

Brookhaven National Laboratory/LIGHT SOURCES DIRECTORATE			
<b>Subject:</b>	<b>VACUUM PROCEDURES FOR BEAMLINE X-24A</b>		
<b>Number:</b>	LS-OPS-0078	<b>Revision:</b>	D
		<b>Effective:</b>	10/19/2009
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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 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)

**NOTE: Only the following PRT members are authorized to bleed up Sections II-V:  
Barry Karlin and Joe Woicik**

## **II. MIRROR TANK 1**

### **A. Bleed-Up**

1. Notify the Coordinator (Beeper 5824)
2. Close and seal Valve 1A and Front End GP Valve.
3. Hook up turbo pump to Mirror Tank 1.
4. Coordinator places yellow tag on Valve 1A and the Front End GP Valve.
5. Slowly bleed-up with boil-off N<sub>2</sub> 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 FE RGA scan.\*
4. Open Valve 1A into FE provided pressure is  $<2 \times 10^{-9}$  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 tag from Valve 1A and Front End GP 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, MONOCHROMATOR**

### **A. Bleed-Up**

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve 2A and Valve 1A.
3. Coordinator places yellow tag on Valve 2A and Valve 1A.
4. Slowly bleed-up with boil-off N<sub>2</sub> while Coordinator monitors pressure upstream of Valve 2A.

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**B. Return to Operation**

1. Pump to  $<5 \times 10^{-7}$  Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for FE RGA scan.\*
4. Open Valve 2A provided pressure  $<5 \times 10^{-7}$  Torr downstream of this valve, and then open Valve 1A 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 tag from Valve 2A and Valve 1A.

**IV. SECTION BETWEEN VALVE 3A AND VALVE 4A, MIRROR TANK 2****A. Bleed-Up**

1. Notify the Coordinator (Beeper 5824).
2. Close Valve 3A and Valve 2A.
3. Coordinator places yellow tag on Valve 3A and Valve 2A.
4. Slowly bleed-up with boil-off N<sub>2</sub> while Coordinator monitors pressure between Valve 3A and Valve 2A.

**B. Return to Operation**

1. Bake and pump to  $<5 \times 10^{-7}$  Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.\*
4. Open Valve 3A and Valve 2A into front end provided pressure downstream of these valves is  $<5 \times 10^{-7}$  Torr.
5. Perform RGA scan.\*
6. If RGA scan or pressure reading (if no RGA scan required) is satisfactory, Coordinator removes yellow tag from Valve 3A and Valve 2A.

**V. SECTION BETWEEN VALVE 4A AND VALVE 5A****A. Bleed-Up**

1. Notify the Coordinator (Beeper 5824).
2. Close Valve 4A and Valve 3A.
3. Coordinator places yellow tag on Valve 4A and Valve 3A.
4. Slowly bleed-up with boil-off N<sub>2</sub> while Coordinator monitors pressure between Valve 4A and Valve 3A.

**B. Return to Operation**

1. Bake and pump to  $<5 \times 10^{-7}$  Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.\*
4. Open Valve 4A and Valve 3A provided pressure  $<5 \times 10^{-7}$  Torr downstream of these valves and provided:
  - a.) Pressure remains  $<2 \times 10^{-9}$  Torr downstream of Valve 1A when Valve 3A opened (when no beam in front end).

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- b.) Pressure downstream of Valve 1A does not increase by more than  $1 \times 10^{-9}$  Torr when Valve 4A opened (when there is beam in front end).
5. Perform RGA scan.\*
6. If RGA scan or pressure reading (if no RGA scan required) is satisfactory, Coordinator removes yellow tag from Valve 4A and Valve 3A.

## VI. SECTION BETWEEN VALVE 6A AND SAMPLE CHAMBER

### A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close Valve 6A and Valve 5A.
3. Coordinator places yellow tag on Valve 6A and Valve 5A.
4. Make a note on Valve 6A yellow tag if an RGA scan will be required due to change in samples or hardware in the chamber.
5. Slowly bleed-up with boil-off N<sub>2</sub> while Coordinator monitors pressure between Valve 5A and Valve 6A.

### B. Return to Operation

1. Pump chamber to  $< 5 \times 10^{-6}$  Torr downstream of Valve 6A.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.\*
4. Open Valve 6A while monitoring pressure between Valves 5A and 6A.
5. Open Valve 5A provided pressure  $< 1 \times 10^{-7}$  Torr downstream of these valves and:
  - c.) Pressure remains  $< 2 \times 10^{-9}$  Torr downstream of Valve 1A when Valve 5A opened (when no beam in front end).
  - d.) Pressure downstream of Valve 1A does not increase by more than  $1 \times 10^{-9}$  Torr when Valve 6A opened (when there is beam in front end).
6. Perform RGA scan.\*
7. If RGA scan or pressure reading (if no RGA scan required) is satisfactory, Coordinator removes yellow tag from Valve 6A and Valve 5A.

### GATE VALVE INDEX

NSLS	NIST
Gate Valve 1A	GV1
Gate Valve 2A	GV2
Gate Valve 3A	GV3
Gate Valve 4A	GV4
Gate Valve 5A	GV5
Gate Valve 6A	GV6

### \* 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:**

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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 when vacuum sections upstream of the chamber are opened into the front end.
2. If any vacuum sections upstream of the bled-up section remains at a pressure of  $<9 \times 10^{-9}$  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 scan 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	
<b>3</b>	Years

Review signatures on file with master copy of controlled document

NSLS REVISION LOG	
<b>Document Number:</b>	LS-OPS-0078
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> See NSLS Quality Control Coordinator for original revision and review signatures <

REVISION TABLE		
Rev	Description	Date
B	Renumbering of in line valves, initial release into the controlled document system	09/22/05
C	Sect. VI B step 4: Changed Valve 5A to Valve 6A, Valve 4A to Valve 5A, and Valve 5A to Valve 6A. Step 5: Changed Valve 6A to Valve 5A, Valve 7A to Valve 5A.	07/17/06
D	Both Sections IV B 1 and V B 1 RTO (Return to Operations) pressure changed from $1 \times 10^{-8}$ Torr to $5 \times 10^{-7}$ Torr.	10/19/2009