Brookhaven National Laboratory/National Synchrotron Light Source				
Subject:	**VACUUM PROCEDURES FOR BEAMLINE X21A**			
Number: LS-OPS-0069	**Revision:** B	**Effective:** 04/06/04		**Page** 1 **of** 4

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The following procedures must be followed when bleeding up different beam line sections and when returning these sections to operation.

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 (Graphite Filter Tank)

A. Bleed up
1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve 1A and Front-End Vat Valve.
3. Coordinator places Yellow Tag on Valve 1A.
4. Hook up turbo pump to this section.
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 1A provided pressure $<2 \times 10^{-9}$ downstream of the valve.
5. Perform RGA scan.*
6. If RGA scan or pressure reading (if no RGA scan is 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 (First Monochromator Tank)

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

B. Return to Operation
1. Pump to $<1 \times 10^{-4}$ Torr.
2. Notify the Coordinator(Beeper 5824).
3. Open all in-line valves, except Valve 1A.
4. Open Valve 1A provided pressure $<1 \times 10^{-4}$ Torr downstream of Be Window 1A.
5. If pressure is satisfactory, Coordinator removes Yellow Tag from Valve 1A.

IV. Section between Manual Valve 2A and Valve 3A (Double-Monochromator Tanks)

   A. Bleed up
1. Notify the Coordinator(Beeper 5824).
2. Close and seal Valve 1A.
3. Coordinator places Yellow Tag on Valve 1A.
4. Close and seal Valves 2A and 3A.
5. Slowly bleed up while Coordinator monitors pressure upstream of Be Window 1A (Graphite Filter Tank).

   B. Return to Operation
1. Pump to $<1 \times 10^{-4}$ Torr.
2. Notify the Coordinator(Beeper 5824).
3. Open all in-line valves, except Valve 1A.
4. Open Valve 1A provided pressure $<1 \times 10^{-4}$ Torr downstream of Be Window 1A
5. If pressure is satisfactory, Coordinator removes Yellow Tag from Valve 1A

V. Section between Valve 3A and Valve 4A (First Mirror-Tank, Tube)

   A. Bleed up
1. Notify the Coordinator(Beeper 5824).
2. Close and seal Valve 1A.
3. Close and seal Valves 3A and 4A.
4. Coordinator places Yellow Tag on Valve 1A.
5. Slowly bleed up while Coordinator monitors pressure upstream of Be Window 1A (Graphite Filter Tank).

   B. Return to Operation
1. Pump to $<1 \times 10^{-4}$ Torr.
2. Notify the Coordinator(Beeper 5824).
3. Open all in-line valves, except Valve 1A.
4. Open Valve 1A provided pressure $<1 \times 10^{-4}$ Torr downstream of Be Window 1A.
5. If pressure is satisfactory, Coordinator removes Yellow Tag from Valve 1A.

VI. Section between Valve 4A and Valve 5A (Second Mirror-Tank, Box)

   A. Bleed up
1. Notify the Coordinator(Beeper 5824).
2. Close and seal Valve 1A.
3. Close and seal Valves 4A and 5A.
4. Coordinator places Yellow Tag on Valve 1A.
5. Slowly bleed up while Coordinator monitors pressure upstream of Be Window 1A (Graphite Filter Tank).

   B. Return to Operation
1. Pump to $<1 \times 10^{-4}$ Torr.
2. Notify the Coordinator(Beeper 5824).
3. Open all in-line valves, except Valve 1A.
4. Open Valve 1A provided pressure $<1 \times 10^{-4}$ Torr downstream of Be Window 1A.
5. If pressure is satisfactory, Coordinator removes Yellow Tag from Valve 1A.

VII. Section between Valve 5A and Valve 6A (Photon Shutter)

    A. Bleed up
1. Notify the Coordinator(Beeper 5824).
2. Close and seal Valve 1A.
3. Close and seal Valves 5A and 6A.
4. Coordinator places Yellow Tag on Valve 1A.
5. Slowly bleed up while Coordinator monitors pressure upstream of Be Window 1A (Graphite Filter Tank).

    B. Return to Operation
1. Pump to $<1 \times 10^{-4}$ Torr.
2. Notify the Coordinator(Beeper 5824).
3. Open all in-line valves, except Valve 1A.
4. Open Valve 1A provided pressure $<1 \times 10^{-4}$ Torr downstream of Be Window 1A.
5. If pressure is satisfactory, Coordinator removes Yellow Tag from Valve 1A.

VIII. Section between Valve 6A and 7A (Hutch-Pipe)

    A. Bleed up
1. Notify the Coordinator(Beeper 5824).
2. Close and seal Valve 1A.
3. Close and seal Valves 6A and 7A.
4. Coordinator places Yellow Tag on Valve 1A.
5. Slowly bleed up while Coordinator monitors pressure upstream of Be Window 1A (Graphite Filter Tank).

    B. Return to Operation (WITH PIPE)
1. Pump to $<1 \times 10^{-4}$ Torr.
2. Notify the Coordinator(Beeper 5824).
3. Open all in-line valves, except Valve 1A.
4. Open Valve 1A provided pressure $<1 \times 10^{-4}$ Torr downstream of Be Window 1A.
5. If pressure is satisfactory, Coordinator removes Yellow Tag from Valve 1A.

    C. Return to Operation (WITH Be-WINDOW 2A)
1. Pump to $<1 \times 10^{-4}$ Torr.
2. Notify the Coordinator(Beeper 5824).
3. Open all in-line valves, except Valve 1A and Valve 7A.
4. Open Valve 1A provided pressure $<1 \times 10^{-4}$ Torr downstream of Be Window 1A.
5. If pressure is satisfactory, Coordinator removes Yellow Tag from Valve 1A.

IX. Section between Valve 7A and Be Window 3A (Pipe between Hutches, with pipe in X21A3)

    A. Bleed up
1. Notify the Coordinator(Beeper 5824).
2. Close and seal Valve 1A.
3. Close and seal Valve 7A.
4. Coordinator places Yellow Tag on Valve 1A.
5. Slowly bleed up while Coordinator monitors pressure upstream of Be Window 1A (Graphite Filter Tank).

B. Return to Operation
1. Pump to $<1 \times 10^{-4}$ Torr.
2. Notify the Coordinator(Beeper 5824).
3. Open all in-line valves, except Valve 1A.
4. Open Valve 1A provided pressure $<1 \times 10^{-4}$ Torr downstream of Be Window 1A.
5. If pressure is satisfactory, Coordinator removes Yellow Tag from Valve 1A.

X. Section between Valve 7A and Be Window 3A (Pipe between Hutches, with Be-window A2 in hutch X21A3)

A. Bleed up
1. Notify the Coordinator(Beeper 5824).
2. Close and seal Valve 7A.
3. Coordinator places Yellow Tag on Valve 7A.

B. Return to Operation (only with Pipe in X21A3)
1. Pump to $<1 \times 10^{-4}$ Torr.
2. Notify the Coordinator(Beeper 5824).
3. Open all in-line valves, except Valve 1A.
4. Open Valve 1A provided pressure $<1 \times 10^{-4}$ Torr downstream of Be Window 1A.
5. If pressure is satisfactory, Coordinator removes Yellow Tag from Valves 1A and 7A.

* 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.**

NSLS REVISION & PERIODIC REVIEW LOG

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> *See NSLS Quality Control Coordinator for original revision and review signatures <*

REVISION TABLE

Rev	Description	Date
B	MAJOR MODIFICATION TO BEAMLINE. INITIAL RELEASE INTO CONTROLLED DOCUMENT SYSTEM.	04/06/04