

# Research Safety Considerations for Energy Conservation

This Fact Sheet provides information to consider when planning modifications to laboratory building supply and exhaust systems for energy conservation. Energy conservation procedures include 1) reducing building supply or exhaust ventilation, 2) reducing chemical fume hood exhaust air flows, 3) decommissioning or mothballing chemical fume hoods, and 4) shutting down ventilation or power to specific rooms or building zones. It should be noted that building supply and exhaust balance should be re-established after making significant general or local exhaust ventilation changes to laboratory buildings.

## Reduction of General Building Supply and Exhaust Ventilation

Before modification of general building exhaust rates, consider the following:

- The acceptable number of air changes per hour for general laboratory ventilation must be maintained. Contact Facilities and Services for specific information on the acceptable number of air changes per hour.
- The specific air flow requirement of the Animal Care Facilities (and housing or procedure rooms for animals outside of designated Animal Care Facilities) must be maintained. Contact the Division of Animal Resources before air handling equipment that serves animal rooms is turned down or off.
- Hazardous chemicals in laboratories must be stored properly. See the Fact sheet on DRS Laboratory Chemical Storage Guidelines at [www.drs.illinois.edu](http://www.drs.illinois.edu).
- The total volume and amount of hazardous chemicals in use and in storage in the laboratory should be minimized, as much as possible.
- The special ventilation requirements of areas using large cryogenic (for example, liquid nitrogen) cooled systems or equipment (MRI, NMR, lasers, etc.) must be addressed. Similarly, areas using large numbers of -80 C freezers, refrigeration units, computer servers, or instrumentation also have special ventilation requirements that must be addressed. The principle investigator and/or laboratory/facility/building manager should be consulted before air handling equipment serving these areas is modified.

## Reducing Individual Chemical Fume Hoods (CFHs) Exhaust Air Flow

When reducing CFHs exhaust airflows, ensure the following will occur after modifications are complete:

- The laboratory has negative pressure relative to the adjacent hallway.
- The ventilated chemical storage cabinets have negative pressure relative to the laboratory.
- The laboratory doors and windows are kept closed in order for the general ventilation systems to work properly.
- The CFHs are functioning properly.



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## Decommissioning or Mothballing of CFH

Decommissioning is the process of demolition and removal of a CFH. Mothballing is the process of turning off the CFH exhaust but leaving it in place. For example, a CFH can be removed from service by F&S with the sash locked down to prevent use. This allows for later use of the fume hood when research needs change. **Before decommissioning or mothballing a CFH, consider the following:**

- Before CFH are decommissioned or mothballed when there is no other working CFH in that lab consider removing *particularly hazardous chemicals*<sup>1</sup> from the laboratory.
- The following chemicals should always be used in a CFH -volatile toxics or poisons, volatile flammables, toxic or flammable gasses, lachrymators and/or smelly chemicals
- Use of *particularly hazardous chemicals* is NOT allowed in a laboratory without a working CFH or glove box.

## Ventilation or Power Shut-Down to Specific Rooms or Building Zones

Before implementing ventilation or power shut-downs to specific rooms or building zones during non-business hours, consider the following:

- The probability of people using the laboratory and/or equipment in the laboratory during the power/ventilation shut-down.
- The risk to workers (biological, chemical or radiological exposure), and the facility (contamination, spill, fire) if people are present during the ventilation shut down.
- The ability for people to override these shutdown procedures to ensure their safety.
- The chemical instability and container pressurization that can occur with the thawing and refreezing of some chemicals.
- The dissociation of radionuclides and pressurization of vials that can occur with the thawing and refreezing of some radiochemicals.
- Similar dissociation and contamination of the vessels that can occur with the heating and cooling cycles of radiochemicals in incubators.

<sup>1</sup>Laboratory work with *particularly hazardous chemicals*, as defined by OSHA's Hazardous Work in Laboratories Standard 29CFR1910.1450 *requires* the use of containment devices such as fume hoods or glove boxes. *Particularly hazardous chemicals* include, but are not limited to, select carcinogens, reproductive toxins and substances which have a high degree of acute toxicity (LD<sub>50</sub> of  $\leq$  50mg/kg).

## Questions?

Contact the Division of Research Safety, Chemical Safety Section 333-2755 or [via e-mail at css@illinois.edu](mailto:css@illinois.edu)) or visit our web site: <http://www.drs.illinois.edu/css/>.

Other Chemical Safety Fact Sheets are available from the Chemical Safety Section at our web site: <http://www.drs.illinois.edu/css/factsheets/>.

