

**In this issue of the Environmental Health and Safety (EHS) Listserv, January 16, 2014:**

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## **1. Plucking Dollars from the Sky?**

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Imagine plucking dollars from the sky! It is possible.....right here at UNL! And, unbeknownst to many in the campus community, most laboratories are equipped with the tools needed to pluck those dollars from the sky. Those tools are in the form of laboratory occupancy controls and laboratory chemical fume hood controls. Take a look around your lab. Do you see a wall plate near one of the doors that looks like this?



If so, you have the at least one tool you need to help reduce UNL's energy cost. Laboratories are very energy-intensive areas, primarily because of ventilation requirements. In accordance with various standards and safety principles, exhaust air from a laboratory is not recirculated; it is directly exhausted to the outside. This is an important design concept that helps to ensure the health of laboratory workers.

In a typical laboratory, there will be a minimum of six air changes per hour, or in other words, the entire volume of air in the lab will be exchanged with fresh air every 10 minutes. While working in a laboratory this exchange rate helps to prevent build-

up of fugitive emissions that could degrade the quality of air. However, there are many hours in a day when a laboratory may be unoccupied and idle. During these times, it is much less likely that fugitive emissions will be a problem and the number of general air changes can be reduced to conserve energy without compromising worker safety.

That's the idea behind the occupancy control switches mounted near the doors to many laboratories. When working in the laboratory or active processes are occurring in the laboratory that could result in fugitive emissions, be sure that the "start" button is activated to indicate that the laboratory is currently occupied. This will activate the HVAC controls to ensure that the laboratory is receiving at least six air changes per hour. During unoccupied times when active processes are not occurring, push the "stop" button. This will conserve energy by reducing the number of general air exchanges to about four.

While using the room occupancy sensor will go a long way toward reducing energy costs, even greater savings can be achieved by controlling the exhaust from chemical fume hoods. Laboratory fume hoods are vital to the protection of laboratory workers, but they consume huge amounts of energy because of the amount of conditioned air that they exhaust. A typical laboratory fume hood can cost upwards of \$5000 per year in energy costs, and often are said to consume the equivalent energy of 3-5 residences.

Take a look around your lab. Do you see a controller mounted on your fume hood that looks like this?



This control device provides an opportunity to conserve energy when the fume hood is not in active use. It is imperative that you use these buttons correctly to ensure your protection. When using the fume hood, activate the black button until the green light comes on steadily to show normal flow. Keep the sash closed when in operation.

When the fume hood is idle, activate the black button again to place the hood in standby mode. When in the standby mode, the light will flash and the amount of air being exhausted will be greatly reduced to conserve energy. NEVER conduct operations in the fume hood while it is in standby mode.

The red button is an emergency button. When this button is activated, the amount of air being exhausted is maximized. Do not operate the fume hood in the emergency mode under normal use conditions. The increased ventilation rate could compromise the capture efficiency of the hood.

The grey button is a mute button for the alarm, which is activated when the face velocity of the hood is below the set point, indicating insufficient capture efficiency. The alarm is also activated when the hood is placed in the emergency mode. Most often the alarm will activate when the sash is raised high resulting in a lowering of face velocity. Only activate the mute button when you know WHY the alarm is activated and the condition is corrected.

Because of the critical importance of a fume hood to laboratory worker protection, a couple of other words about proper use of a fume hood are in order

- Be sure your “set up” is as far back in the fume hood as possible. Spill out can occur if the fume/vapor generating activity is placed near the front of the hood.
- Do not overload the hood with extraneous equipment and supplies. Be sure air can flow under and around apparatus in the hood.
- Do not block baffles or grills.
- Keep the hood sash closed whenever possible.
- Keep foot traffic to a minimum in front of a hood, use slow and deliberate motions when putting hands into the fume hood. Cross currents can cause “spill out” from the hood.
- Do not drill holes in or otherwise modify a cabinet.
- Refer to the EHS SOP, **Laboratory Hood/Cabinet Identification and Use** for more information.

Work safely while also helping to control UNL’s energy costs by utilizing these tools in your lab!

Resources:

- **Laboratory Hood/Cabinet Identification and Use** SOP  
[http://ehs.unl.edu/sop/s-lab\\_hood\\_use.pdf](http://ehs.unl.edu/sop/s-lab_hood_use.pdf)
- ORED research news, September 2013  
<http://research.unl.edu/researchnews/September2013/>

## **2. Correct Laboratory Hood/Cabinet? Correct Use?**

Laboratories may contain more than one type of local ventilation system. Each type has been designed for a specific use. It is important to understand how these systems operate and their limitations. Use of the incorrect hood/cabinet or incorrect use of a hood/cabinet will put the user and others at risk of exposure.

**Chemical Fume Hoods** are designed to protect the worker from chemical exposure. Air is pulled into the face of the hood and exits through a stack that exhausts to the outside of the building.

**Laminar Flow Hoods (Clean Benches)** are designed only to protect the product in the hood. Air is pulled into the bottom of the unit, pushed through a HEPA filter, and then out across the bench. The HEPA filter ensures that air flowing across the workspace is clean, but it does nothing to clean the air exiting the cabinet of bio-aerosols or chemical vapors.

**Biosafety Cabinets** are designed to protect the research product and the worker from biological materials. Air is pulled into the cabinet through a HEPA filter and air that is expelled from the cabinet exits through a HEPA filter. The HEPA filters “clean” the air of bioaerosols but not chemical vapors.

**Glove Boxes** consist of a sealed chamber with glove ports and gloves for handling materials inside, a viewing window for observing, and transfer chamber or door for loading and unloading. Glove boxes can be useful for handling air-sensitive materials or highly toxic materials.

Other types of enclosures include:

- **Canopy Hoods** which are designed to remove steam, heat and odors generated by specialized equipment such as autoclaves, ovens, steam baths, etc.
- **Ductless carbon-filtered enclosures** are not recommended for general laboratory use as they are high-maintenance and not adequately protective for use with toxic or carcinogenic materials or any chemicals in more than minute quantities. Consultation with EHS is required before use.
- **Snorkel hoods** are flex ducts that can be positioned as desired and generally aid in the removal of nuisance odors, heat and similar uses. Contact EHS for an exposure assessment if you are using, or are intend to use, a snorkel hood for worker protection.

Familiarize yourself with each of the particular hoods/cabinets in your area prior to use. Proper use and operation is critical. Always read and adhere to manufacturer recommendations/guidelines. Understand how the controls work and what information is displayed.

To ensure fume hoods and biosafety cabinets are working as designed, they are inspected annually by UNL Facilities Management and Planning. FMP personnel will apply a sticker to the cabinet which identifies the last date of inspection. If an inspection has not occurred within the past year, contact the Facilities Service Desk (21550 or [servicedesk@unl.edu](mailto:servicedesk@unl.edu)).

Resources:

- **Laboratory Hood/Cabinet Identification and Use SOP**  
[http://ehs.unl.edu/sop/s-lab\\_hood\\_use.pdf](http://ehs.unl.edu/sop/s-lab_hood_use.pdf)

### 3. Elements of Creating Safety Cultures in Academic Institutions

#### #14: Establish a Close Working Relationship with EHS Personnel

As you may recall from previous issues of the EHS listserv, there has been a great deal of national attention given to the topic of laboratory safety in higher education following investigations of serious incidents at UCLA and Texas Tech. As a result, the American Chemical Society (ACS) recently issued a report, ***Creating Safety Cultures in Academic Institutions***. While this report focuses on laboratory safety, its content is applicable to all campus settings.

This report contained seventeen specific recommendations for creating vibrant, strong safety cultures in academic institutions. Each of these recommendations is being highlighted individually and presented as a series in the EHS listserv. The fourteenth recommendation in the ACS report is:

***Establish a close working relationship with EHS personnel at every departmental level, seeking their advice and experience in safety and offering departmental and faculty advice to EHS based upon their experience and knowledge (of their discipline).***

At UNL the department of Environmental Health and Safety is a service unit here to help you work safely and in compliance with regulations applicable to your work at UNL. As stated on the EHS home page in the **Message from the Director**, "It is our mission to protect UNL's human resources and preserve the environment. To that end, we are dedicated to creating a partnership with the campus community and providing services to assist employees in integrating safety and compliance into their workplace culture and behavior."

Toward that end EHS provides a number of environmental, health and safety services including many online tools, and maintains a staff of safety professionals for on-site or personal consultation. Please do not hesitate to contact us for assistance or with comments/suggestions on how we can improve our service to the campus community. A few of the many ways that we may be able to assist you include:

- Serving as a liaison to your safety committee;
- Assisting to identify potential hazards and appropriate risk reduction strategies, or critiquing current facilities, plans, and/or procedures for gaps;
- Providing recommendations on appropriate Personal Protective Equipment or engineering controls to reduce risks;
- Assisting in development of safety and compliance plans and procedures;
- Assisting to prepare protocols for review by faculty research oversight committees;

- Identifying and coordinating community resources that may be appropriate for your unique safety and compliance needs;
- Providing training on relevant safety and compliance topics.

EHS stands ready to be a valued part of your safety program. Always “think safety” and help foster the proper attitude toward safety as reflected in the “Safety Ethic,” espoused by the Safety Culture Task Force of the ACS Committee on Chemical Safety:

- **Value safety:** Safety is an integral part of what one does, its automatic, and it does not change its priorities. It is never questioned and never compromised.
- **Work safely:** One continues to learn about safety, learns to recognize hazards, assesses the risks of hazards, manages the risk of hazards, and prepares to handle emergencies.
- **Prevent at-risk behavior:** One does not cut corners or bypass safety measures in the laboratory (or other work environment) and shares this information with others, as needed.
- **Promote safety:** One encourages and acknowledges others in working safely.
- **Accept responsibility for safety:** One takes steps to work safely, setting a positive example for others, and being accountable for safety.

Resources:

- Creating Safety Cultures in Academic Institutions  
[http://portal.acs.org/portal/PublicWebSite/about/governance/committees/chemicalsafety/CNBP\\_029720](http://portal.acs.org/portal/PublicWebSite/about/governance/committees/chemicalsafety/CNBP_029720)
- EHS Virtual Manual <https://scsapps.unl.edu/VirtualManual/>
- EHS Safe Operating Procedures <http://ehs.unl.edu/sop>
- EHS Web-Based Training <http://ehs.unl.edu/onlinetraining>
- EHS Listserv <http://ehs.unl.edu/listserv>
- Near-Miss/Close Call Reporter <https://scsapps.unl.edu/EHSNearMissReporter/>
- Student Injury/Illness Reporter!  
<https://scsapps.unl.edu/studentinjuryillnessReporter/>
- Chancellor’s University Safety Committee (CUSC)  
<http://ehs.unl.edu/chancellors-university-safety-committee-cusc#cusc>

#### 4. Overview: UNL Injury Incidents and Safety Surveys

EHS will periodically provide information on a few of UNL’s recent occupational injuries and highlights of campus-wide safety survey findings. By sharing this information, we hope to create an opportunity to learn from the experiences of others. When reviewing audit findings, consider whether similar conditions may exist in your work area, and if so, take action to remedy the situation.

A few of the recent occupational injuries and possible mitigation strategies are highlighted below:

- Various circumstances resulted in cuts to fingers/thumbs while UNL employees were conducting their work tasks:
  - Employee did not turn off a farm machine before attempting to clear a jam and cut their finger. In some cases, it is as simple as shutting off a machine and removing the keys before putting any part of the body into a hazard zone. In other cases, more complex steps (in the form of a lockout/tagout procedure) might be needed.
  - Employee was not wearing a cut-resistant glove while chopping vegetables and the knife was not appropriate for the type of vegetable. The employee attempted to re-position the knife without having full control. This resulted in a laceration of the finger.
  - Employee cut their finger on an undetected sharp edge of a metal container. Be aware of the potential for undetected hazards and inspect items carefully before handling.
  - Employee cut their finger while washing a knife. Protective gloves were not in use and the employee was not using appropriate handling/washing techniques.
- There were several sprain/strain injuries. Many involved moving large/awkward/heavy items (ladder, vinyl floor matting, coffee dispenser, empty dish rack) from one place to another, sometimes to an overhead location. Mitigation for this type of injury would be to use the proper mechanical assistance (e.g., carts or dollies) to move items, ask co-workers to assist, make sure heavy items are stored lower than shoulder level, etc..

A few highlights of EHS safety survey findings follow:

- In a number of areas zip ties were being used to restrain electrical items, e.g. power strips and cords. Power strips may be restrained to keep them in place or cords restrained to keep them out of the way but electrical code does not permit restraints that require use of a tool for removal.
- Relocatable power strips were being used to power microwaves, coffeepots, heat guns, etc. Higher power items should be plugged directly into a permanently installed outlet. Relocatable power strips are designed for low power applications only and typically will be overloaded at 12 amps or less.
- Quite a number of laboratory and shop areas did not have a Virtual Manual or equivalent plan addressing hazards in the area. Many workers in audited areas had not completed basic safety training (e.g. Core-Injury and Illness Prevention Plan, Core-Emergency Preparedness, Chemical Safety) or other training required based on the job tasks (e.g., Lockout/Tagout, Biosafety).

We encourage you to share this overview of injury incident findings and audit deficiencies with others in your area as applicable and continue to report student injuries and near-misses.

Resources:

- EHS **Near-Miss/Close Call Reporter!**  
<https://scsapps.unl.edu/EHSNearMissReporter/>
- EHS **Student Injury/Illness Reporter!**  
<https://scsapps.unl.edu/studentinjuryillnessReporter/>
- **First Report of Alleged Occupational Injury or Illness** and related forms  
[http://hr.unl.edu/forms/pdf/firstreport\\_incidentreport\\_choiceofdoctor.pdf](http://hr.unl.edu/forms/pdf/firstreport_incidentreport_choiceofdoctor.pdf)
- **On-The-Job and Student Injuries** SOP <http://ehs.unl.edu/sop/s-injury.pdf>
- **Training Needs Assessment For EHS-Related Topics**  
[http://ehs.unl.edu/Training\\_Needs\\_Assessment.pdf](http://ehs.unl.edu/Training_Needs_Assessment.pdf)
- **General Machine Safety** SOP [http://ehs.unl.edu/sop/s-gen\\_machine\\_safety.pdf](http://ehs.unl.edu/sop/s-gen_machine_safety.pdf)
- **Lockout/Tagout for Machines & Equipment** SOPs  
<http://ehs.unl.edu/sop/lockouttagout-machines-equipment>
- **General Material Handling/Safe Lifting** [http://ehs.unl.edu/sop/s-gen\\_safe\\_lifting.pdf](http://ehs.unl.edu/sop/s-gen_safe_lifting.pdf)
- **Personal Protective Equipment** Web-Based Training  
<http://ehs.unl.edu/onlinetraining>
- **Safety Audit Guidelines** SOPs <http://ehs.unl.edu/sop/safety-audit-guidelines>

## 5. Revised Safe Operating Procedures

- **Chemical Hazard Assessment and Risk Minimization**  
[http://ehs.unl.edu/sop/s-chemical\\_haz\\_assessment\\_risk\\_min.pdf](http://ehs.unl.edu/sop/s-chemical_haz_assessment_risk_min.pdf)
- **Chemical Security** <http://ehs.unl.edu/sop/s-chemsecurity.pdf>
- **Communication of Work Area Safety Information** <http://ehs.unl.edu/sop/s-workareasafety.pdf>
- **Construction Site NPDES Permits** [http://ehs.unl.edu/sop/s-construction\\_site%20npdes\\_permits.pdf](http://ehs.unl.edu/sop/s-construction_site%20npdes_permits.pdf)
- **General Guidance for Chemical Ordering, Receipt, Distribution, Use & Storage** [http://ehs.unl.edu/sop/s-gen\\_chem\\_guidance\\_ord\\_us.pdf](http://ehs.unl.edu/sop/s-gen_chem_guidance_ord_us.pdf)
- **Management of Construction and Demolition Waste**  
[http://ehs.unl.edu/sop/s-construction\\_demo\\_waste\\_mgmt.pdf](http://ehs.unl.edu/sop/s-construction_demo_waste_mgmt.pdf)
- **Microtome Safety** [http://ehs.unl.edu/sop/s-microtome\\_safety.pdf](http://ehs.unl.edu/sop/s-microtome_safety.pdf)
- **Nanoparticle Safety** [http://ehs.unl.edu/sop/s-nanoparticle\\_safety.pdf](http://ehs.unl.edu/sop/s-nanoparticle_safety.pdf)
- **On-the-Job and Student Injuries** <http://ehs.unl.edu/sop/s-injury.pdf>
- **Preserved Specimens Hazards, Storage, Labeling, and Disposal**  
[http://ehs.unl.edu/sop/s-preserved\\_specimens.pdf](http://ehs.unl.edu/sop/s-preserved_specimens.pdf)

The ten SOPs listed were revised to include minor updates, e.g., to correct titles of referenced documents or to clarify existing language.

- **Personal Protective Equipment for Chemical Exposures**  
<http://ehs.unl.edu/sop/s-ppe.pdf>  
Added PPE guidance specifically for laboratories as referenced in other EHS training and documents.

**Remember...SAFETY IS AN ATTITUDE!**

**Environmental Health and Safety**

University of Nebraska-Lincoln

3630 East Campus Loop

Lincoln, NE 68583-0824

(402) 472-4925

<http://ehs.unl.edu>