

In this issue of the Environmental Health and Safety (EHS) Listserv, August 9, 2013:

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1. Laser Pointer Safety

Commercial laser pointers are most commonly designed to assist speakers when giving lectures or presentations. The laser pointer is a high-tech alternative to the retractable, metal pointer. The laser pointer produces a small dot of light on the object at which it is aimed, for example, to draw an audience's attention to a particular key point in a slide show. Pointers are also used for other purposes such as aligning of other lasers, laying pipes in construction, and as aiming devices for firearms. Laser pointer use throughout the university is fairly common.

Laser pointers have become very affordable recently due to new developments in laser technology, and they are also available with much more power. They are widely available at electronic stores, novelty shops, through mail order catalogs and online. Currently, it is possible for anyone to purchase a laser pointer with a power rating up to 1000mW (1 Watt). Calling a high powered laser a "laser pointer" does not minimize its potential to cause some real damage. For instance, consider the following power levels and their effects on the eye and skin:

- 10mW: Blinking and turning away from the beam may not be enough to prevent some eye injury.
- 100mW: Exposure at close range will cause a change in the retina (i.e. eye injury).
- 150mW: Can be felt on the skin.
- 500mW: Is a skin burn hazard.

Are you safe using a high-powered laser pointer purchased online? Good question. The answer in many cases is "no". A recently published paper by the U.S. government agency NIST (National Institute of Standards and Technology) indicated that of 122 laser pointers, most of which had been purchased online, both red and green laser pointers often emitted more visible power than allowed under the Code of Federal Regulations (CFR), and green pointers often emitted unacceptable levels of infrared light as well.

Use laser pointers with care and thoroughly research all new purchases. Laser pointers from reputable manufacturers and 5mW or less in power are recommended. The Laser Institute of America provides the following safety tips:

- Never shine a laser pointer at anyone. Laser pointers are designed to illustrate inanimate objects.
- Do not allow minors to use a pointer unsupervised and no one should engage in horseplay with a pointer. Laser pointers are not toys.
- Do not point a laser pointer at mirror-like surfaces. A reflected beam can act like a direct beam on the eye.
- Be aware of irresponsible uses of pointers so the psychological (startle or panic) effect will be minimized if you are illuminated by a laser beam, e.g. while driving on a highway.
- Do not purchase a laser pointer if it does not have a caution or danger sticker identifying its class. Report suspicious devices to the FDA.

Resources:

- EHS **Laser Classification and General Safety Control Measures** SOP
<http://ehs.unl.edu/sop/s-laserclass.pdf>
- Laser Institute of America: Laser Pointer Safety
http://www.lia.org/subscriptions/safety_bulletin/laser_pointer
- Laser Pointer Safety web site <http://laserpointersafety.com/>
- National Institute of Standards and Technology *Tech Beat*: March 20, 2013
<http://www.nist.gov/pml/div686/pointer-032013.cfm>

2. NIOSH Workshop on Nanomaterials Online

Recently, UNL was privileged to be a participant in a workshop offered by the National Institute for Occupational Safety and Health (NIOSH). NIOSH is part of the Centers for Disease Control (CDC) and is responsible for conducting research and making recommendations for the prevention of worker injury and illness to protect the health and safety of the nation's 155 million workers. Workshop videos and presentation copies are available online within the **Laboratory Safety Colloquium Series** section of the EHS web site.

Nanotechnology is the manipulation of matter on a near-atomic scale to produce new structures, materials and devices. This technology holds promise in medicine, consumer products, energy, materials and manufacturing. Materials at the nano level (1-100 nanometers in size) often exhibit special properties, for example are stronger, lighter, and more durable than larger particles of the same substance. Enhanced chemical reactivity and electrical conductivity are also exhibited in some cases.

These properties lead to useful and money/life-saving applications in the fields of agriculture, automotive, biomedical, energy, environmental, food, materials and water. For example, in the biomedical field nanotechnology can lead to targeted

therapeutics and advanced disease detection; in the environmental arena new pollution control and remediation tools/sensors; in the area of “water,” new purification approaches; and in the area of “materials,” stain-resistant and/or stronger textiles. These technological advances hold great potential, but the health effects of exposure to nanomaterials remains uncertain. Early research indicates that adverse health effects are likely in the absence of adequate exposure controls.

The NIOSH workshop consisted of five modules, all of which centered on the potential health hazards of engineered nanomaterials and risk reduction strategies.

- Recommendations for building a risk management program for nanomaterials
- Guidance published by the NIOSH – Nanotechnology Research Center
- Recommendations for risk assessment approaches for nanomaterials
- Recommendations for exposure assessment strategies for nanoparticles
- Using the concept of control banding to select appropriate risk reduction strategies

If your work involves manipulation of nanomaterials in a form that could result in occupational exposure, you are encouraged to review the NIOSH presentations.

Resources:

- EHS Laboratory Safety Colloquium Series
<http://ehs.unl.edu/training/Colloquium>
- M Methner, L. Hodson, C. Geraci, “Nanoparticle Emission Assessment Technique (NEAT) for the Identification and Measurement of Potential Inhalation Exposure to Engineered Nanomaterials, Part A & Part B.” *Journal of Occupational and Environmental Hygiene* March 2010.
<http://www.tandfonline.com/doi/abs/10.1080/15459620903508066#.UgPxLW0phpk>
- General Safe Practices for Working with Engineered Nanomaterials in Research Laboratories <http://www.cdc.gov/niosh/docs/2012-147/>
- International Council on Nanotechnology (ICON) Virtual Journal
<http://icon.rice.edu/virtualjournal.cfm>
- Filling the Knowledge Gaps for Safe Nanotechnology in the Workplace
<http://www.cdc.gov/niosh/docs/2013-101/>
- CDC Workplace Safety & Health Topics: Nanotechnology
<http://www.cdc.gov/niosh/topics/nanotech/>
- Progress Toward Safe Nanotechnology in the Workplace
<http://www.cdc.gov/niosh/docs/2010-104/>
- Strategic Plan for NIOSH Research and Guidance: Filling the Knowledge Gaps
<http://www.cdc.gov/niosh/docket/archive/pdfs/NIOSH-134-A/0134-A-110109-Document.pdf>
- The GoodNanoGuide <http://www.goodnanoguide.org/tiki-index.php?page=HomePage>
- **Virtual Manual** <https://scsapps.unl.edu/VirtualManual/>
- EHS **Nanoparticle Safety** SOP http://ehs.unl.edu/sop/s-nanoparticle_safety.pdf

3. Elements of Creating Safety Cultures in Academic Institutions #9: Adopt a Personal Credo

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 ninth recommendation in the ACS report is:

Adopt (as your) personal credo: The “Safety Ethic”

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
- EHS Virtual Manual, <https://scsapps.unl.edu/VirtualManual/>

4. Horseplay Can Hurt

A recent ‘near-miss/close call’ reported to EHS involved “horseplay” defined as “activities done for amusement.” In a classroom laboratory there was a fire involving

acetone. The instructor had just finished giving safety instruction for an experiment. Students were cautioned that ether and acetone are flammable and volatile so they should not be handled near fire.

One student in the class saw a butane lighter remaining on the bench top from a previous laboratory session. He thought it would be interesting to point the lighter toward the mortar and pestle his partner had just used and which contained acetone. The acetone caught fire, with flames rising quickly and spreading to an adjacent beaker. Fortunately there was not much acetone in either the mortar or beaker so the fire extinguished quickly.

Factors that contributed were:

- The attractive nuisance of a lighter.
- The desire to have some fun while watching flames.

Possible solutions:

- Ensure better clean-up of lab counters from one session to the next so extraneous, potentially hazardous items such as the lighter would not be present.
- Specifically prohibit students from beginning work until the introduction is complete to provide for closer instructor oversight.
- Emphasize that deviation from established procedures and “horseplay” will not be tolerated. This student received a “zero” for the experiment.

This incident very easily could have resulted in student injury and significant property damage. Consider this near-miss and the lessons it provides when instructing students or researchers in your area. Don't let this happen in YOUR lab!

Resources:

- EHS Near-Miss/Close Call Reporter <https://scsapps.unl.edu/EHSNearMissReporter/>
- EHS **Hazards of Flammable Gases, Liquids & Aerosols & Risk Minimization** SOP http://ehs.unl.edu/sop/s-hazards_flam_gases_liq_aeros_risk_min.pdf

5. Revised Safe Operating Procedures

- **Hoists and Cranes** http://ehs.unl.edu/sop/s-hoist_crane.pdf
Added regulatory language including reference to applicable standards and safe operating considerations. The scope of the SOP was broadened to include all stationary cranes and hoists.
- **Packaging and Shipping Hazardous Materials/Dangerous Goods** http://ehs.unl.edu/sop/s-ship_hazmat_dangerousgoods.pdf

Added wording that clarifies the requirements for initial and recurrent training.
Made reference to other SOP's for review and a recommendation to contact UNL's Export Control Office.

- ***Shipping Biological Substances & Patient Specimens***
http://ehs.unl.edu/sop/s-ship_biological_substances.pdf
Added "Patient Specimens" as another type of material that can be shipped.
Included the definition of "Patient Specimens" and instructions on how to package, mark and label these shipments.
- ***Shipping Infectious Substances With or Without Dry Ice***
http://ehs.unl.edu/sop/s-ship_infectious_substances.pdf
SOP contents verified with minor revisions.
- ***Shipping Items With Dry Ice That Are Not Otherwise Dangerous Goods***
http://ehs.unl.edu/sop/s-ship_nondanger_dry_ice.pdf
Added wording about occupational exposure limits of carbon dioxide.

Remember...SAFETY IS AN ATTITUDE!

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