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C-A OPERATIONS PROCEDURES MANUAL

7.1.3 Compressor Room – Instrument Nitrogen Compressor Operation

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Hand Processed Changes

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Approved: _____ *Signature on File* _____
Collider-Accelerator Department Chairman Date

E. Quimby

7.1.3 Compressor Room – Instrument Nitrogen Compressor Operation

1. Purpose

This procedure covers the operation of the instrument nitrogen compressor that services the RHIC instrument system. The compressor provides 7 atm dry nitrogen to operate the air-operated controls and valves on the purifier, gas management system, compressor skids, and the refrigerator building. It also provides a source of dry gas for regenerating carbon adsorber beds. This OPM contains the following procedures relating to the operation of the instrument gas compressor:

Sections: 5.1 Emergency Shutdown
 5.2 Skid Initialization
 5.3 Startup
 5.4 Shutdown

2. Responsibilities

- 2.1 The Shift Supervisor, or an operator designated by the Shift Supervisor, is responsible for conducting this procedure and providing documentation.
- 2.2 Should a problem arise during the completion of the procedure, the Shift Supervisor shall report to the Technical Supervisor for instructions.

3. Prerequisites

- 3.1 Operator shall become familiar with the instrument gas compressor skid P&ID 3A995027, the electrical schematic 3A985029, the physical location of components on the skid, and the skid's local control panel.
- 3.2 The skid is prepared as follows:
 - 3.2.1 The motors have been checked for alignment and rotation and all electrical disconnects have been energized.

4. Precautions

- 4.1 If all faults are clear, the instrument compressor can be started from the cryogenic control computer.
- 4.2 Notify the Cryogenic Control Room prior to putting the instrument compressor online or offline.
- 4.3 Hearing protection shall be worn when the compressors are operating.

5. Procedure

5.1 Emergency Shutdown

The instrument compressor is NOT outfitted with a dedicated emergency stop button. In the event of an emergency depress the compressor stop button or open the local disconnect switch.

Note:

After stopping the compressor, immediately CLOSE valve N2514M and N2516M. This will stop solenoid valve E2505E from venting all the gas in the instrument gas system.

5.2 Skid Initialization

This procedure is to configure and check out the instrument compressor skid prior to being operated.

- _____ [1] CONFIRM that the nitrogen supply system is operational.
- _____ [2] CONFIRM that all valves are in their initial positions according to Initial Valve Settings in [C-A-OPM 7.1.3.a “Valve Tables”](#).
- _____ [3] CONFIRM the main disconnect switches are on. The white POWER ON light will illuminate indicating that line and control voltage are available.
- _____ [4] CONFIRM valve N3600M (located down stream of N2516M) is OPEN and valves N2514M, N2516M, and N3601M (located down stream of N2516M) are CLOSED.
- _____ [5] SWITCH hand switch HS2500 on the local control panel to the UNLOAD position.

Note:

This switch shall always be placed in the UNLOAD position when starting the unit.

- _____ [6] SWITCH hand switch HS2501 to the ON/OFF LINE position.
- _____ [7] CHECK to determine that the lubricant level is at the mid-point of the sight glass provided. Add lubricant as required.
- _____ [8] START the compressor using the START button HS2503, and allow it to run unloaded for at least (5) five minutes. CHECK for any oil or gas leaks and correct as required.

- _____ [9] SWITCH hand switch HS2500 to the NORMAL position and allow the pressure to rise to 100 psi as read on AIR PRESSURE gauge PI2520 (Line Pressure, blue indicator needle). If the proper pressure is not obtained, adjust the compressor as per its operation and maintenance manual.
- _____ [10] STOP the compressor according to section 5.4 of this OPM.
- _____ [11] RECHECK the lubricant level in the separator tank. If required, add lubricant to bring the level up to the half way mark on the oil sight glass.
- _____ [12] RECORD in the Cryogenic Control Room Log that the compressor skid has been initialized.

5.3 Startup

This procedure is for starting the nitrogen gas compressor.

- _____ [1] CONFIRM that the compressor skid has been initialized according to section 5.2 of this OPM.
- _____ [2] CONFIRM hand switch HS2500 is in the UNLOAD position.

Note:

This switch should always be placed in the UNLOAD position when starting the unit.

- _____ [3] CONFIRM valve N3600M (located downstream of N2516M) is OPEN and valves N2514M, N2516M, and N3601M (located downstream of N2516M) are CLOSED.
- _____ [4] START the compressor using the START button H2503, and allow it to run unloaded for at least (5) five minutes. CHECK for any oil or gas leaks and correct as required.
- _____ [5] SWITCH hand switch HS2500 to the NORMAL position. The gas pressure should rise to 100 psi as read on AIR PRESSURE gauge PI2520 (Line Pressure, blue indicator needle).
- _____ [6] SWITCH hand switch HS2501 to the MODULATE position.
- _____ [7] Slowly OPEN the discharge valve N2516M.

Note:

If the compressor is discharging into a non-pressurized system, it is good practice to use the discharge valve (N2516M) to develop a back-pressure of about 5 psig below the compressor-rated pressure (which is 100 psi). When the system is pressurized, OPEN the discharge valve completely and allow the unit to operate normally.

5.4 Shutdown

This procedure is for shutting down the Instrument Nitrogen Compressor after a period of normal operation.

- _____ [1] NOTIFY the Cryogenic Control Room that the instrument compressor is going to be shutdown.
- _____ [2] CLOSE the discharge valve N2516M.
- _____ [3] SWITCH hand switch HS2500 to the UNLOAD position.
- _____ [4] Let the compressor run unloaded for at least (2) two minutes.
- _____ [5] STOP the compressor using the STOP button HS2502.

6. Documentation

- 6.1 The check-off lines on the procedure are for place-keeping only. The procedure is not to be initialed or signed, it is not a record.
- 6.2 The Shift Supervisor, or designee, shall document the completion of the procedure in the Cryogenics Control Room Log.

7. References

- 7.1 P&ID drawing 3A995027 and electrical schematic 3A985029.
- 7.2 BNL Compressor Station Operating Manual Volume I as supplied by Koch Process Systems Inc.

8. Attachments

- 8.1 [C-A-OPM-ATT 7.1.3.a "Initial Valve Tables"](#).