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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 SLS-96.52-001-5 Rev. A):

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

N.B.: the M0A mirror chamber is vacuum-contiguous with the U12A Front End.

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 V1A AND VALVE V2A (S0A entrance slit section)

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve V1A and Front End Valve.
3. Hook up turbo pump to this section.
4. Coordinator places yellow tags on Valve V1A 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 V1A 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 V1A 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 (grating chamber)

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve V2A and Valve V1A.
3. Hook up turbo pump to this section.
4. Coordinator places yellow tags on Valve V2A and Valve V1A.
5. Slowly bleed-up with boil-off N_2 while Coordinator monitors pressure in the S0A entrance slit section.

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 the S0A entrance slit section provided pressure $< 2 \times 10^{-9}$ Torr downstream of valve.
5. Open Valve V1A into the M0A mirror chamber provided pressure $< 2 \times 10^{-9}$ 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 V2A and Valve V1A.
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 (S1A exit slit section)

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve V3A and V2A.
3. Hook up turbo pump to this section.
4. Coordinator places yellow tags on Valve V3A and Valve V2A.
5. Slowly bleed up with boil-off N_2 while Coordinator monitors pressure in the grating chamber.

B. Return to Operation

1. Pump chamber to $< 2 \times 10^{-9}$ Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.*
4. Open Valve V3A into the grating chamber provided pressure $< 2 \times 10^{-9}$ Torr downstream of valve.
5. Open Valve V2A into the S0A entrance slit section provided pressure $< 2 \times 10^{-9}$ 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 (I0 section)

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve V4A and V3A.
3. Hook up turbo pump to this section.
4. Coordinator places yellow tags on Valve V4A and Valve V3A.
5. Slowly bleed up with boil-off N_2 while Coordinator monitors pressure in the S1A exit slit section.

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 V4A into the S1A exit slit section provided pressure $< 2 \times 10^{-9}$ Torr downstream of valve.
5. Open Valve V3A into the grating chamber provided pressure $< 2 \times 10^{-9}$ 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 (Refocusing Mirror section)

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve V5A and V4A.
3. Hook up turbo pump to this section.
4. Coordinator places yellow tags on Valve V5A and Valve V4A.
5. Slowly bleed up with boil-off N_2 while Coordinator monitors pressure in the I0 section.

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 V5A into the I0 section provided pressure $< 2 \times 10^{-9}$ Torr downstream of valve.
5. Open Valve V4A into the S1A exit slit section provided pressure $< 2 \times 10^{-9}$ 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 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. Hook up turbo pump to this section.
3. Coordinator places yellow tags on Valve V6A and Valve V5A.
4. Slowly bleed up with boil-off N_2 while Coordinator monitors pressure in the I0 section.

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

1. Bake and pump to $< 2 \times 10^{-9}$ Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.*
4. Open Valve V6A into the Refocusing mirror section provided pressure $< 2 \times 10^{-9}$ Torr downstream of valve.
5. Open Valve V5A into the I0 section provided pressure $< 2 \times 10^{-9}$ 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 V6A and Valve V5A.
8. Remove any unprotected turbo pump from this section or valve off the turbo pump and cplace 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 $\leq 2 \times 10^{-6}$ Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.*
4. Close valve V4A.
5. Open Valve V6A into the Refocusing Mirror section provided pressure $< 2 \times 10^{-6}$ Torr downstream of valve.
6. **If** pressure in the Refocusing Mirror section is $< 1 \times 10^{-8}$ Torr, open Valve V5A into the I0 section. Then, **if** the pressure in the I0 section is $< 2 \times 10^{-9}$ Torr, open Valve V4A into the S1A exit slit section. **However, if** pressure in the I0 section is $> 2 \times 10^{-9}$ Torr but $< 1 \times 10^{-8}$ Torr, open Valve V4A into the S1A exit slit section with window isolation valve VW4A closed. Valve V4A can remain open **ONLY** if the pressure in the I0 section is $< 1 \times 10^{-8}$ Torr AND the pressure in the S1A exit slit section is $< 2 \times 10^{-9}$ Torr.
7. Perform RGA scan.*
8. If RGA scan or pressure reading (if no RGA scan required) is satisfactory, Coordinator removes yellow tags from Valve V6A and Valve V5A.
9. 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-0086
Subject:	VACUUM PROCEDURES FOR BEAMLINE U-12A

Rev	Description	Date
B	CHANGE IN RETURN TO OPERATION SECTION VI C 5. SECTION VII REMOVED. INITIAL RELEASE INTO CONTROLLED DOCUMENT SYSTEM.	11/17/05
C	INSTALLATION OF REFOCUSING MIRROR SECTION DOWNSTREAM OF VALVE 5A. EXPERIMENTAL CHAMBER MOVED TO DOWNSTREAM OF VALVE 6A. CONRAD FOERSTER REPLACED BY EUGENE HU.	03/24/08