

Overview:

A total loss of power in the plant can be caused by numerous unexpected emergencies, such as extreme weather or flooding. During a power loss, the plant will lose all pumps, compressors, and other electrically powered equipment, leading to a hard shutdown. For each group of Operators, the major and secondary steps for a hard shutdown procedure are located at the top of the page. These major steps correspond to a group of minor steps that can be found in the following emergency shutdown procedures: 33SP049, 33SP050, and 33SP051. **This duty is not intended to be a full procedure for a hard shutdown.** The purpose of this duty is to highlight certain tasks within the shutdown procedure that require special attention. Failure to perform all of the necessary tasks during a hard shutdown can have severe consequences to the equipment and/or personnel.

Major Steps – P&P

- A** All Compressors, Pumps, and ID Fan (116-J) Shut Off Due to Power Loss
 - B** Vent and Isolate Methanator (106-D)
 - C** Isolate Process Air (FIC-104)
 - D** Isolate Process Gas
 - E** Open PIC-157 Vent
 - F** Block Steam to Standby MEA Circulating Pump (103-JA) Turbine
- G** Isolate Valve HIC-310
 - H** Isolate MEA System
 - I** Add Steam to Steam Ring at ID Fan and Open Bypass Around SV-134
 - J** Steam to Gas Crossover (Visual Field Check of FIC-3602)
 - K** Field Check – Steam to Air Coil

Secondary Steps – P&P

- L** Isolate All Quenches (HTS, LTS, Reboilers)
- M** Block in Reformer Burners
- N** Isolate Makeup Water to CO₂ Stripper (102-E)

Major Steps – Compressors

- A** Isolate Primary (123-F) and Secondary Ammonia Separators (122-F)
- B** Block in East/West Chillers (115-CA/CB)
- C** Block in Ammonia Refrigerant Receiver (124-F)
- D** Block in Ammonia to Chillers (Double Block)
- E** Block in the 118 Chain Valve
- F** Block in the Oil Trap (121-F)
- G** Isolate Compressors



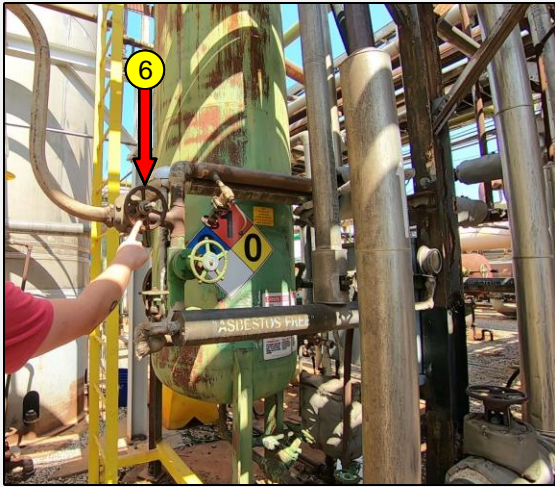
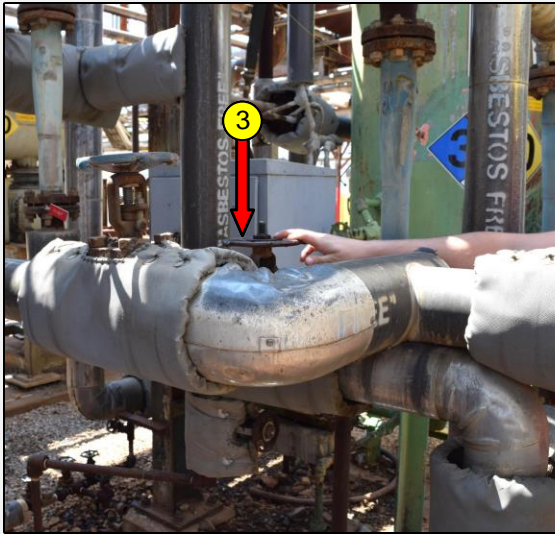
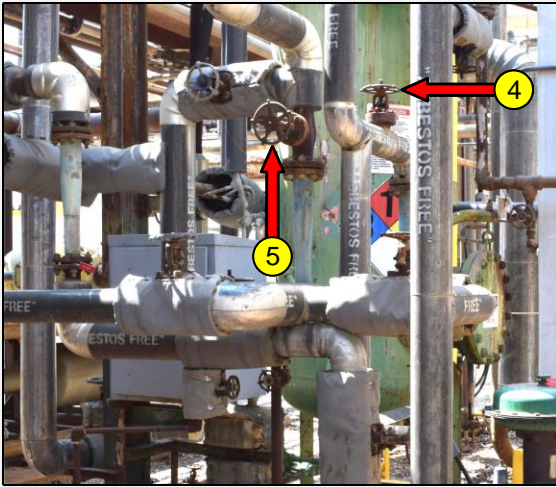
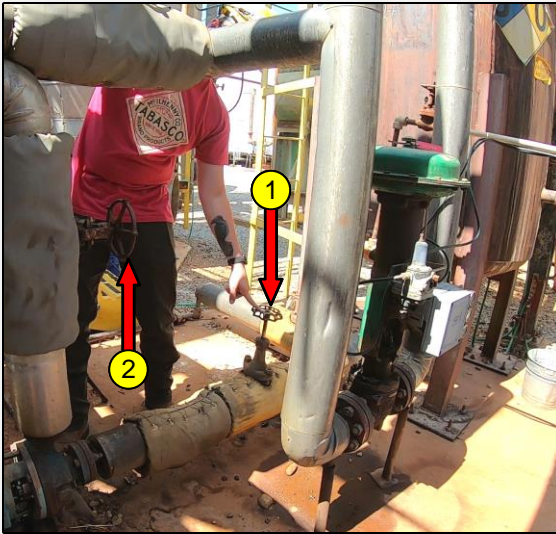
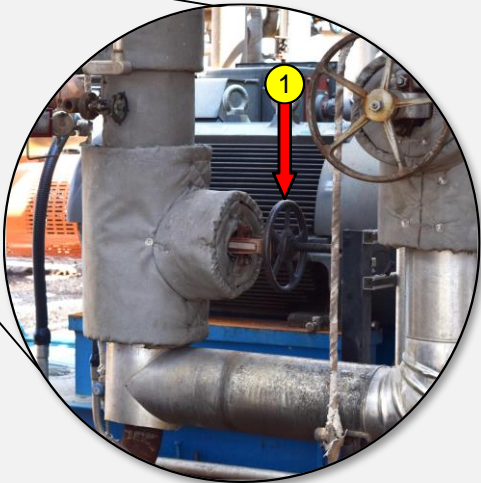
F Block Steam to Standby MEA Circulating Pump (103-JA) Turbine

Requires Special Attention: Block in steam valve to 103-JA turbine

Consequence of Deviation: When the MEA Circulating Pump (103-J) shuts off during a power outage, the 103-JA steam turbine will kick in. Failure to block in the steam valve would cause all of the MEA to be pumped into the CO₂ Absorber (101-E).

Steps:

- 1** Close the inlet steam block valve to 103-JA



H Isolate MEA System

Requires Special Attention: Isolate the MEA Aeration Tank (142-F)

Consequence of Deviation: Failure to isolate the MEA Aeration Tank would result in the tank overflowing and spilling MEA onto the ground.

Steps:

- 1** Close valve #1
- 2** Close valve #2
- 3** Close valve #3
- 4** Close valve #4
- 5** Close valve #5
- 6** Close valve #6

Major Steps – P&P

- A** All Compressors, Pumps, and ID Fan (116-J) Shut Off Due to Power Loss
- B** Vent and Isolate Methanator (106-D)
- C** Isolate Process Air (FIC-104)
- D** Isolate Process Gas
- E** Open PIC-157 Vent
- F** Block Steam to Standby MEA Circulating Pump (103-JA) Turbine
- G** Isolate Valve HIC-310
- H** Isolate MEA System
- I** Add Steam to Steam Ring at ID Fan and Open Bypass Around SV-134
- J** Steam to Gas Crossover (Visual Field Check of FIC-3602)
- K** Field Check – Steam to Air Coil

Secondary Steps – P&P

- L** Isolate All Quenches (HTS, LTS, Reboilers)
- M** Block in Reformer Burners
- N** Isolate Makeup Water to CO₂ Stripper (102-E)

Major Steps – Compressors

- A** Isolate Primary (123-F) and Secondary (122-F) Ammonia Separators
- B** Block in East/West Chillers (115-CA/CB)
- C** Block in Ammonia Refrigerant Receiver (124-F)
- D** Block in Ammonia to Chillers (Double Block)
- E** Block in the 118 Chain Valve
- F** Block in the Oil Trap (121-F)
- G** Isolate Compressors

L Isolate All Quenches (HTS, LTS, Reboilers)

Requires Special Attention: The CO₂ Stripper Reboiler A/B (102-CA/CB) has both a water quench AND a steam quench. Ensure that the steam quench is blocked in.

Consequence of Deviation: Failure to block in the steam quench would result in steam continuing to be put in the process gas lines. This will eventually result in condensate going into the reboilers and into the process stream on startup. An overload of condensate can cause uncontrollable temperatures and excessive condensate in the KO pots. If the KO pots overflow, the condensate spills over into vessels and areas that cause process issues.



Steps:

- 1 Close the steam quench valve to the CO₂ Stripper Reboiler A/B, located near the Low Temperature Shift Converter (107-D)

N Isolate Makeup Water to CO₂ Stripper (102-E)

Requires Special Attention: Makeup water to the CO₂ Stripper must be isolated during a hard shutdown.

Consequence of Deviation: If the CO₂ Stripper is shut down for a few days and makeup water is not turned off, water will accumulate in the stripper because it won't be boiled off.

Steps:

- 1 Close the makeup water valve, located near the bottom of the CO₂ Absorber (101-E)



A Isolate Primary (123-F) and Secondary (122-F) Ammonia Separators

Requires Special Attention: Keep an eye on the level in both separators. You need to allow each separator to bleed down to the Letdown Unit without emptying either vessel. This requires close observation because the levels are very fickle.

Consequence of Deviation: Ammonia could potentially fill up both separators.

Steps:

- 1 Gradually open valve from Primary Separator to NH₃ Letdown until you feel a flow
- 2 Watch the level gauge
- 3 Close valve once the level goes down
- 4 Repeat steps 1 through 3 for the Secondary Ammonia Separator

