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*Approval signatures on file with master copy.

The following procedures must be followed when bleeding up different beam line sections and when returning these sections to operation (refer to Beamline Layout Drawing)

I. FRONT-END (PROCEDURE TO BE PERFORMED BY NSLS VACUUM GROUP ONLY)

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Refer to Front-End Vacuum Procedures (SLS-07.19-13-1).

B. Return to Operation

1. Notify the Coordinator (Beeper 5824).
2. Refer to Front-End Vacuum Procedures (SLS-07.19-13-1).

II. SECTION BETWEEN VALVE V1 AND VALVE V2A (M0 mirror chamber)

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve V1 and Front End Valve.
3. Hook up turbo pump to this section.
4. Coordinator places yellow tags on Valve V1 and Front End Valve.
5. Slowly bleed-up with boil-off N_2 while Coordinator monitors front end pressure.

B. Return to Operation

1. Bake and pump to $< 2 \times 10^{-9}$ Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.*
4. Open Valve V1 into Front End provided pressure $< 2 \times 10^{-9}$ Torr downstream of valve.
5. Perform RGA scan.*
6. If RGA scan or pressure reading (if no RGA scan required) is satisfactory, Coordinator removes yellow tags from Valve V1 and Front End Valve.
7. Remove any unprotected turbo pump from this section or valve off the turbo pump and place a yellow tag on the valve.**

III. SECTION BETWEEN VALVE V2A AND VALVE V3A (S0A entrance slit)

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valves V2A, V2B, and V1.
3. Coordinator places yellow tags on Valves V2A. V2B. and V1.
4. Slowly bleed-up with boil-off N_2 while Coordinator monitors the pressure in M0A mirror chamber.

B. Return to Operation

1. Bake-and pump to $< 2 \times 10^{-9}$ Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.*

4. Open Valve V2A into M0 mirror chamber provided pressure < 2×10^{-9} Torr downstream of valve.
5. Open Valve V1 into Front End provided pressure < 2×10^{-9} Torr downstream of valve.
6. If V2B was closed and sealed at Bleed-Up section III point A.2., Open ValveV2B into M0 mirror chamber provided pressure < 2×10^{-9} Torr downstream of valve.
6. Perform RGA scan.*
7. If RGA scan or pressure reading (if no RGA scan required) is satisfactory, Coordinator removes yellow tags from Valves V2A, V2B, and V1.
8. Remove any unprotected turbo pump from this section or valve off the turbo pump and place a yellow tag on the valve.**

IV. SECTION BETWEEN VALVE V3A AND VALVE V4A (grating chamber)

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve V3A and Valve V2A.
3. Coordinator places yellow tags on Valve V3A and Valve V2A.
4. Slowly bleed-up with boil-off N_2 while Coordinator monitors pressure in S0A entrance slit section.

B. Return to Operation

1. Bake and pump to < 2×10^{-9} Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.*
4. Open Valve V3A into S0A entrance slit section provided pressure < 2×10^{-9} Torr downstream of valve.
5. Open Valve V2A into M0A mirror chamber provided pressure < 2×10^{-9} Torr downstream of valve.
6. Perform RGA scan.*
7. If RGA scan or pressure reading (if no RGA scan required) is satisfactory, Coordinator removes yellow tags from Valve V3A and Valve V2A.
8. Remove any unprotected turbo pump from this section or valve off the turbo pump and place a yellow tag on the valve.**

V. SECTION BETWEEN VALVE V4A AND VALVE V5A (S1A exit slit)

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve V4A and Valve V3A.
3. Coordinator places yellow tags on Valve V4A and Valve V3A.
4. Slowly bleed-up with boil-off N_2 while Coordinator monitors pressure in grating chamber section.

B. Return to Operation

1. Bake and pump to < 1×10^{-8} Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.*
4. Open Valve V4A into grating chamber section provided pressure < 1×10^{-8} Torr downstream of valve.
5. Open Valve V3A S0A entrance slit section provided pressure < 2×10^{-9} Torr downstream of valve.

6. Perform RGA scan.*
7. If RGA scan or pressure reading (if no RGA scan required) is satisfactory, Coordinator removes yellow tags from Valve V4A and Valve V3A.
8. Remove any unprotected turbo pump from this section or valve off the turbo pump and place a yellow tag on the valve.**

VI. SECTION BETWEEN VALVE V5A AND VALVE V6A ,Chopper Chamber

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve V5A and V4A.
3. Coordinator places yellow tags on Valve V5A and Valve V4A.
5. Slowly bleed up with boil-off N_2 while Coordinator monitors pressure in S1A exit slit section.

B. Return to Operation

1. Bake and pump to 1×10^{-7} Torr. Pressure interlock to valve Valve V5A must be in place and operating at a trip point $\leq 2\times10^{-5}$ Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.*
4. Open valve V5A into S1A exit slit section provided pressure $< 1 \times 10^{-7}$ Torr downstream of valve.

5. Open Valve V4A into grating chamber section provided pressure $< 1 \times 10^{-8}$ Torr downstream of valve.
6. Perform RGA scan.*
7. If RGA scan or pressure reading (if no RGA scan required) is satisfactory, Coordinator removes yellow tags from Valve V5A and Valve V4A.
8. Remove any unprotected turbo pump from this section or valve off the turbo pump and place a yellow tag on the valve.**

VII. SECTION DOWNSTREAM OF VALVE V6A (Experimental chamber)

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve V6A and V5A.
3. Coordinator places yellow tags on Valve V6A and Valve V5A.
5. Slowly bleed up with boil-off N_2 while Coordinator monitors pressure in I0 Chamber.

B. Return to Operation if Experimental Chamber is Ultra High Vacuum (UHV) type:

1. Bake and pump to $< 1 \times 10^{-7}$ Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.*
4. Open Valve V6A into I0 Chamber provided pressure $< 1 \times 10^{-7}$ Torr downstream of valve.
5. Open Valve V5A into S1A exit slit section provided pressure $< 1 \times 10^{-7}$ Torr downstream of valve.
6. Perform RGA scan.*

7. If RGA scan or pressure reading (if no RGA scan required) is satisfactory, Coordinator removes yellow tags from Valve V6A and Valve V5A.
8. Remove any unprotected turbo pump from this section or valve off the turbo pump and place a yellow tag on the valve.**

C. Return to Operation if Experimental Chamber is non-UHV type:

1. Pressure interlock to valve Valve V6A must be in place and operating at a trip point $\leq 2 \times 10^{-5}$ Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.*
4. Open Valve V6A into I0 chamber provided pressure $< 2 \times 10^{-5}$ Torr downstream of valve.
5. **If** pressure in I0 chamber is $< 1 \times 10^{-7}$ Torr, open Valve V5A into S1A exit slit section. **However, if** pressure in I0 chamber is $> 1 \times 10^{-7}$ Torr, temporarily open Valve V5A into S1A exit slit section with window isolation valve V5AW closed. Valve V5A can remain open **ONLY** if pressure in S1A exit slit section is $< 1 \times 10^{-8}$ Torr.
6. Perform RGA scan.*
7. If RGA scan or pressure reading (if no RGA scan required) is satisfactory, Coordinator removes yellow tags from Valve V6A and Valve V5A.
8. Remove any unprotected turbo pump from this section or valve off the turbo pump and place a yellow tag on the valve.**

***NSLS POLICY FOR RGA SCANS**

An RGA scan is required before returning to operation if there is a major change of hardware in the vacuum system, i.e., changing of samples, mirrors, windows, monochromator crystals or gratings, manipulators, detectors, etc., **with the following two exceptions:**

1. After UHV sample chambers have been bled up for replacing components, an RGA scan will not be required if the chamber pressure is returned to $< 2\times10^{-9}$ Torr and the front end pressure remains 2×10^{-9} Torr when vacuum sections upstream of the chamber are opened into the front end.
2. If any vacuum section upstream of the bled-up section remains at a pressure of $< 9\times10^{-10}$ Torr as read using a hot-filament ion gauge, when the entire beamline is opened into the front end, and the front end pressure does not increase, no RGA is required.

**** NSLS TURBO PUMP POLICY**

An unprotected turbo pump is one not separated from the front end by a valve which automatically closes in the event of a power loss or a pressure increase. Any unprotected turbo pump, upstream of a window, **must either be removed** from a beamline section before that section is opened to the front end or **must be valved off and the valve yellow tagged** by the Coordinator.

Document Review Frequency	
3	Years

Review signatures on file with master copy of controlled document

NSLS REVISION LOG

Document Number:	LS-OPS-0076
Subject:	VACUUM PROCEDURES FOR BEAMLINE X-13A

> See NSLS Quality Control Coordinator for original revision and review signatures <

REVISION TABLE

Rev	Description	Date
D	Section VI changed to reflect changes to the beamline.	June 15, 2006