

The University of British Columbia Land and Building Services		FUME HOOD SYSTEM MAINTENANCE AND REPAIRS	
Work Procedure		I-B-16	
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FUME HOOD SYSTEM MAINTENANCE AND REPAIR SAFETY PROCEDURES

In order to reduce the potential safety risks to Plant Operations staff and laboratory personnel when fume hood systems are being inspected, maintained or repaired, it is essential that safe procedures setting out the responsibilities of both parties must be in place.

Cooperation and coordination between the Plant Operations Department and campus laboratories is essential. Only through cooperation and adherence to safe procedures can the risks be minimized. It is the intention of these procedures to minimize exposure to laboratory chemicals by coordinating group shut-down of hoods in proximity to each other. Selecting hoods for shut down will be the responsibility of the Area Supervisor, Plant Operations acting in consultation with the Department of Health, Safety and Environment (HSE). These procedures address two different form hood system shut-down situations:

1. Preventive Maintenance Inspections
2. Unplanned Air Flow Failures

A rooftop or mechanical room containing fume hood fans may be entered for a short period of time (less than 20 minutes) provided:

1. A dual cartridge 1.2 mask respirator equipped with acid gas/organic vapour (yellow coloured) cartridges is worn.
2. The respirator has been properly fitted and the workers are trained in the safe use of respirators.

If these areas must be entered for longer than 20 minutes and fume hood system shut-down is not practical be, then a full face respirator system may be used. Workers involved must be fit tested and trained in respirator system used. Workers shall not work alone using these systems. HS & E shall be consulted to determine the appropriate system. The UBC Respirator Use Program, developed by HS & E, shall be followed.

Procedure #1 Preventive Maintenance and Repairs

It is intended that all fume hood systems should be included in an annual preventative maintenance program. The work shall be scheduled so that all of the hoods in a building (or the wing of a major building) will be serviced at the same time whenever possible. This will facilitate the shut-down of the hoods with a minimum of operational disruption and allow for the coordination of all trade groups so that as much maintenance work as possible may be conducted while the hoods are shut down. Work will be coordinated in accordance with Plant Operations Shut-Down Procedure I-D-01.

All trade shops and HS&E are to be informed of all planned fume hood system shut-downs. A minimum of 2 weeks notice should be given.

The documents to be used in the shut-down procedure are:

- a) The “Laboratory Fume Hood System Shut-Down Request” which is sent to the Departmental Contact 4 weeks before the shut down date. See Appendix #1.
- b) The “Fume Hood Shut-Down Procedure”, copies of which are sent to the Departmental contact with the “Fume Hood System Maintenance Shut-Down Request”. These forms are filled in by the fume hood user to indicate that the hood is ready for maintenance. See Appendix #2, a, b, & c.
- c) The Tradesperson’s danger tag, which is a tag, containing the tradespersons name, stating the hood is being inspected/repaired. See Appendix 3.

1.0 Notification to Academic Department

A Plant Operations “Laboratory Fume Hood System Shut-down Request” scheduling the work and detailing the scope of the work will be forwarded to the designated Departmental contact four weeks before the work is scheduled. (See appendix) Included with the request will be “Fume Hood Shut-Down Procedure” forms for each hood involved in the shut-down.

The Departmental contact must acknowledge that the Request has been received and arrangements have been made to shut down the appropriate hoods so that the preventative maintenance may be done. Departmental representatives must send their acknowledgment to the Area Supervisor, Plant Operations Department, a minimum of two weeks before the scheduled date. The acknowledgement will include the Departmental official’s signature on the Shut-Down Request.

Trades Procedures

The tradesperson will pick up the work order and proceed to the labs where the fume hoods are located.

Plant Operations personnel will check the hoods to ensure they are shut down and in a safe condition, and that the “Fume Hood Shut-Down Procedure” has been posted and signed by the Department at the lower edge of the sash.

The hood sash shall be secured in the closed position in accordance with “Plant Operations Lock Out Procedure”. The tradesperson will place a trades danger tag on each loc.

Perform the maintenance inspection of the exhaust system recording and reporting any repairs that have to be scheduled for subsequent attention.

On completion of the work, the workers will remove their tag from the fume hood sash, free the sash and sign the posted Shut-Down Procedure in the “work complete” space.

3.0 Lack of Response from User Departments

If the Departmental representative does not return the signed Shut-Down Request to Plant Operations before the work has been scheduled, work will be postponed. It may be some time before the inspection will be done and may not be performed until the next regular maintenance inspection is scheduled. Under these circumstances, Plant Operations cannot be held responsible for a failure of a fume hood exhaust system. If Departments are uncooperative with arranging shut-downs, then the situation shall be reported to the Director, Health, Safety and Environment.

4.0 Preparing Fume Hood for Maintenance Work

There are three possible levels of maintenance activity and hazard conditions that could exist.

Level 1 (blue sign) would include the following conditions:

- i) on a roof, the exhaust system is stacked or, in a mechanical room, the fan system has integrity and,
- ii) the work is done outside hood and ductwork.

Level 2 (yellow sign) would include the following condition:

- i) On a roof, the exhaust system is NOT stacked on the roof or,
- ii) Mechanical roof fans do NOT have integrity or,
- iii) The ductwork must be opened.

Level 3 (red sign) would include the following conditions:

- i) Work must be done within the fume hood itself.

Procedure #2 Fume Hood Airflow Failure Response Repair

Introduction

The abrupt and complete loss of airflow to a laboratory fume hood may create significant hazards or cause injury to maintenance and laboratory staff. The purpose of the following procedure is to ensure that the hazards to faculty, staff and students associated with hood system failure are minimized. Each fume hood will have an Air Flow Failure Sticker attached, which contains the procedure to follow if the fume hood airflow fails. See Appendix 4. The trouble call operator will be instructed to prompt the person reporting the breakdown to refer to the sticker and follow its instructions.

Maintenance Tradesperson Procedure

- 1.1 Upon receipt of a trouble call report, mechanical maintenance tradesperson shall go to the laboratory initiating the report.
- 1.2 Ensure any experiment in the hood is shut down, in accordance with the Air Flow Failure Stickers. If the tradesperson is not satisfied with the state of the hood, they shall bring their concerns to the Departmental Contact noted on the Stickers.
- 1.3 Conduct an initial inspection of the fan and the system to determine the extent of repairs required. Follow the procedure for safe mechanical room or roof top entry as noted below in section 1.4 and 1.5. Determine the degree of shut down required to safely perform the work (Blue, Yellow or Red) and determine if the fan serves more than one fume hood. If the fan has a label which indicates that more than one hood is served by the fan, the tradesperson shall go to the rooms indicated to ensure that the users are informed and the hoods are properly shut down. Inform the Departmental Contact of the level of shut down required and the probable length of time to fix the problem.
- 1.4 If the fume hood is located in a Mechanical Room, consult the posted "Mechanical Room Entrance Procedure" on the door. Follow this procedure for safe entry into the room.
- 1.5 If the fan is located on a rooftop, then wear a dual cartridge respirator equipped with an organic vapour/acid (yellow) gas cartridges while inspecting the fan. If any unusual symptoms such as burning eyes, headaches, or nausea are experienced, leave the rooftop and report to your supervisor and check with the Departmental contact person or lab user. If extensive repairs are required, the adjacent fans may have to be shut down while repairs are in progress. Consult with your supervisor concerning the extent of the shut down required.
- 1.6 Upon completion of the repair, the tradesperson shall unlock the sash, remove his lock and tag from the fume hood and sign the Laboratory Shut-down Notice that the repair has been completed. Leave a signed Laboratory shutdown notice indicating that the repair has been done.

5.0 Laboratory User Procedures

Scheduled Shut-Down

- 5.1 For level 1 (Blue) situations the following actions will be required by hood users:
- a) All chemical containers shall be closed; all compressed gas cylinders to be removed.
 - b) All sources of heat turned off.
 - c) No other laboratory equipment or apparatus may be vented into the hood during shutdown.
 - d) The hood shall be monitored for radioactive contamination where radioisotopes have been used and decontaminated if necessary. The Radiation Protection Office must be contacted at 822-7052.
 - e) The fan switch shall be turned off where a local switch is provided.
 - f) The sash shall be lowered and tagged with the Shut Down Procedure posted and signed on the lower sash edge indicating that the hood is ready for maintenance. This will also ensure that other laboratory workers will not start using the hood.
- 5.2 For a Level 2 (Yellow) situation lab users must do the following:
- a) In addition to the steps outlined in level 1, all chemicals must be removed from the hood.
- 5.3 For a Level 3 (Red) situation lab users must, in addition to the steps outlined above, everything must be removed from the hood.
- 5.4 After the locks are removed, the notice is signed off and the system is operating, remove the shutdown notice.

If the removal of any equipment, apparatus or material from the hood will endanger lab users, then Health Safety and Environment office must be contacted so that a safe work procedure may be developed.

Laboratory Users Procedure for Fume Hood Air Flow Failure

Good experimental design requires that hood users develop a plan of action to follow if the fume hood fails. This planned procedure should include the steps outlined on the following air Flow Failure instruction sticker that will be attached to each fume hood:

Air Flow Failure Instruction Sticker

If Fume Hood Air Flow Stops:

- a) Note pressure gauge reading, if one is provided.
- b) Shut off experiments, turn off heat, relieve pressures.
- c) Seal containers; remove compressed gas cylinders from the hood.
- d) Ensure no other lab equipment is vented into the hood.
- e) Place “Do Not Use; Hood Out of Order” sign on the fume hood.
- f) Where radioisotopes are used, contact Radiation Protection at 2-7052.
- g) Call Trouble Calls @ 2-2173.
- h) Advise departmental administrator – Phone No.

**Emergency Plan
Laboratory Fume Hood Users**

Hood users should incorporate the following elements into their emergency planning in order to facilitate the emergency shut-down of experiments being conducted in fume hoods:

- a) An understanding of the hazards associated with the materials being used. Keep the amount of toxic material in the fume hood to a minimum.
- b) The provision for personal protective equipment such as chemical cartridge respirators, which will provide protection from the chemicals in use.
- c) A planned shutdown procedure, so that the experiment may be shut down safely. (Some experiment may be safely interrupted, but it may be safer for others to be driven to completion). Shut-down includes: closing chemical containers, turning off heat, relieving all pressures, removing hazardous substances and monitoring for radioisotopes where they are in use.
- d) Determine if evacuation of the lab is required and if the Fire Department should be called.

Level I
FUME HOOD SHUT-DOWN PROCEDURES

University of British Columbia
Plant Operations

DO NOT USE THIS FUME HOOD

**FOR REGULAR MAINTENANCE WORK WHERE THE EXHAUST SYSTEM IS
STACKED ON THE ROOF AND SYSTEM IS INTACT**

Planned Shut-Down Date: _____ *Time:* _____ *AM/PM*

DONE (√)

INSTRUCTIONS

Ensure all containers are tightly capped.
All *extremely hazardous* materials, such as compressed gas cylinders, must be removed from hood.
Shut down all heat sources.
Contact the Radiation Protection Office at 822-7072. Monitor the hood for radioactive decontamination where radioisotopes have been used and decontaminate if necessary.
Ensure that no other lab equipment or apparatus is vented into the hood during shutdown.
Lower the sash and attach this completed form to the front face.
Advise all personnel in the area of the planned work.

If removal of the chemicals will endanger lab users, call Health, Safety and Environment at 822-2029 to develop safe work procedures.

I have prepared this good for REPAIR/MAINTENANCE as per the instructions given above. To be signed by the Hood User

SIGNATURE OF FUME HOOD USER: _____ **DATE:** _____

CAUTION!!!

**DO NOT REMOVE THIS TAG
OR USE THIS FUME HOOD
UNLESS SIGNED OFF BY THE TRADESPERSON**

I have completed the REPAIR/MAINTENANCE and this fume hood may now be used. To be signed by the tradesperson.

SIGNATURE OF TRADESPERSON: _____ **DATE:** _____

Level II
FUME HOOD SHUT-DOWN PROCEDURES

University of British Columbia
Plant Operations

DO NOT USE THIS FUME HOOD

**FOR REGULAR MAINTENANCE WORK WHERE THE EXHAUST SYSTEM IS
NOT STACKED ON THE ROOF AND SYSTEM IS NOT INTACT**

Planned Shut-Down Date: _____ *Time:* _____ *AM/PM*

DONE (√)

INSTRUCTIONS

Remove *all materials* from the hood.
Shut down all heat sources.
Contact the Radiation Protection Office at 822-7072. Monitor the hood for radioactive decontamination where radioisotopes have been used and decontaminate if necessary.
Ensure that no other lab equipment or apparatus is vented into the hood during shutdown.
Lower the sash and attach this completed form to the front face.
Advise all personnel in the area of the planned work.

If removal of the chemicals will endanger lab users, call Health, Safety and Environment at 822-2029 to develop safe work procedures.

I have prepared this good for REPAIR/MAINTENANCE as per the instructions given above. To be signed by the Hood User

SIGNATURE OF FUME HOOD USER: _____ **DATE:** _____

CAUTION!!!

**DO NOT REMOVE THIS TAG
OR USE THIS FUME HOOD
UNLESS SIGNED OFF BY THE TRADESPERSON**

I have completed the REPAIR/MAINTENANCE and this fume hood may now be used. To be signed by the tradesperson.

SIGNATURE OF TRADESPERSON: _____ **DATE:** _____

Level III
FUME HOOD SHUT-DOWN PROCEDURES
University of British Columbia
Plant Operations

DO NOT USE THIS FUME HOOD

**FOR REGULAR MAINTENANCE WORK WHERE THE EXHAUST SYSTEM IS
STACKED ON THE ROOF AND SYSTEM IS INTACT**

Planned Shut-Down Date: _____ *Time:* _____ *AM/PM*

DONE (√)

INSTRUCTIONS

All materials and equipment must be removed from the hood.
Shut down all heat sources.
Contact the Radiation Protection Office at 822-7072. Monitor the hood for radioactive decontamination where radioisotopes have been used and decontaminate if necessary.
Ensure that no other lab equipment or apparatus is vented into the hood during shutdown.
Lower the sash and attach this completed form to the front face.
Advise all personnel in the area of the planned work.

If removal of the chemicals will endanger lab users, call Health, Safety and Environment at 822-2029 to develop safe work procedures.

I have prepared this good for REPAIR/MAINTENANCE as per the instructions given above. To be signed by the Hood User

SIGNATURE OF FUME HOOD USER: _____ **DATE:** _____

CAUTION!!!

**DO NOT REMOVE THIS TAG
OR USE THIS FUME HOOD
UNLESS SIGNED OFF BY THE TRADESPERSON**

I have completed the REPAIR/MAINTENANCE and this fume hood may now be used. To be signed by the tradesperson.

SIGNATURE OF TRADESPERSON: _____ **DATE:** _____