

Brookhaven National Laboratory/National Synchrotron Light Source			
<b>Subject:</b>	<b>VACUUM PROCEDURES FOR BEAMLINE X8C</b>		
<b>Number:</b>	LS-OPS-0074	<b>Revision:</b>	C
		<b>Effective:</b>	06/30/08
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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)

## **II. SECTION BETWEEN VALVE 1C AND VALVE 2C, BENCH 1**

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

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve 1C and the Front-End High Vacuum Valve.
3. Close and seal downstream Valve 2C.
4. Hook up turbo pump to this section and isolate turbo.
5. Coordinator places Yellow Tags on Valve 1C and the Front-End High Vacuum Valve.
6. Slowly bleed up with boil-off N<sub>2</sub> while Coordinator monitors the Front-End pressure.

### **B. Return to Operation**

1. Bake and pump to  $< 2.0 \times 10^{-9}$  Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.\*
4. Open Valve 1C into the Front-End provided pressure  $< 2.0 \times 10^{-9}$  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 1C and the 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 2C AND VALVE 3C, COLLIMATING MIRROR TANK**

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

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve 2C and Valve 1C.
3. Close and seal downstream Valve 3C.
4. Hook up turbo pump to this section and isolate turbo.
5. Coordinator places Yellow Tags on Valve 2C and Valve 1C.
6. Slowly bleed up with boil-off N<sub>2</sub> while Coordinator monitors pressure between Valve 2C and Valve 1C (Bench 1).

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**B. Return to Operation**

1. Bake and pump to  $< 2.0 \times 10^{-9}$  Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.\*
4. Open Valve 2C provided pressure  $< 6.0 \times 10^{-9}$  Torr downstream of the valve.
5. Open Valve 1C provided pressure  $< 2.0 \times 10^{-9}$  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 2C and Valve 1C.
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 3C AND VALVE 4C, BENCH 3****A. Bleed-Up**

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve 3C and Valve 2C.
3. Close and seal downstream Valve 4C.
4. Hook up turbo pump to this section and isolate turbo.
5. Coordinator places Yellow Tags on Valve 3C and Valve 2C.
6. Slowly bleed up with boil-off  $N_2$  while Coordinator monitors pressure between Valve 3C and Valve 2C (Collimating Mirror Tank).

**B. Return to Operation**

1. Bake and pump to  $< 2.0 \times 10^{-9}$  Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.\*
4. Open Valve 3C provided pressure  $< 2.0 \times 10^{-9}$  Torr downstream of the valve.
5. Open Valve 2C provided pressure  $< 2.0 \times 10^{-9}$  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 3C and Valve 2C.
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 4C AND VALVE 5C, MONOCHROMATOR****A. Bleed-Up**

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve 4C and Valve 2C.
3. Close and seal downstream Valve 5C.
4. Coordinator places Yellow Tags on Valve 4C and Valve 2C.
5. Connect boil-off  $N_2$  line to the vent valve on the upstream pump.
6. Turn off power on the Turbo pump controllers. Wait ~15 min for pumps to slow down.
7. Once the vent valve opens, Coordinator monitors pressure between Valve 4C and Valve 2C (Bench 3).

**B. Return to Operation**

1. Pump to  $< 1.0 \times 10^{-6}$  Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.\*
4. Open Valve 4C provided pressure  $< 1.0 \times 10^{-6}$  Torr downstream of the valve.

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5. Open Valve 2C provided pressure  $< 2.0 \times 10^{-9}$  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 4C and Valve 2C.

## VI. SECTION BETWEEN VALVE 5C AND VALVE 6C, FOCUSING MIRROR TANK

### A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve 5C and Valve 2C.
3. Close and seal downstream Valve 6C.
4. Hook up turbo pump to this section and isolate turbo.
5. Coordinator places Yellow Tags on Valve 5C and Valve 2C.
6. Slowly bleed up with boil-off  $N_2$  while Coordinator monitors pressure between Valve 5C and Valve 2C (Bench 4/Monochromator).

### B. Return to Operation

1. Pump to  $< 6.0 \times 10^{-8}$  Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.\*
4. Open Valve 5C provided pressure  $< 6.0 \times 10^{-8}$  Torr downstream of the valve.
5. Open Valve 2C provided pressure  $< 2.0 \times 10^{-9}$  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 5C and Valve 2C.
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 BETWEEN VALVE 6C AND Be WINDOW 1C

### A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve 6C and Valve 2C.
3. Hook up turbo pump to this section and isolate turbo.
4. Coordinator places Yellow Tags on Valve 6C and Valve 2C.
5. Slowly bleed up with boil-off  $N_2$  while Coordinator monitors pressure between Valve 6C and Valve 2C (Focusing Mirror Tank).

### B. Return to Operation

1. Pump to  $< 6.0 \times 10^{-8}$  Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.\*
4. Open Valve 6C provided pressure  $< 6.0 \times 10^{-8}$  Torr downstream of the valve.
5. Open Valve 2C provided pressure  $< 2.0 \times 10^{-9}$  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 6C and Valve 2C.
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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**\* 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.

**\*\* 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.**

<b>Document Review Frequency</b>	
<b>3</b>	Years

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<b>LIGHT SOURCES DIRECTORATE REVISION LOG</b>		
<b>Document Number:</b>		LS-OPS-0074
<b>Subject:</b>		VACUUM PROCEDURES FOR BEAMLINE X-8C
<b>Rev</b>	<b>Description</b>	<b>Date</b>
B	SECTION IIIB, STEP 1 CHANGED FROM 2.0 x 10 <sup>-9</sup> TO 6.0 x 10 <sup>-9</sup> . STEP 4 CHANGED FROM 2.0 x 10 <sup>-9</sup> TO 6.0 x 10 <sup>-9</sup> . INITIAL RELEASE INTO CONTROLLED DOCUMENT SYSTEM.	06/01/05
C	SECTION IIIB, STEP 1 CHANGED FROM 6.0 x 10 <sup>-9</sup> TO 2.0 x 10 <sup>-9</sup> . SECTION VA&B REMOVED TURBO PUMP POLICY- BEAMLINE HAS PERMANENT TURBO PUMPS MOUNTED.	06/30/08