment
(5) Purge of hydrocarbon gas
(6) Isolation of LP flash gas compressor train

(1) Stop of LP flash gas feed

When LP Flash Gas Compressor will be maintained, the LP flash gas from Condensate Processing Trains (Unit 51 and 52) shall be stopped.

(a) Close 51UZ-012 at outlet of LP Condensate Flash Drums (V-5103/5203). Then flash gas will be flared directly from the outlet of respective drum.

(2) Stop of the LP flash gas compressor

(a) Push the stop button of the compressor.

(b) Close 56UZ-002 at the outlet of Discharge Scrubber (V-5602).

(c) Stop the aftercooler E-5601.

(d) Stop the lube oil system for the compressor according to the vendor's manual.

(3) Depressuring of LP Flash Gas Compressor train

(a) After the rotation of compressor and motor are stopped and the system becomes stable at the settling pressure, depressure the compressor system by opening 56UZ-006 at the outlet of Discharge Scrubber (V-5602).

(b) After confirming that the system pressure is close to 0 barg by 56PIA-003 at the outlet of the compressor (K-5601) (or local 56PG-004 on V-5602), close 56UZ-006.

(4) Draining of liquid in equipment

When the relating system is depressurized completely, drain the liquid in the vessels to Closed Drain Recovery system.

(5) Purge of hydrocarbon gas

Prior to opening the equipment, the hydrocarbon gas in the system shall be purged with nitrogen.

(a) Ensure that :
- Nitrogen is available.
- Pressure in the equipment is as low as atmosphere.

(b) Connect with the utility hose between nitrogen supplier and utility connection in each equipment (or vent /drain)

(c) Feed nitrogen into the vessel.

(d) Open valves at end of the system to the flare system.

(e) Check hydrocarbon content, when hydrocarbon in the purged gas becomes less than 3%, stop purging.

(6) Isolation of LP Flash Gas Compressor Train

When depressuring is finished, 56UZ-001, 002 and 006 (one suction, one discharge and one for blowdown) are closed and anti-surge valve 56UIC-003 is open.

(a) Close the block valve upstream of 56UZ-001 and open the bleed valve near 56UZ-001.

(b) Close the block valve downstream of 56UZ-002 and open the bleed valve near 56UZ-002.

(c) Purge the remaining process gas with nitrogen from the suction side of compressor (i.e. the utility connection on Suction Scrubber (V-5601)) to the outlet of Discharge Scrubber (V-5602) and flare the purge gas by opening the manual flaring at V-5602 outlet.

(d) After confirming that the hydrocarbon content in the system is less than 3% by gas analysis, change the spacer to spade (or change opening installation of spectacle blind to closing one) at downstream of 56UZ-001 and upstream of manual block valve in the discharge line of V-5602.

(e) Blind lists should be prepared by operations for vessel entry. Place blind plates at nozzle flanges connected with process section such as process line , fuel gas line or flare line. Purge nitrogen in the system by air when any personnel will enter into the equipment. Purging will be done by opening both manways of equipment. Any necessary repairs can now be carried out.

5.19.3.2 Operational shut down

Operational shutdown is carried out in order to shut-in the production from individual process unit in the whole of the facility.

The operational shutdown of LP flash gas compression system may be carried out as follows:

(1) Stop of LP flash gas feed.
(2) Stop of the AG/flash gas compressor.

The procedures are the same as those in Para. 5.19.3.1 (1) to (2) (the procedure in item (3) to (6) of Para. 5.19.3.1 are not required to be carried out in the operational shut down.)

5.19.3.3 Process shutdown

This section describes the cause and restart-up procedure in case of the plant shutdown (OSD2) of "LP Flash gas compression system".

(1) Causes of shutdown

(a) 56PZA-002LL on the suction line of the compressor

(b) 56PZA-004LL on the discharge line of the compressor

(c) 56PZA-005HH on the discharge line of the compressor

(d) 56TZA-003HH on the discharge line of the compressor

(e) 56TZA-004HH on the outlet of the aftercooler

(f) 56LZA-002,005HH at the scrubbers

(2) Restart-up procedure

(a) Check the cause and the source of cause. If the unit can be restarted without maintenance, the unit can be started according to Para. 5.19.1.3

(b) If not, further shutdown described in Para.5.19.3.1 shall be performed.

5.19.3.4 Emergency shutdown

(1) Emergency shutdown will be initiated by the following causes:

(a) ESD
- Fire detection inside hazardous area
- Power failure

(b) OSD1
- Instrument Air failure
  initiator : 68PZA-003LL
- Sales gas export line pressure is low
  initiator : 45PZA-001A/B/C LL
- T-5501 liquid level is high.
  initiator : 55LZA-005HH

(2) Effect of ESD or OSD1

(a) ESD

In case of ESD, LP flash gas compression system is isolated and depressurized. When the operator starts it, start from Para.5.19.1.1 (2) "System Line-up"

(b) OSD1

In case of OSD1, LP flash gas compression system is isolated. When the operator starts it, start from Para.5.19.1.3.