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TITLE: COFL-GTL-ED-4.4.6-2 METHOD OF OPERATING M.A.C.S TO REDUCE ELECTRICAL CONSUMPTION SOP 0200 (GTL.LX.13.00X)

ESMS Standard Operating Procedure

System: Electrical Efficiency	Procedure No. : SOP 0200
Subsystem: Operating Main Air Compressor in Cryogenic Plant	Page No. : Page 1 of 4
Process: Method of operating M.A.C.'s to reduce electrical Consumption	Revision No. : 01
	Revision Date : 4/27/15

Purpose:

Manage Main Air Compressors (MAC) in Cryogenic plant to maintain the most efficient electrical consumption

Scope:

To implement the best operational practices to reduce and maintain efficient electrical consumption.

Responsibility:

Adherence to these written procedures will be the responsibility of the Regional Chief Wastewater Operator.

Procedure:

1. PURPOSE

On occasion, there is a need to switch from one running MAC to another for reasons of run time rotation or maintenance. This procedure is to perform that as smoothly as possible

2. WARNING STATEMENTS

In this procedure there is a provision for running cooling water to all three MACs – Two of them online and one in cool down. In theory, this should work. If under actual operation it proves to be incorrect, please be diligent in getting this procedural printout changed.



A and C MACs are on the same FPL leg and the circuit trips around 225 Amps, therefore DO NOT START A MAC OR C MAC WHILE THE OTHER IS LOADED.

3. OPERATING INSTRUCTIONS

Prepare Off-Line MAC for starting

- 3.1 Turn on One additional cooling tower pump.
- 3.2 30 minutes before starting MAC, turn on Lube Oil Pump.
- 3.3 Verify there is vacuum in the Oil Sump by reading the Magnahelic Gauge on the side of the MAC Control Panel. If gauge reads excessively low or zero, STOP HERE and get help.
- 3.4 Open the inlet water valve completely. Be sure the outlet water valve is completely open.
- 3.5 Be sure the Oil Cooler outlet valve is open completely

4. To Run In One MAC Mode

- 4.1 If switching from 2 MACs to 1 MAC or Large MAC to Small MAC, see Step 4.9 for Lining Out Plant
- 4.2 Go to MAC to be brought online
- 4.3 At Compressor Control Panel, press Control Reset Button
- 4.4 When reset finished, ensure that Unload Button light is lit and press Start Button
- 4.5 On A and B MACs, where applicable, blow out all three Differential Pressure (D.P.) cells.

See Short Plant Shutdown and Restart for locations.

- 4.6 Go to currently online MAC and press Unload Button
- 4.7 When online MAC unloads completely and amps stabilize around 30, go to the other unloaded MAC and hit Load button
- 4.8 Open outside chain valve slowly to bring air into Plant. Blow off valve (BOV) should close.
- 4.9 After MAC has finished loading, and amps and flows stabilize, press Stop Button on the MAC that is going off-line
- 4.10 Proceed to **STEP 6: Line Out Plant**

5. To Run In Two MAC Mode

- 5.1 **If A and C MAC are to be run together and one of them is online**
 - 5.1.1 **(SEE WARNING REGARDING A AND C MAC)** Unload online MAC (A or C) before starting other MAC (A or C)



- 5.2 Go to MAC (A, B, or C) to be brought online
- 5.3 At Compressor Control Panel, press Control Reset Button
- 5.4 When reset finished, ensure that Unload Button light is lit and press Start Button
- 5.5 On A and B MACs, where applicable, blow out all three D.P. cells. See **Short Plant Shutdown and Restart** for locations.
- 5.6 Open outside chain valve
- 5.7 **If going from One MAC mode to Two MAC mode,**
 - 5.7.1 Adjust MAC flow and amp setpoints for two MAC operation
 - 5.7.2 Set Expander brakes at slower speed in preparation for extra flow from second MAC
- 5.8 **If A and C MACs running together,**
 - 5.8.1 Load first MAC, either A or C
 - 5.8.2 After flows and amps stabilize, Load other MAC
- 5.9 **If B MAC is running with either A or C MAC,**
 - 5.9.1 Load second MAC
- 5.10 **If rotating MACs during an already running two MAC mode,**
 - 5.10.1 Follow one of the previous two steps, either H. or I., as appropriate. Then, After MACs have finished loading, and amps and flows stabilize, press Stop Button on MAC to go offline
- 5.11 Proceed to **STEP 6: Line Out Plant**
- 6. **Line Out Plant**
 - 6.1 Put PIC-70 into Auto at pre-shutdown setting
 - 6.2 Adjust MAC controllers, settings, and expander brakes to maintain normal flows, column pressures and levels, and expander speed
- 7. **Secure Off-Line MACs**
 - Always allow the lube pump and cooling water to run for at least 30 minutes after the MAC is shut off**
 - 7.1 After 30 minutes, turn off auxiliary lube oil pump.
 - 7.2 Close inlet water supply to MAC intercooler.
 - 7.3 Close Chain Valve.
 - 7.4 If in One MAC Mode, turn off additional cooling tower water pump.



8. Lining Out Plant (special section) - 2 MAC to 1 MAC and Large (A or C) MAC to B MAC

Process Overview

- 8.1 Changing MAC modes 1-2 and 2-1 changes volume of gas in the process stream
- 8.2 Adding a MAC to an already running MAC (1-2) is considerably easier to line out than removing 1 of 2 MACs (2-1) for the process. For this reason, the following is written primarily for lining out 1 MAC when volumes decrease (2-1)/(Big-Small).

For more information see Normal Operation and Troubleshooting and MAC Settings in Settings and Guidelines Section

RECORDS

Record	Where Filed	Responsible Individual	Indexing Method	Minimum Retention Time

REVISION LOG

Revision No.	Revision Date	Description of Change(s)
01	4/27/15	Changed box on first page by adding revision number and date

AUTHORIZATION		
Name	Title	Date
Mary Ann Johnston	ESMS Coordinator	4/27/15