VOLUME 4, ISSUE 1 COLUMBIA UNIVERSITY EH&S Winter 2010

Safety Matters

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FDNY Revises List of Peroxide-Formers *by Juliet Ogbonnaya*

Certain classes of chemicals (ethers, furans) spontaneously form peroxides upon exposure to oxygen in ambient air. Over time, the peroxides will crystallize in proportion to the age of the material. Crystallized peroxides are extremely sensitive and may explode when subjected to friction or shock. Due to the reactive nature of these chemicals, FDNY regulates their storage and handling to reduce the risk of peroxide formation.

Laboratories must safely manage peroxide formers by dating the bottles once opened and discarding them when they reach the end of their allowable storage time; see http://ehs.columbia.edu/Peroxidables.pdf for the FDNY peroxide formers list. Some manufacturers pre-label peroxide-forming chemicals (e.g. diethyl ether, tetrahydorfuran) with an expiration date. These chemicals should be disposed as per the manufacturer's recommendations if their limits are more conservative than the FDNY's.

Recently, **secondary alcohols were removed from the FDNY's list of peroxide formers** and therefore, laboratories are no longer required to note the opening date on containers of 2-Propanol (*aka* isopropyl alcohol, propan-2-ol, isopropanol, IPA) or other secondary alcohols such as 2-butanol and 2-pentanol.

Expired chemicals must be properly discarded by submitting an Online Chemical Waste Pick-Up Form. For any questions, concerns, or assistance, contact the Laboratory Safety Officer for your particular building.

Black-out Curtain Installation *by John LaPerche*

Black out curtains used in laboratories must have the same type of fire protection as those used in places of public assembly, per the NYC Fire Code. Curtains may either be treated with a fire resistant chemical, or made or inherently fire resistant (IFR) material.

EH&S has opted to use the latter approach-IFR curtains. The initial cost is greater, but IFR material provides several advantages. Flame resistance is documented at the time of installation. IFR curtains do not require any fire safety maintenance; as long as they hang, they maintain their fire resistant qualities. A combustible curtain treated with a fire resistant chemical would have to be retreated each time it was cleaned, tested annually and retreated every three years. Each test and retreatment requires new documentation from the vendor resulting in an interruption in lab activities, potential exposure to harmful chemicals, additional time spent on arranging for these services, and additional costs. Once an IFR curtain is installed, records of each curtain's unique ID number and location are maintained by EH&S; a copy is provided to each lab.

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A Review: Research Using Controlled Substances *by Christopher Pettinato*

The acquisition, use and disposal of controlled substances are highly regulated by both the New York State Department of Health (NYS DOH) and the United States Drug Enforcement Agency (US DEA) to prevent their diversion. Among other things, the regulations detail requirements for licensure and registration; detailed recordkeeping; and secure storage.

Columbia's "Policy for Acquisition, Use and Disposal of Controlled Substances in Research" addresses these requirements for *in vivo* and *in vitro* research. The Policy, FAQs and other resources to assist researchers are available at http://www.ehs.columbia.edu/ControlledSubstances.html. This policy does not apply to human subject research.

To purchase, synthesize or use controlled substances, an individual must obtain a license from the NYS DOH and subsequently must register with the US DEA. Typically, the principal investigator (PI) of a laboratory using controlled substances for research obtains the license and registration, and may authorize others within the laboratory to use controlled substances for research. The PI however, retains overall responsibility for meeting all regulatory requirements.

Requisitions for controlled substances must be processed through the Purchasing Department using commodity code 5845 and be accompanied by a copy of a valid DEA registration certificate. Purchases cannot be made by EZ-PO, P-Card, Credit Card or any other method unless approved by Purchasing.

Licensees must maintain complete and accurate receipt, use, inventory and disposal logs, which must be retained for at least five years and are subject to inspection by NYS DOH and US DEA. Record-keeping requirements while significant, are essential in preventing diversion and documenting compliance. Suspected loss or theft of controlled substances must be reported immediately to Public Safety, NYS DOH and US DEA.

Controlled substances must be securely stored in accordance with the regulations. In many cases, a narcotics locker is sufficient to meet security requirements. However, researchers who store larger amounts may need a higher level of security. The University has established a preferred pricing agreement with a local vendor that is available to all researchers.

To assist researchers, the University's Controlled Substances Working Group has created a webpage that includes a number of resources, including the Policy, record-keeping templates, and information on selecting a narcotic locker, http://www.ehs.columbia.edu/ControlledSubstances.html. A Rascal-based training program is available with step-by-step instructions for initiating applications, procuring, recordkeeping, reporting loss or theft, and disposal. Refresher training will be required triennially when renewing a DEA registration.

EQUIPMENT FAILURES AND ACCIDENTS CAN OCCUR ANY TIME OF DAY OR NIGHT. INFORMATION ABOUT HAZARDOUS MATERIALS AND EQUIPMENT IN THE LABORATORY IS CRITICAL FOR ENABLING FIRST RESPONDERS TO SAFELY TAKE APPROPRIATE ACTIONS. ALL DOORS TO LABS AND ENVIRONMENTAL AND EQUIPMENT ROOMS MUST HAVE AN AFTER-HOURS NAME AND **EMERGENCY CONTACT NUMBER** FOR THE PERSON(S) TO BE CALLED IN THE EVENT OF A EQUIPMENT ALARM, SPILL, OR OTHER INCIDENT.

For Lab Fire Safety Prevention tips, check out: FDN(wh)Y Me @ http://ehs.columbia.edu/FDNYMe.html

SMOKE DETECTORS

DID YOU CHANGE YOUR BATTERIES AND TEST YOUR SMOKE DETECTOR? LOCAL FDNY ENGINE 67 WAS PRESENT ON THE CUMC CAMPUS ON OCTOBER 30 DISTRIBUTING 9 VOLT BATTERIES AND REMINDING PEOPLE TO CHANGE THE BATTERIES IN THEIR SMOKE DETECTOR WHEN THEY TURNED BACK THEIR CLOCKS. **REMEMBER, SMOKE DETECTORS SAVE LIVES!**

Get the Lead Out!! *by Ilona Szigethy*

Here's another item to add to your hazardous waste collection - autoclave tape. That's right! Autoclave tape is made with a series of angled stripes (/ / / / /) that appear light beige under normal conditions and darken in the autoclave when exposed to sufficiently high heat and pressure. It is commonly used in many hospitals, clinics, and laboratories to indicate that a package of materials, instruments, flasks, glassware etc. has been sterilized.

In some brands of tape, the color changing compound in the angled stripes contains lead-a harmful environmental pollutant that affects practically all body systems including the central nervous system, kidneys, and blood cells. The lead content in some tapes greatly exceed limits for 'regular' land fill waste. After autoclaving the lead's 'absorbability' by the skin greatly increases due to heat-induced change in the chemistry of the lead component. EH&S is promoting a program to "Get the LEAD Out" by requiring laboratories to purchase lead free autoclave tape and collect and dispose of autoclave tape with lead as hazardous waste. During EH&S's upcoming laboratory inspections starting early in 2010, we will be able to offer a roll of lead free tape in exchange for any unused rolls of leaded autoclave tape. ***Note:*** tape that contains the word "Autoclaved" instead of the angled stripes is lead free.

Some of the most common brands of lead containing autoclave tape (prior to November 2008) are Propper "Canada", Fisherbrand, 3M Comply, and Shamrock. As an alternative, Biostores (on the Morningside campus), Fisher, and VWR now carry "Lead Free" autoclave tape. The best way to determine if your autoclave tape contains lead is always the Material Safety Data Sheet (MSDS).

EH&S Website: http://ehs.columbia.edu

Sodium Hydride Incident and Response *by Kevin McGhee*

Sodium Hydride (NaH) is one of many pyrophoric reagents used in laboratory research. NaH is extremely reactive with water, to the point that the dry powder will often react with moisture in air. Recently a lab worker was weighing a small amount of the dry powder in ambient air when it began to smolder. The reagent was quickly moved to the hood, where it was placed in an inert (nitrogen gas) environment and covered with sand. The lab worker correctly stopped a colleague from using a CO_2 extinguisher, which might have dispersed the material and exacerbated the problem. Quick thinking on the part of the lab staff, as well as their use of available resources from EH&S and experienced faculty, prevented a serious incident from occurring with this pyrophoric material.

As a basic engineering control, pyrophoric solids should only be handled in an inert atmosphere, e.g., in a glove box flushed with inert gas. With sodium hydride specifically, the mineral oil dispersion should be used whenever possible; the dry powder form should only be used in a glove box. Sand should always be kept on hand to use as an extinguishing agent in case of a fire, and lab workers must always wear personal protective equipment when using these materials.

In order to better prepare the university community for such situations, EH&S and the Department of Chemistry co-authored *The Safe Use of Pyrophoric Reagents* http://www.ehs.columbia.edu/pyrophorics.pdf, which was used as a reference guide by the lab staff in responding to this incident. To further emphasize the importance of handling pyrophoric reagents with extreme care and to help familiarize lab workers with appropriate techniques and precautions for handling pyrophoric reagents, EH&S invited a speaker from Sigma-Aldrich to give a lecture on the subject on December 7, 2009. Researchers from multiple departments that use these materials were in attendance.

Special Note: Hydrofluoric Acid (HF) This one of the most hazardous chemicals used in Columbia laboratories. All users must be knowledgeable about specific engineering controls, work practices, and emergency procedure s prior to initiating any activities with HF. See: http://www.ehs.columbia.edu/hfPolicy.html

Small Bytes on Computer Recycling *by James Kaznosky*

Did you know that waste electronic equipment is the fastest growing category of waste in the US? The EPA estimates that in 2008 3.16 million pounds of electronic waste was designated for disposal with about 18% of this material being recycled. Much of the electronic waste stream contains heavy metals, such as lead, mercury, cadmium and other hazardous constituents. One component of Columbia University's continued commitment to environmental protection is focused on computer recycling. For the past decade, Columbia University has been recycling computers and other electronics when they become obsolete.

Waste computers and electronics can often find another "life" through repurposing efforts, whereby this equipment is donated as-is, or is refurbished and donated, providing useful technology to those who otherwise would not have such access. It is important to be aware that before a computer is designated for recycling or repurposing, the end user must ensure that sensitive data are cleansed from the hard drive. Deleting files or reformatting the hard drive will not stop someone intent on recovering private, personal or confidential data. CUIT's "Data Sanitization/Disposal of Electronic Equipment Policy" outlines the procedure for cleansing electronic equipment of sensitive data. CUIT also provides the Columbia community with DBAN http://www.columbia.edu/acis/security/download/, an easy to use program that erases all data from a hard drive. Visit http://www.ehs.columbia.edu/Recycling.html for more information on Columbia's recycling programs.

Depleted Uranium (DU): Civilian and Military Use *by George Hamawy*

Depleted uranium DU (mostly U-238) is the leftover material after removing most of the valuable fissionable U-235 from natural uranium. It is weakly radioactive and the radiation dose from it is about 60% of that from natural uranium. Due to its high density, about twice that of lead, and its low radioactivity, its main civilian uses include counterweights in aircraft, radiation shields in medical radiation therapy machines and containers for transport of radioactive materials with high activity.

The military uses DU for armor plate. Due to its high density and ignitability upon impact with a target, it is also used in armor penetrating military ammunitions, (see below). Several United Nations studies have found that radiation levels close to DU-contaminated events may exceed background levels with highly contaminated zones requiring a cleanup operation, a difficult proposition in a war zone.

Over time following such an event, the contamination normally becomes dispersed into the wider natural environment by wind and rain. Those living or working in affected areas may inhale contaminated dust or consume contaminated food and drinking water. Most of the uranium that enters the body through ingestion is naturally eliminated. Inhaling uranium however, poses a higher risk. The kidneys and lungs are the critical organ in each case. When an individual is believed to have been exposed to high levels of uranium, urinalysis must be performed and dialysis might be needed to eliminate the uranium. Urynal acetate used in electron microscopes at Columbia University is made up of Depleted Uranium where the weight is the same as natural uranium while the radioactivity is much lower. For some high activity sources such as molybdenum generators, depleted uranium is used as a shielding material in transportation and storage.

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Do you have a suggestion for a future *Safety Matters* article? Do you have a comment on something you just read? Please share it with us at , newsfeedback@columbia.edu