Prepared By: R. Abramowitz	Reviewed By: J. Klug	Approved By: S. Ehrlich	Approved By: E. Hu

*Approval signatures on file with master copy.

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The following procedures must be followed when bleeding up different beamline sections and when returning these sections to operation (refer to Beam Line 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 1A AND Be WINDOW 1A

A. Bleed-Up

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

B. Return to Operation

1. Pump to $< 2x\ 10^{-9}$ Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.*
4. Open Valve 1A into Front-End provided pressure $< 2x\ 10^{-9}$ 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 Tag from Valve 1A.
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 Be WINDOW 1A AND VALVE 2A

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve 1A and downstream Valve 2A.
3. Coordinator places Yellow Tag on Valve 1A.
4. Slowly bleed-up while Coordinator monitors pressure upstream of Be Window 1A.

B. Return to Operation

1. Pump to $< 5x\ 10^{-5}$ Torr. (as read by the 30 l/sec ion pump)
2. Notify the Coordinator (Beeper 5824).
3. Open Valve 2A provided pressure $< 5x\ 10^{-5}$ Torr upstream of valve.
4. Open Valve 1A provided pressure $< 2x\ 10^{-9}$ Torr downstream of valve.
5. If pressures are satisfactory, Coordinator removes Yellow Tag from Valve 1A.

IV. SECTION BETWEEN Be WINDOW 1A AND VALVE 3A, MONOCHROMATOR

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve 1A and downstream Valve 3A.
3. Coordinator places Yellow Tag on Valve 1A.
4. Slowly bleed-up while Coordinator monitors pressure upstream of Be Window 1A

B. Return to Operation

1. Pump to $< 5x\ 10^{-5}$ Torr.
2. Notify the Coordinator (Beeper 5824).
3. If pressure is satisfactory, Coordinator removes Yellow Tag from Valve 3A.

V. SECTION BETWEEN VALVE 2A AND VALVE 3A, MONOCHROMATOR

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve 2A and downstream Valve 3A.
3. Coordinator places Yellow Tag on Valve 2A.
4. Slowly bleed-up while Coordinator monitors pressure upstream of Valve 2A .

B. Return to Operation

1. Pump to $< 5x\ 10^{-5}$ Torr.
2. Notify the Coordinator (Beeper 5824).
3. Open Valve 2A provided pressure $< 5x\ 10^{-5}$ Torr downstream of valve.
4. If pressure is satisfactory, Coordinator removes Yellow Tag from Valve 2A.

VI. SECTION BETWEEN VALVE 3A AND Be WINDOW 2A, MIRROR BOX

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve 3A and Valve 2A.
3. Coordinator places Yellow Tag on Valve 3A.
4. Slowly bleed-up while Coordinator monitors pressure in Monochromator.

B. Return to Operation

1. Pump to $< 6x\ 10^{-7}$ Torr.
2. Notify the Coordinator (Beeper 5824).
3. Open Valve 3A provided pressure $< 6x\ 10^{-7}$ Torr downstream of valve.
4. If pressure is satisfactory, Coordinator removes Yellow Tag from Valve 3A.

*** NSLS POLICY FOR RGA SCANS** (24 HOUR NOTICE REQUIRED)

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 $< 2\times10^{-9}$ 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 beamline valve which automatically closes in the event of a power loss or a pressure increase at the turbo pump. **No unprotected turbo pump can share a contiguous vacuum with the Front End.**

Document Review Frequency	
3	Years

Review signatures on file with master copy of controlled document

LIGHT SOURCES DIRECTORATE REVISION LOG

Document Number:	LS-OPS-0131
Subject:	VACUUM PROCEDURES FOR BEAMLINE X-4A

Rev	Description	Date
B	Initial release in to the Controlled Document System. Section III B, steps 1 and 3 RTO pressure changed from $< 1 \times 10^{-6}$ Torr to $< 5 \times 10^{-5}$ Torr. Secondary Bleed-Up option for the Monochromator added as Section IV, original Section IV is now Section V, and original Section V is now Section VI.	060/10/2010