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Environmental Health & Safety

Safety Matters

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Resilience by Terrence Jaimungal

Resilience is the ability to withstand, recover and grow in the face of stressors and changing demands[1]. In a workplace where there is rapid and continuous change, EH&S prepares for those stressors and changing demands by continuously building our skill sets. Resilience encompasses the continuous improvement of risk assessments and response procedures and includes a "whole person" concept which requires one to be ready to anticipate, recognize, monitor, and respond to any given situation. Staying strong in all these disciplines allows us to remain resilient when faced with difficult situations. In EH&S, this is more than just a concept, but rather a "culture" embedded within the department.

Deficits in resiliency can lead to mishap, emergency, and even fatality. By emphasizing the skills needed to cope with stressors, EH&S seeks to eliminate preventable incidents caused by complacency, carelessness, or reckless behaviors such as inattention to detail, failure to follow standard operating procedures (SOP's), not using personal protective equipment (PPE), and/or not using engineering controls.

EH&S understand that each person's reactions are not necessarily the same for all changes – that different kinds of changes impact people differently – and that circumstances can vary over time. For example, in relation to indoor air quality, one person's thermal comfort level might be different than their colleague's. The goal, rather, is to create a sense of resilience in individuals and the workplace. Focusing on these underlying issues, can keep Columbia University staff healthy, reduce incidents and promote a safe work environment.

[1] *e-Intake Iowa Air National Guard*

We're Moving by Christopher Pettinato

The Morningside EH&S office is moving from Mudd. Staff will be relocated either to Studebaker or, following renovations, to 419 West 119th Street, just off of Amsterdam Avenue. The fire safety, research safety, hazardous materials and radiation safety personnel will be located at 119th Street while the occupational safety and industrial hygiene personnel re-located to the third floor of Studebaker in January. In the event of a biological, chemical or radioactive material emergency, EH&S personnel will be responding from 119th Street. EH&S's contact number for these services will remain the same: 212-854-8749.

EH&S Announces: Thomas Morgan, PhD, CHP has joined as Chief Radiation Safety Officer and Eugenio Silvestrini as an Assistant Physicist. We congratulate Kevin McGhee on his promotion to Biological Safety Officer.

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New Certificate of Fitness (C-14) Study Material & Renewal Procedures by John LaPerche

With the new New York City Fire Code now in place, the FDNY Certificate of Fitness Unit has updated the study material for the C-14 Certificate of Fitness Exam for Supervising Non-Production Chemical Laboratories. New study material is available on the FDNY website: http://www.nyc.gov/html/fdny/pdf/cof_study_material/new_c_14_st_mat.pdf.

The new study material is 72 pages and far more detailed than the previous material; it explains the differences between the "pre-existing" and the "new" code, increased focus on safety issues, pictures of common laboratory hazards, and tables of permitted amounts of various liquids and gases. All applicants for the new C-14 must be thoroughly familiar with this material in order to pass the test.

Renewals Procedures have also changed. EH&S will continue to process and pay for C-14 renewals. When your Certificate is up for renewal, EH&S will send an email a copy of the New C-14 Study Material and a Renewal Form. In order to be processed, the Renewal Form MUST be emailed, scanned or faxed back to EH&S. If your Renewal form is not received, it cannot be processed. (Please note - you may also receive a Renewal form in the mail from FDNY; these forms can be disregarded because the renewal process will be managed by EH&S) .

Please renew early! Renewals past the expiration date WILL NOT be processed by EH&S. Late fees of $25.00 apply for late renewals and after 1 year, applicants must retake the C-14 test at FDNY Headquarters at Metrotech Center in Brooklyn. For any questions concerning Certificate of Fitness, please refer to the EH&S website or email Fire Safety @ fire-life@columbia.edu

COMPREHENSIVE LAB SAFETY SURVEYS WILL BEGIN THIS SPRING,

FOCUSING ON LAB SAFETY, AS WELL AS COMPLIANCE WITH HAZARDOUS CHEMICAL AND RADIOACTIVE WASTE MANAGEMENT, THE AUDIT PROCESS WILL HELP MAINTAIN A SAFE WORK ENVIRONMENT AND COMPLIANCE WITH THE VARIOUS REGULATORY AGENCIES THAT OVERSEE OUR RESEARCH ACTIVITIES. THIS IS ALSO A GREAT OPPORTUNITY TO CONSULT YOUR RESEARCH SAFETY OFFICER WITH ANY QUESTIONS OR CONCERNS RELATED TO ENVIRONMENTAL HEALTH AND SAFETY IN YOUR LAB.

EPA issues Compact Fluorescent Light Bulb Clean-Up Guidelines by James Kaznosky

Compact fluorescent light bulbs (CFLs) are quickly becoming the preferred replacement for incandescent bulbs; they save both energy and money. One environmental tradeoff to using the energy efficient CFL however, is the presence of up to 4mg of mercury in each lamp. When a fluorescent bulb breaks in your office, dorm, or apartment, some mercury vapor can be released. To minimize exposure to mercury vapor, the EPA has issued guidance addressing cleanup and disposal of broken CFLs.

If a CFL (or any fluorescent lamp) should break, clear the room for 5-10 minutes, open a window, and shut down any window air conditioning units or fans that may be in operation. The broken lamp and visible white powder (mercury and phosphor) require proper cleanup and disposal. The EPA recommends using industrial tape, moist paper towels, and stiff paper or cardboard to aid in cleanup but advises against the use of vacuum cleaners. A sealable container or sealable plastic bag should be used to contain the debris.

- Use the cardboard or stiff paper to corral the larger pieces of glass into the container or

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

Continues next page

bag. Bare hands should never be used to pickup broken glass of any sort.

- Industrial tape, such as duct tape, can be used to pick up the finer particles of glass and powder.
- Use a moist paper towel for a final sweep over the affected area.
- Place all debris in the sealable container and follow the instructions below for disposal.

If the breakage occurred on campus, the debris can be given to Facilities for proper disposal through EH&S. If the breakage occurred in a dorm or in other Columbia University Residential housing, the debris can be given to the superintendent or Columbia Residential Operations Facilities staffing the building for proper disposal through EH&S. For detailed information, including how to handle such situations in non-Columbia settings, please consult the EPA's web page on CFLs, which can be found at: http://www.epa.gov/cfl/cflcleanup.html

Chemical Fume Hoods: Your First and Best Line of Defense

by Brian Anderson

A chemical fume hood (CFH) is an invaluable laboratory engineering control. They are designed to minimize or eliminate lab personnel's exposure to hazardous materials by directing gases and vapors away from the breathing zone and by creating a physical barrier between workers and their processes. CFH's however, are only as effective as the people using them. Safe work practices with a CFH include:

- Lab personnel should not place their upper body in the CFH except during initial setup of equipment inside the hood, before any hazardous materials have been placed inside the hood.
- Hazardous materials and equipment that could be emission sources should be placed at least 6 inches inside the CFH for proper containment of chemical vapors.
- CFHs should not be used for permanent storage of hazardous materials.
- Elevate large pieces of equipment inside the CFH so as to not block airflow through baffle slots in the back of the hood.
- The hood sash or panels should be set at the lowest (comfortable) working height, usually 12". Larger sash openings will reduce the the sash's effectiveness as a physical barrier to spilled or splashed materials and reduce the hood's overall capture velocity so that gases and vapors may not be effectively removed.
- The hood sash or panels must not be removed except for initial experimental setup and before hazardous chemicals are placed in the hood.

EH&S posts each hood with a sticker showing the date of the last air flow certification check. If a hood fails its annual performance test because its face velocity is outside of the acceptable 80-120 ft. per minute flow rate range, it is taken out of service until repaired, and posted with a restricted use notice.

Since CFHs exhaust air without recirculating it, they create a large energy burden. Many CFHs have variable air volume (VAV) controllers which adjust the volume of air that the hood exhausts based on the height of the sash; this allows for less air to be exhausted when the sash is closed. Keeping the sash closed when the hood is not in use consumes less energy by decreasing the lab's need for warm air during winter and cool air during the summer. To find out if you have a VAV hood or if you have other questions relating to work with CFHs, contact the Research Safety Team.

Training = Safety and more

Safety is the primary rationale for EH&S trainings. But for compliance purposes, 'if it's not written down, it didn't happen'. Even if people are doing the right things safety-wise, the inability to document required training participation is a major negative finding that can adversely affect the University's ability to obtain funding or respond to requests for such records during regulatory inspections. See http://ehs.columbia.edu/Training.html for information on training requirements.

Mercury thermometer

In an effort to reduce the quantity of elemental mercury at the Columbia campuses and prevent accidental release of mercury into the environment, EH&S has provided a free mercury thermometer substitution program for the past ten years.

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

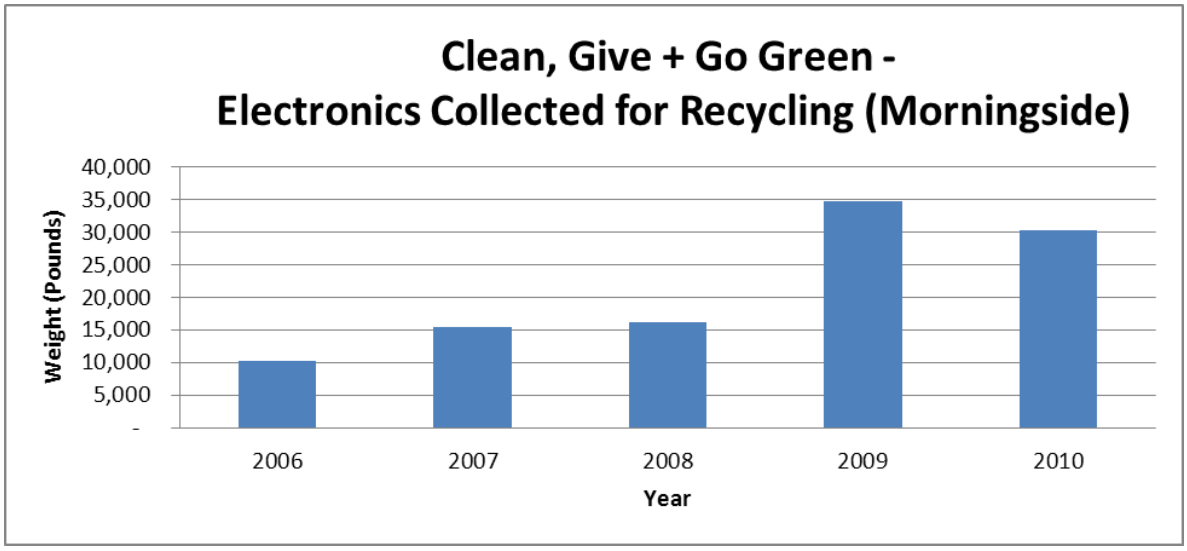
Clean, Give + Go Green by Geraldine Tan

Columbia University's Morningside campus is getting greener each year. How? Its annual Clean, Give + Go Green (CG+GG) recycling and reuse collection event: an innovative approach to campus waste reduction fostering collaboration among departments and partnerships with local charities and recyclers. This free event started in 2006 for the campus community to clean out unwanted items such as furniture, electronics and books. Since then the event has expanded its scope and changed its name from "Clean and Go Green" to "Clean, *Give* and Go Green" when, in 2010, the "Give" component was added to encourage the community to donate clothing, food and household items to local charities.

The three day CG+GG events are held at the start of the fall and spring semesters, giving the campus community an opportunity to properly dispose of unwanted items. Large metal and cardboard containers are staged in the Fairchild courtyard, the Grove and the Lerner walkway. Signs are posted to indicate the location for collection of electronics, furniture, paint, toner, batteries and paper. The 2010 event also included a book swap tent, paper shredding services and donation collection in the Low Plaza. Collected clothing, food, and household items were donated to the local charities New York Cares and the Broadway Presbyterian Church.

The event relies on the support of several campus organizations including Facilities Operations; Environmental Stewardship; Environmental, Health and Safety (EH&S); and Public Safety. Each group contributes expertise in an operational aspect of the event including arranging vendor services, coordinating materials sorting and managing the labor and equipment. Continued success of CG+GG would not be possible without the partnership of these organizations. Staff is on hand to assist with collection and educate donors about recycling.

Over the years, and with the help of the CG+GG program, the **collection of electronics** at Columbia University has grown tremendously. The figure below shows the quantity of printers, servers, monitors, laptops and peripherals (e.g., mice, keyboards and cables) collected during the events. This material was designated "end-of-life" meaning that it could not be used by another organization due to the age or condition of the material. Approximately 100,000 pounds of electronics have been collected in the past five years. All the electronics were submitted to Columbia University's vendor for dismantling into discrete recyclable parts (e.g., metals and plastics). That's about 50 tons of material kept out of landfills.



Myth busters: The truth behind radioactive waste management by Lauren Kelly

MYTH: uncapped, radioactive needles and syringes may be placed in dry solid waste containers because the outer container is rigid and puncture proof. TRUTH: all needles, syringes and other sharps (including pipettes and pipette tips) must be collected in rigid, puncture proof containers, such as empty cell media bottles prior to placing them into dry solid waste collection containers.

MYTH: Coomassie blue and transfer buffer process waste (typically mixed with water, methanol and glacial acetic acid) in a radioactive application may be collected in radioactive aqueous waste container as it's just a color indicator/dye. TRUTH: Coomassie blue when used in an application with radioactive materials is considered a mixed waste (hazardous and radioactive) and must be collected separately from aqueous radioactive liquids. Please consult EH&S if additional clarification is needed regarding the laboratory's radioactive waste stream.

MYTH: lead pigs/lined containers from radioactive materials may be thrown in the regular trash if they were wipe-tested clean. TRUTH: all lead materials must be cleared through EH&S and recycled in accordance with environmental regulations.

MYTH: autoclave or red regulated medical waste bags may be used to collect radioactive waste. TRUTH: clear bags must be used to collect radioactive waste on bench tops and inside the waste collection containers unless the material is potentially infectious. If the laboratory's waste stream is potentially infectious, please contact EH&S for guidance regarding disposal.

MYTH: radioactive waste containers may only be submitted for pickup once full. TRUTH: if the lab is no longer utilizing a protocol that generates radioactive waste, pick-up requests for semi-full containers may be submitted.

MYTH: unwanted check sources may be placed in dry waste containers when no longer needed. TRUTH: Check sources must be discarded separately from all other waste streams in a clear plastic bag and with a radioactive waste label affixed to it for discard through EH&S.

MYTH: cold rooms can be used as radioactive waste storage areas. TRUTH: Radioactive wastes should only be stored in cold rooms if the laboratory process generates wastes that are temperature sensitive. These cold rooms must be assigned as radioactive use areas and on the list of Radiation Safety permitted spaces associated with the PI.

MYTH: cold rooms shared by multiple PIs are not part of the EH&S laboratory clearance procedure. TRUTH: shared cold rooms need to be cleared by EH&S prior to vacating the associated laboratories. Radioactive wastes may not be left behind during the move.

MYTH: fume hoods that are out of service for radioactive materials may be used for chemicals. TRUTH: no materials may be used in malfunctioning hood. Please submit a service request to Facilities.

MYTH: the door signage "Caution Radioactive Material" implies everything in the room is radioactive. TRUTH: door signage is meant to inform emergency responders that radioactive materials may be in use, but that the entire lab and its contents are not radioactive.

MYTH: plastic and glass liquid scintillation vials (LSV) have to be separated by glass or plastic vials. TRUTH: plastic and glass LSV may be comingled in the same collection container independent of the type of vial. Please note, only ^{3}H and ^{14}C wastes may be mixed together, all other isotopes must be separated by isotope and PI.

When in doubt, please contact EH&S with questions regarding radioactive wastes.

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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

Securing Compressed Gas Cylinders by Tasha Hightower

Each week the University is visited by the New York City Fire Department (FDNY) for random laboratory inspections. Unfortunately, week after week laboratories receive Violation Orders (VO's) that are easily avoidable. One of the most common, easily avoidable VOs is written for "Unsecured Compressed Gas Cylinders."

In addition to chemical hazards, including oxygen displacement and the potential toxic effects of the gas contained within the cylinder, the amount of energy resulting from the sudden release of a gas can turn a compressed gas cylinder, for lack of a better term, into a rocket if knocked over or punctured. Furthermore, full-size compressed gas cylinders can weigh nearly 150 pounds, even when empty; more than heavy enough to cause a substantial crush injury. For these reasons, the FDNY and OSHA require compressed gas cylinders to be stored upright and properly restrained at all times! They must be firmly belted or chained to a wall, cylinder cart or rack, or a rigid unmovable structure.

According to laboratory staff, cylinders are sometimes left unrestrained by the vendor during change-outs. However, the lab is ultimately responsible and MUST ensure that cylinders are properly restrained at all times. Environmental Health & Safety recommends that cylinders be checked weekly, whenever a cylinder is in use and immediately after a delivery. In 2009 the Medical Center received 20 violations for "Unsecured Compressed Gas Cylinders". We are pleased to report that this number dropped by 40% in 2010 and with your help and diligence we can ensure that this number is even lower for 2011. **If your lab does not have means to restrain its cylinders, or you anticipate using cylinders in the near future, please contact your campus Facilities Department to place a service request to have restraints installed.**

Radioactive Contamination: Why We Survey by Thomas Morgan

Picture this. Research Safety personnel enter a research laboratory to conduct a routine unannounced inspection. During spot surveys for fixed contamination, a technician finds numerous locations where the Geiger-Mueller counter shows count rates well above background, sometimes exceeding 10,000 cpm. Further surveys find contamination on the responsible investigator's (RI) office desk. Review of radioisotope purchase records indicates the lab recently ordered 5 mCi of I-131 to be used for protein labeling. Conversations with the RI indicate that the radiolabeling was conducted by the RI seven days prior to the survey.

The institution where this event occurred requires individuals who use more than 1 mCi of any radioiodine compound to submit to a bioassay within 72 hr of working with the isotope. A belated survey of the RI's thyroid indicated a dose of 550 mrem to the gland. Further conversations with the RI suggested that his wife should have a precautionery bioassay even though she did not work in the lab. A bioassay conducted the next day indicated a similar amount of I-131 in the wife's thyroid. The couple also had a three-month old infant who was being fed breast milk. A bioassay indicated a dose of 850 mrem to the child's thyroid. It was unclear how the RI's wife became contaminated, but once the I-131 entered her body, it was available in her breast milk.

The Nuclear Regular Commission's standard for such 'above background' exposures is 5,000 mrem per year for those who work with and around radioactive material, and 100 mrem per year for members of the public. In other words, the researcher received 11% of the his annual maximum from one procedure and his wife 550%.

When unsealed sources of radioactive material get out of control, contamination can spread far and wide. The most effective means of controlling the spread of contamination is early detection by frequent surveys of work areas. Individuals working with unsealed sources of radioactivity are required to perform surveys before, during, and after use of radioactive materials (see Columbia University Radiation Safety Policies and Procedures Manual and Columbia University Medical Center Radiation Safety Code & Guide).