

If you are using a printed copy of this procedure, and not the on-screen version, then you MUST make sure the dates at the bottom of the printed copy and the on-screen version match. The on-screen version of the Collider-Accelerator Department Procedure is the Official Version. Hard copies of all signed, official, C-A Operating Procedures are available by contacting the ESSHQ Procedures Coordinator, Bldg. 911A

C-A OPERATIONS PROCEDURES MANUAL

7.1.35 Reactivation of Regeneration System

Text Pages 2 through 6

Hand Processed Changes

<u>HPC No.</u>	<u>Date</u>	<u>Page Nos.</u>	<u>Initials</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

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

M. Sardzinski

7.1.35 Reactivation of Regeneration System

1. Purpose

- 1.1 To provide instruction on reactivation of the Regeneration (Regen) system.
- 1.2 The Regen System consists of the skid, including dryer towers, and the distribution manifold.

2. Responsibilities

- 2.1. The shift supervisor or an operator designated by the shift supervisor is responsible for conducting the procedure and providing documentation in the cryogenic control room log.
- 2.2 Should a problem arise in the process of installing or removing an expander braking system, the shift supervisor shall report to the technical supervisor for instructions before continuing.
- 2.3 The technical supervisor shall report all problems to the appropriate engineer.

3. Prerequisites

- 3.1 Pure helium system available.
- 3.2 Nitrogen gas available.
- 3.3 If Regen skid or distribution manifold is to be evacuated and back filled, the Regen System must be shut down.
- 3.4 If a dryer tower is to be reactivated, that tower must be off line.
- 3.5 All personnel involved in working on any electrical system or equipment in the C-A shall be familiar with [BNL SBMS Electrical Safety](#), [BNL SBMS Lockout/Tagout Implementation Plan](#), [C-A-OPM 1.5, "Electrical Safety Implementation Plan"](#), [C-A-OPM 1.5.3, "Procedure to Open or Close Breakers and Switches"](#), [C-A-OPM 2.36 "Lockout/Tagout for Control of Hazardous Energy"](#). C-A will provide on-site/work specific training to individuals in the electrical safety aspects of their job functions and assignments.

4. Precautions

- 4.1 Hearing protection shall be worn when the compressors are in operation.
- 4.2 Approved eye protection and safety shoes shall be worn at all times.

4.3 If there is liquid in the refrigerator pots, all personnel entering the refrigerator wing of Bldg. 1005R must be ODH Class1 qualified, have a Personal Oxygen Monitor (POM) and carry an emergency escape pack.

5. Procedure

5.1 General

5.1.1 Ensure closed 110 VAC circuit breakers 25 ____ 27 ____ and 29 ____ in panel RP-2 (located next to CB3 and CB5 calorimeter local control panels).

5.1.2 Ensure closed 480 VAC circuit breakers 1 ____ and 2 ____ on subsection F (panel located on east wall of lower level).

5.2 Reactivation of Dryer Tower "A"

Note:
Ensure that there is nitrogen gas for purging.

____ 5.2.1 Date_____.

____ 5.2.2 Ensure the following valves are closed:

- | | |
|-------------|------------------------------|
| H6105M_____ | H6202M_____ |
| H6102M_____ | H6140M_____ |
| H6103M_____ | N645M_____ |
| H6104M_____ | Helium Pump Out Valve_____ |
| H6207M_____ | Nitrogen Pump Out Valve_____ |

____ 5.2.3 Depressurize tower "A" by opening valves N646m_____ and H6106M_____.

____ 5.2.4 Align N₂ purge by opening valves H6104_____ and N6200M_____.

____ 5.2.5 Start purge by throttling valve H6202M for a flow of 100%, as read on N₂ flow meter FI6201N.

____ 5.2.6 Depress "System control Reset" button on Regen skid control panel.

____ 5.2.7 Set left temperature switch to 400°F.

____ 5.2.8 Place flow switch selector to "Flow Switch 1 On" (N₂).

____ 5.2.9 Place tower reactivation selector switch to "LT Reactivation."

- _____ 5.2.10 Place control circuit selector switch to “On.”
- _____ 5.2.11 After approximately six hours, record T1 temperature (should be 300 to 375°F). Stop the heating cycle by placing the control circuit selector switch to “Off.”
- _____ 5.2.12 Start cooldown of the bed by leaving nitrogen purge on until T1 is below 100°F.
- _____ 5.2.13 Stop N₂ purge by closing valves N6200M_____ and H6106M_____.
- _____ 5.2.14 To start helium purge, open valve H6106M_____, N651M_____, H6104M_____, and throttle valve H6102M_____. FI6101N should read 50%.
- _____ 5.2.15 After purging for approximately 20 minutes, close valve H6106M_____ and pressurize tower “A” to approximately 100 psig.
- _____ 5.2.16 Close the following valves:

H6102M_____	N646M_____
H6104M_____	N651M_____
H647M_____	
- _____ 5.2.17 Open valve N618M.

5.3 Reactivation of Dryer Tower “B”

Note:
Ensure that there is nitrogen gas for purging.

- _____ 5.3.1 Date_____.
- _____ 5.3.2 Ensure the following valves are closed:

H6205M_____	H6142M_____
H6202M_____	H6104M_____
H6139M_____	N645M_____
H6106M_____	Helium Pump Out Valve_____
H6102M_____	Nitrogen Pump Out Valve_____
- _____ 5.3.3 Depressurize tower “B” by opening valves N646M_____ and H6207M_____.

- _____ 5.3.4 Align N₂ purge by opening valves H6140M_____ and N6200M_____.
- _____ 5.3.5 Start purge by throttling valve H6202M for a flow of approximately 100, as read on N₂ flow meter FI6201N.
- _____ 5.3.6 Depress “System Control Reset” on Regen skid control panel.
- _____ 5.3.7 Set right temperature switch to 400°F.
- _____ 5.3.8 Place flow switch selector to “Flow Switch 1 On” (N₂).
- _____ 5.3.9 Place tower reactivation selector switch to “RT Reactivation.”
- _____ 5.3.10 Place control circuit selector switch to “On.”
- _____ 5.3.11 After approximately six hours, record T2 temperature (should be 300 to 375°F). Stop the heating cycle by placing the control circuit selector switch to “Off.”
- _____ 5.3.12 Start cooldown of the bed by leaving the nitrogen purge on until T2 is below 100°F.
- _____ 5.3.13 To start helium purge, open valve H6207M_____, N651M_____, H6140M_____, and throttle valve H6102M_____. FI6101N should read 50%.
- _____ 5.3.14 After purging for approximately 20 minutes, close valve H6207M_____ and pressurize tower “B” to approximately 100 psig.
- _____ 5.3.15 Close the following valves:

H6102M_____	N646M_____
H6140M_____	N651M_____
H647M_____	
- _____ 5.3.16 Open valve N618M.

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 shall document the completion of the procedure in the Cryogenics Control Room Log.

7. References

- 7.1 Drwg. 3A995060, Regeneration System.
- 7.2 Drwg. 3A995009, 25 kW Helium Refrigerator P&ID.
- 7.3 [C-A-OPM 1.5, “Electrical Safety Implementation Plan”](#).
- 7.4 [C-A-OPM 1.5.3, “Procedure for Open or Close Breakers and Switches”](#).
- 7.5 [C-A-OPM 2.36, “Lock and Tag Program for Control of Hazardous Energy”](#).
- 7.6 [SBMS Electrical Safety](#).
- 7.7 [SBMS Lockout/Tagout \(LOTO\)](#).

8. Attachments

None