

**In this issue of the Environmental Health and Safety (EHS) Listserv, May 6, 2013:**

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## **1. Enhancing Laboratory Safety NOW ONLINE**

Did you miss the most recent Laboratory Safety Colloquium, **Enhancing Laboratory Safety**, jointly sponsored by EHS and the Office of Research and Economic Development (ORED)? On April 11, 2013, Dr. Craig Merlic, UCLA Professor in the Department of Chemistry and Biochemistry, shared his experience in building a laboratory safety culture at UCLA following a laboratory accident that claimed the life of a staff researcher in 2009. A video and the presentation are now online.

Previous colloquium presentations (most with a video) are maintained online for periodic review as applicable to current and changing research needs. Check out the list of previous sessions to see if one or more might be of value to the safety of you and your students and staff.

Resources:

- Laboratory Safety Colloquium Series
  - EHS web site: <http://ehs.unl.edu/training/Colloquium/>
  - ORED web site: <http://research.unl.edu/laboratorysafetymcolloquium/>

## **2. FREE NIOSH Nanotechnology Safety Workshop**

Representatives of the National Institute of Occupational Safety and Health (NIOSH) Nanotechnology Research, Education and Information Center will offer a FREE one-day workshop at UNL on Tuesday, June 11<sup>th</sup>, 2013 from 8 a.m. – 5 p.m. To date, this course has been offered at only three other universities. UNL is fortunate to have been selected as a site for this NIOSH workshop.

The objective of the workshop is to teach participants how to evaluate potential occupational exposures to nanoparticles in the research setting. Participants will become versed in documented risk assessments and safety protocols, which are often required as a condition of many agencies providing funding for research. This

is your opportunity to learn how to apply the risk assessment process, use sampling equipment designed to evaluate potential exposures, ask questions of the NIOSH experts, and interact with other researchers on campus and EHS staff.

Due to the hands-on activities and the size of the room, space is limited to the first 30 participants. For more information and to register, contact Lisa Mensah ([lmensah2@unl.edu](mailto:lmensah2@unl.edu) or (402) 472-6513) by Thursday, May 16<sup>th</sup>, 2013. After that date, open seats will be offered to other academic institutions, safety professionals, and local companies manipulating nanoparticles. A confirmation email with all of the details will be sent to those who register.

### **3. Use the Student Injury/Illness Reporter! & Near-Miss/Close Call Incident Reporter!**

The ***Student Injury/Illness Reporter!*** online tool is a confidential, self-reporting mechanism to collect information on student injury/illnesses. EHS follows up any uncontrolled hazards identified through the information provided. This reporting tool is intended only for students that do not have "employee" status and which have not filed for workers compensation benefits as described in the EHS Safe Operating Procedure (SOP), ***On-the-Job and Student Injuries***.

Another online tool, the ***Near-Miss/Close Call Incident Reporter!*** is also available for your use. A "near miss" is an incident where no property was damaged and no personal injury sustained, but where, given a slight shift in time or position, damage and/or injury or illness easily could have occurred. It can also be thought of as a "close call." This online app allows the campus community to report near misses/close calls that they may hesitate to report within their work unit but which may serve as a learning tool for others.

EHS encourages reporting of near-miss/close call incidents so that contributing factors can be identified and abated before they result in personal injury/illness or property damage. By reporting these circumstances you are contributing to a safer campus environment.

Resources:

- ***Student Injury/Illness Reporter!*** <http://ehs.unl.edu/sop/s-injury.pdf>
- ***Near Miss/Close Call Incident Reporter!***  
<https://scsapps.unl.edu/EHSNearMissReporter/>
- ***On-the-Job and Student Injuries*** SOP <http://ehs.unl.edu/sop/s-injury.pdf>

### **4. Elements of Creating Safety Cultures in Academic Institutions - #6: Implement Hazard Analysis**

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,

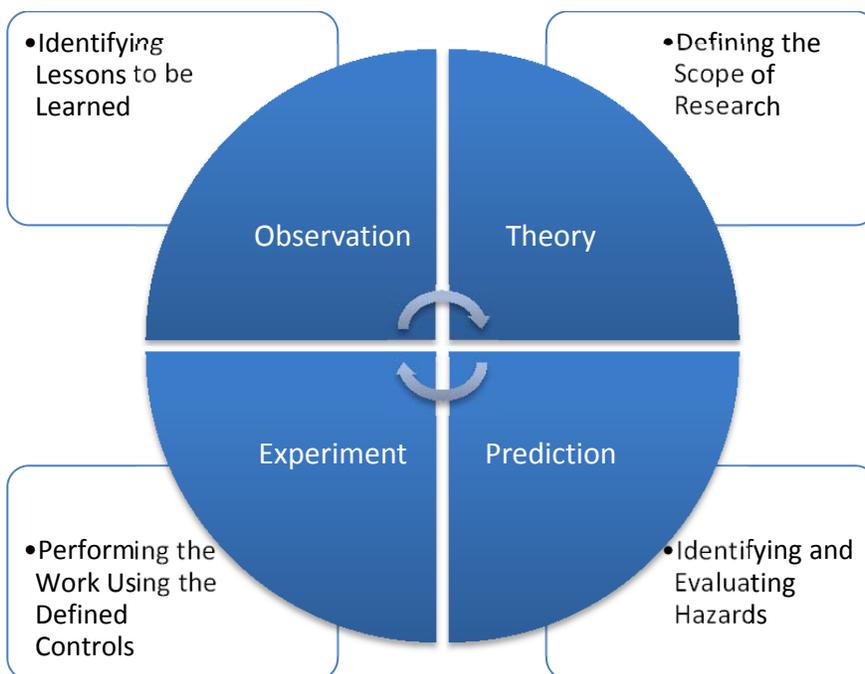
the American Chemical Society (ACS) recently issued a report, ***Creating Safety Cultures in Academic Institutions***. While this report focuses on laboratory safety, its content is applicable to all campus settings.

This report contained seventeen specific recommendations for creating vibrant, strong safety cultures in academic institutions. Each of these recommendations will be highlighted individually and presented as a series in the EHS listserv.

The sixth recommendation in the ACS report is:

***Implement hazard analysis procedures in all new lab work, especially laboratory research.***

The ACS report emphasizes the importance of integrating the process of identifying, evaluating, and mitigating the hazards of an experiment to be performed into the experimental design process. The ACS report makes it clear that this should not be viewed as an onerous process and provides a visual representation of the harmony between the scientific method (elements in the circle) and the basic elements of the hazard analysis process (elements in the boxes).



Each of these hazard assessment elements is briefly described below:

- **Define the scope of the research.** Ascertain published information on the reactivity and toxicity of the chemicals used or generated in the proposed experiment. For novel preparations or those having unstable reactants/products, determine appropriate safe approaches to carry out operations, such as running reactions on a small scale.

For research not involving chemicals, use published information relating to the intended process/similar processes. Identify emergency procedures and equipment needed for the proposed work.

- **Identify and evaluate hazards.** Include hazards to the investigator and risks to the environment, for example, routes of potential exposure (including such components as being hit by flying objects, receiving cuts from sharp objects, adverse contact with moving parts/pinching/burns/pressure/electrical shock, etc.). This serves as the basis of how to eliminate or minimize identified hazards.

Encourage a questioning attitude by all involved to ensure the best analysis possible. Hypothesize about credible event scenarios. Consider regulatory requirements, which are often hazards-based. Use tools such as checklists, what-if analyses, barrier analyses, failure modes analyses, control banding and so forth to facilitate through review. Though the experiment may be completed by an individual, call upon others to help or advise, deferring to those who may have more experience, such as a senior investigator.

Set up/implement the controls identified to eliminate the hazard, control it, or protect the all persons involved in the event the thinkable or unthinkable happens.

- **Perform the work with the identified controls and protective measures in place.** Confirm the agreed upon controls/protective measures are in place BEFORE the work begins. This includes a conscious evaluation of the skills and capabilities of the individuals who will complete the work.

If unexpected conditions are found, pause and ensure the scope of the work or the necessary controls have not changed significantly enough to warrant additional analysis. If it is suspected that a necessary control is not in place, question the process before continuing.

Seek to avoid at-risk behavior in your work and help others recognize risky behaviors in their work. At-risk behavior, a leading cause of incidents, results when persons bypass safe practices to reduce the time or level of effort. Some examples are: not wearing personal protective equipment; not using ventilation hoods; skipping safety plans or steps; poor housekeeping; and scaling up a reaction without adequate planning. PREVENTION is a key component of safety!

- **Identify lessons to be learned.** Approach the end of an experiment the same way it began, by asking questions. For example, “Did a hazard manifest itself that was not previously identified? Did a control perform the way it was expected to or is another option needed if the experiment is repeated? Did something go really well that others can learn from? Were there any close calls that can serve as a warning for identifying areas of needed improvement?”

The proper attitude toward safety is 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 listserv articles: Risk Assessment series (July, August, September, November 1, 2012) <http://ehs.unl.edu/listserv>
- EHS SOP **Job Safety Assessments** <http://ehs.unl.edu/sop/s-JSA.pdf>
- EHS SOP **Chemical Hazard Assessment & 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)
- **Prudent Practices in the Laboratory: Handling and Disposal of Chemicals, Revised 2011 Edition** [http://www.nap.edu/catalog.php?record\\_id=12654](http://www.nap.edu/catalog.php?record_id=12654)
- UC (University of California) Center for Laboratory Safety (Resources)  
<http://cls.ucla.edu/>

## 5. Don't Let This Happen in YOUR lab!

Recently there was an explosion of a peroxide-forming chemical at another NU university that resulted in an injury. This particular incident occurred in a teaching laboratory but peroxide-forming chemicals are used widely at UNL. Let's take a brief look at this incident to see what happened so you can prevent a similar incident in YOUR lab.

A student was performing a standard distillation procedure as part of an unknown solvent identification exercise. While distilling a solution of 2-butanol, with approximately 2 milliliters of solution remaining in the distillation flask, the flask exploded. The laboratory was evacuated and the injured student was transported for medical care.

After the incident, the stock solution of 2-butanol was tested for the presence of peroxides and confirmed to have peroxides present. The peroxides became unstable and exploded as the solvent boiled off and the peroxides became concentrated. Although there were procedures in place to properly label and test peroxide-forming chemicals, 2-butanol was not recognized as a potential peroxide-forming chemical.

Here are a few tips from the ***Use and Storage of Peroxide-Forming Chemicals*** SOP:

- Check all solvents for peroxide formation prior to distilling.
- Manufacturers may add an inhibitor to peroxide-forming chemicals to counter peroxide formation. For many peroxide-forming solvents, butylated hydroxy toluene (BHT) is commonly added. BHT 'scavenges' oxygen in the solvent and prevents it from reacting with the solvent to form peroxides. Be aware that over time BHT or other inhibitor in the solvent can become exhausted allowing peroxides to form. Distilling the solvent can completely remove the BHT and make the solvent immediately susceptible to peroxide formation.
- Keep a record of all peroxidizable compounds to indicate the date of receipt, the date the container was first opened, and disposal date according to information from the Safety Data Sheet (SDS). Permanently mark the container or affix a label with this information. Including a notice such as **Warning-Peroxide Former** may be helpful.
- Be sure caps are replaced promptly after use. Store peroxide-formers in the original manufacturer's container whenever possible.
- If a peroxide-forming chemical or container is of unknown age or history, if crystals or solid masses are visibly present on or in the container or lid, or if the chemical shows discoloration, string-like formations, or liquid stratification, do not open the container. Contact EHS for assistance.

In addition to more tips, this EHS SOP discusses test procedures, treatment suggestions if peroxides are detected (if safe to do so), and a list of SOME peroxidizable compounds.

Resources:

- **Chemical Safety** SOPs <http://ehs.unl.edu/sop/chemical-safety>
- **Use and Storage of Peroxide-Forming Chemicals** SOP <http://ehs.unl.edu/sop/s-peroxides.pdf>

## 6. New & Revised Safe Operating Procedures & Training

- **Communication of Work Area Safety Information** SOP <http://ehs.unl.edu/sop/s-workareasafety.pdf>  
Added a reference to "Employee Training Needs Assessment for EHS-Related Topics" and clarified a few items.

- ***Import and Transfer of Etiological Agents*** SOP [http://ehs.unl.edu/sop/s-ship\\_etiologic\\_agents.pdf](http://ehs.unl.edu/sop/s-ship_etiologic_agents.pdf)  
Updated document to reflect revised guidance from CDC related to the Etiological Agent Import Permit Program.
- ***Injury and Illness Prevention Plan*** web-based training  
Training updated to include availability and use of the new online “Student Injury/Illness Reporter!” and the “Near Miss/Close Call Incident Reporting System!”
- ***NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules*** web-based training  
Training updated to reflect the recent revisions to the NIH Guidelines published on 9/5/2012 and effective on 3/5/13.
- ***On-The-Job and Student Injuries*** <http://ehs.unl.edu/sop/s-injury.pdf>  
Significantly revised to include guidance on immediate response actions for both worker and student injuries/ illnesses, the online “Student Injury/Illness Reporter” and “Near-Miss/Close Call Incident Reporting System,” and provide a “Checklist for Local Planning for Responses to Injuries.”
- ***Sewer Disposal List*** <http://ehs.unl.edu/sop/s-sewerdisp.pdf>  
Revised to include three classes of general disinfectants used on campus and their specific disposal instructions.
- ***Sharps Use and Handling with Livestock*** [http://ehs.unl.edu/sop/s-sharps\\_use\\_%26\\_handling\\_livestock.pdf](http://ehs.unl.edu/sop/s-sharps_use_%26_handling_livestock.pdf)  
SOP developed to address an informational need previously not addressed.
- ***Use and Storage of Peroxide-Forming Chemicals*** <http://ehs.unl.edu/sop/s-peroxides.pdf>  
Updates the list of possible peroxide-forming chemicals to reflect additional chemicals reported in the literature.

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

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