

Brookhaven National Laboratory/ LIGHT SOURCES DIRECTORATE			
Subject:	VACUUM PROCEDURES FOR BEAMLINE U-4A		
Number:	LS-OPS-0041	Revision:	C
		Effective:	08/05/2010
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*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 VALVE 2A, MONOCHROMATOR

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Ensure that the front mirror shutter is down.
3. Close and seal Valve 1A and the Front-End High Vacuum Valve.
4. Hook up turbo pump to this section and isolate turbo.
5. Coordinator places Yellow Tags on Valve 1A and the Front-End High Vacuum Valve.
6. Slowly bleed-up with boil-off N₂ while Coordinator monitors the 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 1A into the Front-End provided pressure $< 2 \times 10^{-9}$ Torr downstream of the 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 1A and the Front-End High Vacuum 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 2A AND VALVE 3A, UPSTREAM EXPERIMENTAL CHAMBER

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Ensure that the front mirror shutter is down.
3. Hook up turbo pump to this section and isolate turbo.
4. Close and seal Valve 2A and Valve 1A.
5. Coordinator places Yellow Tags on Valve 2A and Valve 1A.
6. Slowly bleed-up with boil-off N₂ while Coordinator monitors monochromator pressure. Beamline personnel should monitor pressure downstream of Valve 3A.

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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 2A into the Monochromator provided pressure $< 2 \times 10^{-9}$ Torr downstream of the valve.
5. Open Valve 1A into the Front-End provided pressure $< 2 \times 10^{-9}$ Torr downstream of the 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 2A and Valve 1A.
8. Remove any unprotected turbo pump from this section or valve off the turbo pump and place a Yellow Tag on the valve.**

C. Partial Bleed-Up (Bleed-up to 5×10^{-5} Torr Ne or Ar, 1×10^{-7} Torr Oxygen)

1. Close Valve 2A.
2. User monitors pressure in the Monochromator (between Valve 2A and Valve 1A) during the partial bleed-up of the Upstream Experimental Chamber.

D. Return to Operation after partial bleed-up

1. Pump to $< 2 \times 10^{-9}$ Torr.
2. Open Valve 2A into the Monochromator.

IV. SECTION BETWEEN VALVE 3A AND VALVE 4A, EXIT MIRROR CHAMBER**A. Bleed-Up**

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve 3A and Valve 2A.
3. Hook up turbo pump to this section and isolate turbo.
4. Coordinator places Yellow Tags on Valve 3A and Valve 2A.
5. Slowly bleed-up with boil-off N_2 while Coordinator monitors pressure in the Upstream Sample Chamber. Beamline personnel should monitor pressure downstream of Valve 5A.

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 3A into the Upstream Experimental Chamber provided pressure $< 2 \times 10^{-9}$ Torr downstream of the valve.
5. Open Valve 2A into the Monochromator provided pressure $< 2 \times 10^{-9}$ Torr downstream of the 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 3A and Valve 2A.
8. Remove any unprotected turbo pump from this section or valve off the turbo pump and place a Yellow Tag on the valve.**

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V. SECTION DOWNSTREAM OF VALVE 4A, DOWNSTREAM EXPERIMENTAL CHAMBER

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve 4A and Valve 3A.
3. Hook up turbo pump to this section and isolate turbo.
4. Coordinator places Yellow Tags on Valve 4A and Valve 3A.
5. Slowly bleed-up with boil-off N₂ while Coordinator monitors pressure in the Exit 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 4A into the Exit Mirror Chamber provided pressure $< 5 \times 10^{-8}$ Torr downstream of the valve.
5. Open Valve 3A into the Upstream Experimental Chamber provided pressure $< 5 \times 10^{-8}$ Torr downstream of the valve.
6. Perform RGA scan.*
7. If RGA scan or pressure reading (if no RGA scan required) is satisfactory, Coordinator removes Yellow Tag from Valve 5A.
8. Remove any unprotected turbo pump from this section or valve off the turbo pump and place a Yellow Tag on the valve.**

C. Partial Bleed-Up to 5×10^{-5} Torr Ne or Ar, 1×10^{-7} Torr Oxygen

1. Close Valve 4A.
2. User monitors pressure in the Exit Mirror Chamber (between Valve 4A and Valve 3A) during partial bleed-up of the downstream Experimental Chamber.

D. Return to Operation after Partial Bleed-Up

1. Pump to $< 2 \times 10^{-9}$ Torr.
2. Open Valve 4A into the Exit Mirror Chamber.

* 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 $< 2 \times 10^{-9}$ Torr and the Front End pressure remains $< 2 \times 10^{-9}$ 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 $< 9 \times 10^{-10}$ 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.

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**** 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.**

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Document Review Frequency

3 Years

Review signatures on file
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LIGHT SOURCES DIRECTORATE REVISION LOG

Document Number:	LS-OPS-0041	
Subject:	VACUUM PROCEDURES FOR BEAMLINE U-4A	
Rev	Description	Date
B	Initial release in to the Controlled Document System	01/01/02
C	Changed Section V B steps 4 and 5 from $< 2 \times 10^{-9}$ Torr to $< 5 \times 10^{-8}$ Torr. Removed C. Forester as Approver and added E. Hu as Approver.	08/05/2010