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Brookhaven National Laboratory/National Synchrotron Light Source					
Subject:	X7B Gas Cabinet Procedure				
Number:	LS-ESH-0048	Revision:	02	Effective: 10/17/2011	Page 1 of 4
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*Approval signatures on file with master copy.

System Description

The ventilation system consists of a single (AMCA Type A spark resistant fan with a HEPA filter) on the roof of Bldg. 725 that serves two six inch duct branches at X7B; one branch goes to the roof of the beam line X7B hutch and the other to a commercial exhaust cabinet. In addition, the main exhaust has 6 inch ducts to X6B and X9 and a flow meter attached to X7B. The main power switch is on hutch X9. The two X7B branches of this system each have a manually adjustable gate than can be used to control flow volume in each branch.(one is currently partly closed and locked in that position) The flow of the two X7B ducts have an additional control on flow and flow meters. The exhaust cabinet is a Matheson Gas Cabinet Enclosure, Model # 11987. The manufacturer specifications for the unit indicate a required flow volume of air through the system of 250 cubic feet per minute. The cabinet is designed to hold two standard 1a compressed gas cylinders and may also be used for smaller cylinders. The cabinet will be used to void gasses from the building in the event of a leak from the compressed gas cylinders kept inside the cabinet. The cabinet is intended for gas containment and exhaust for cylinders that are in active use and not as a cylinder storage device. The flow meter for the gas cabinet branch has a relay which is open if exhaust flow is normal. This relay controls the flow of gas from cylinders to the hutch. If the cabinet system exhaust flow stops, a small electronic box closes valves on the cylinders stopping flow from the cylinders to the hutch.

The six inch duct that penetrates the top of the X7B hutch terminates inside the hutch as a simple round opening that is connected to a 15 foot "elephant trunk". This portion of the system exhausts gasses inside the hutch to the outside of Bldg 725. This hutch exhaust is not intended to provide dilution ventilation to the interior of the X7B hutch. Instead gas flow is directed to the inside of the elephant trunk opening where they are carried outside by the flow volume of the system. The duct must remain open and unobstructed to assure good flow volume for purge of whatever gasses are introduced into the hutch.

Gasses proposed for use at X7B include, but are not limited to, ammonia, hydrogen, hydrogen sulfide, carbon monoxide, carbon dioxide, oxygen, nitric oxide, nitrous oxide and sulfur dioxide. All gas use at this and every other beam line at the NSLS, is reviewed as part of the NSLS Experimental Safety Review Program. Use of combustibles with this system requires an appropriately classed fan and motor or of dilution apparatus that assures introduction of gasses at or below 25 percent of the gases lower explosive limit. Normal operation of the gas flow experiments involves low flow rates (typically less than 50 cc/min) through a sapphire or quartz capillary and volumes of approximately 72 STD liters/24 hour day run (50cc/min x 24 hr/day x 60min/hr = 72000cc/day =72 liters/day). The effluent gases are directed to the elephant trunk via a small diameter tube. The size of the supply tanks will be kept to a minimum (e.g. for 5% gas/He a size G (6.9liter) cylinder).

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Ventilation System Operation and Control.

A gas cabinet/hutch exhaust system operation check list (see attached) will be performed every time a new safety approval form involving hazardous gases is posted. Check lists will be filed when experiments are completed.

An annual validation of the condition of the gas handling system will also be performed and the validation check list (see attached) will be posted on the gas cabinet. Old check lists will be filed when a new one is posted.

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Annual X7B Gas Cabinet Validation Check List

(Post this form each year on the X7B Gas Cabinet and store expired forms in the Gas Cabinet binder at the beam line)

Exhaust system air flow:

- Clean gas cabinet air intake filter.
- Required volume flow rate = 250 cubic feet/min
- Linear flow rate is measured in the duct above the cabinet. The radius of duct is 0.25 feet. The area of that duct = $\pi r^2 = \pi(0.25)^2 = 0.196$ square feet.

Measured Linear Flow Rate (feet/min) _____

Calculated Volume Flow Rate (cu ft/min)
(measured linear flow rate)(0.196) _____

SHSD/RCD support _____
Print name/Signature
Date

1. Air Flow Check

Check that the green light on hutch air flow indicator is on _____

Close the gas cabinet gate valve and wait (there will be a 20 second delay).
Does the Green light go out _____

2. Gas Flow Cutoff Check

- Check the gas flow cutoff system.
- a. Attach inert gas to flow system in gas cabinet
 - b. Attach flow in hutch to flow meter or bubbler
 - c. Does the flow stop when the gate on the duct above the cabinet is closed? _____

Local contact _____
Print Name /Signature
Date

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X7B Gas Cabinet Operation Checklist

Date: _____

SAF #: _____

User Printed name: _____

Signature: _____

- Validation checklist on gas cabinet is less than 12 months old.
- The green light on the gas flow control cabinet is on, and the
- The hazardous gas is connected to the cutoff valve to insure that gas cannot flow into the hutch if ventilation goes off.
- The output of the pumping system or flow system is directed to the elephant trunk of the hutch vent.

This form must be completed by the gas cabinet user at the start of each experiment requiring the gas cabinet.

This form must be posted at the gas cabinet whenever the cabinet is in use.

At the end of the experiment, this form must be removed from the cabinet and stored in the X7B Gas Cabinet binder.