Volume 12 Issue 1 COLUMBIA UNIVERSITY EH&S Winter 2018

Environmental Health & Safety

Safety Matters

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Winter is Coming, Prepare Your Laboratory

by Maisha Rahman, Research Safety Specialist

Winter break is filled with holidays and planned time off. Now is the time to plan how the busy season, with possible researcher absences or altered work schedules, will impact laboratory operations.

The motto "never work alone" is of particular importance in a research laboratory. Instituting the buddy system is a great practice to help mitigate hazards, especially during odd work hours. The buddy can help in the event of an emergency by calling for help or assisting in the use of emergency equipment e.g., fire extinguishers, eyewashes or overhead emergency showers.

UNATTENDED LABORATORY OPERATION

AN UNATTENDED LABORATORY OPERATION THAT MIGHT CAUSE A HAZARDOUS CONDITION IF THERE IS EQUIPMENT OR BUILDING SERVICES FAILURE IS INSIDE THIS LABORATORY.

The following hazards or hazardous materials could be present:

Continuously Running Water (e.g., equipment cooling water)		Radioactive Materials		Corrosives (eg. shaker, rocker, rotator containing acid or base)	
In-process Hazardous Material Application (e.g., western blot)		Flammables		Compressed Gasses	
Continuously Energized Magnetic Fields or Electricity		Odorous Substances		Noise Generating Equipment (eg. sonicator)	

Dates Posted are Valid: From: To:

The following people should be contacted in the event of an emergency:

Primary Contact Name:	24-Hour Phone Number:
Secondary Contact Name:	24-Hour Phone Number:

If a hazardous condition is suspected, notify Public Safety immediately!

Morningside	Medical Center	Manhattanville	LDEO
212 854 5555	212 305 7979	212 853 3333	845 365 8822

Special shut off instructions if applicable:

PLEASE E-MAIL A COPY OF THIS SIGN TO LABSAFETY@COLUMBIA.EDU

Another important preparedness measure is the creation of a plan for all laboratory equipment that might be unattended. In one past notable incident, a nitrogen gas cylinder supplying a glove box ran out of gas while researchers were away. No one had been assigned to change out the cylinder; the vacuum pump continued running and the gloves were pulled into the box and inflated. Luckily, this was noticed before the gloves burst, which could have resulted in a chemical spill and loss of valuable samples. Avoid such incidents in your laboratory by discussing unattended equipment in advance and assigning responsibility if equipment must be maintained or checked e.g., switching out gas cylinders. EH&S provides guidelines for unattended equipment operation as well as signage to be posted on the exterior laboratory door. The signage describes the unattended procedure, possible hazards, and contact information for the responsible parties. The sign, as seen above, can be located on the EH&S website at: https://research.columbia.edu/content/unattended-operation-equipment.

In summary, consider the following key safety and preparedness measures during winter break:

- Utilize the buddy system for work with hazardous materials at all times, day or night
- Make a plan for unattended equipment
- Label any continuously running unattended equipment and assign responsibility
- Update emergency contact information on all laboratory doors

When working in the laboratory, eating, drinking or applying cosmetics is prohibited.

Proper work attire (long pants, closed toe shoes) and PPE (e.g., laboratory coat, gloves and eye protection) must be worn when working in the laboratory.

Remember to periodically flush your laboratory cup sinks and floor drains with water to prevent sewer gases from migrating into your laboratory.

Have you seen our new and improved website? https://research.columbia.edu/content/environmental-health-safety

For Lab Fire Safety Prevention tips, check out FDN(wh)Y Me https://research.columbia.edu/content/fdnwhy-me

National Radiation Safety Professionals Week

by Samuel Dindayal, Health Physicist

The National Council on Radiation Protection (NCRP) has declared that November 5-11, 2017 be designated as National Radiation Safety Protection Professionals Week. The weeklong event is to honor and recognize the contributions of radiation safety professionals. Radioactive materials (RAM) and radiation are a vital part of our modern world and radiation safety professionals work diligently to prevent and reduce environmental contamination and personal exposure from such uses. The EH&S Radiation Safety program at Columbia University assists researchers and staff in the safe use of ionizing radiation (RAM and X-ray radiation) and also carries out policies and procedures that protect patients, the general public, and the environment.

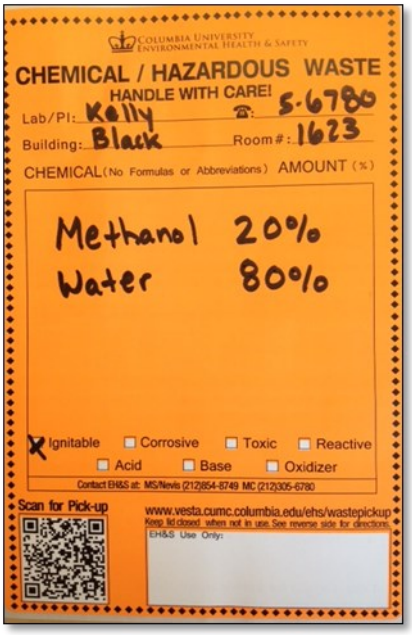
The Radiation Safety program supports the research community in the use of radiation from cradle to grave: from procurement and receipt of radioactive materials, to their safe handling, usage, and storage, and finally to RAM disposal. Additionally, the office monitors workers through the dosimetry badge program to ensure that radiation exposure remains As Low As Reasonably Achievable (ALARA) and assists users in managing RAM operations in compliance with applicable city, state and federal regulations.

Columbia University's Radiation Safety Professionals take pride in their contributions to the safe utilization of radiation in science and healthcare. For more information about services to the Columbia community, visit https://research.columbia.edu/content/radiation-and-laser-safety.

Proper Hazardous Waste Labeling and Container Closure

by Shane Son, Hazardous Materials Specialist

A satellite accumulation area (SAA) is a designated area in a laboratory where hazardous waste is accumulated prior to removal to a central storage location. In late 2016, the Hazardous Materials team concluded a campus-wide SAA survey and found room for improvement in laboratory management of hazardous waste labels and container closure.



Listed below are best practices and requirements to adequately manage the laboratory's hazardous waste accumulation site and ensure a safe and healthy work environment for all researchers and staff:

- Fill out a hazardous waste label to fully list all chemical constituents using common chemical names and nomenclature; there should be no usage of abbreviations or chemical formulas.
- List each chemical constituent to the percentage, heavy metals down to the parts per million range (ppm) or mg/L.
- Hazardous waste containers must be kept closed at all times except when actively adding waste. If using a funnel in the container, the funnel must have a cover that latches closed, or be removed and the container closed after each use.

Accurately filling out the label is crucial to ensure proper end-disposal of the hazardous waste, whether that be landfill, treatment, incineration or recycling. For additional guidance on hazardous waste management, visit https://research.columbia.edu/content/hazardous-waste-management or reach out to a Hazardous Material Specialist at hazmat@columbia.edu.

RFID Chemical Tracking Launches at the Manhattanville Campus

by Fanny Tang, Research Health and Safety Specialist

Effective October 2017, ChemTracker has been activated at Columbia University's newest research facility, the Jerome L. Greene Science Center (JLGSC) at the Manhattanville campus. ChemTracker is a web-based chemical inventory program that tracks chemical containers and links them to important safety and regulatory information. Specific to the Manhattanville campus, ChemTracker utilizes RFID technology to create real-time hazardous chemical inventories. EH&S has compiled an FAQ to inform current and future Manhattanville occupants about this novel technology.

What is RFID? RFID is an acronym for radio-frequency identification. It is a technology that utilizes electromagnetic fields to automatically identify and track objects using an electronically stored information tag (see picture above). RFID technology is popular in transportation (e.g., E-Z Pass transponders), in commerce for tracking various retail products, and even for personal use such as micro-chipping of pets!

How do hazardous chemicals get entered into ChemTracker? Similar to practice at the Morningside campus, hazardous chemicals must be shipped to the loading dock at JLGSC. Manhattanville occupants should pay particular attention to using the appropriate "Ship To" address when ordering hazardous chemicals (see right). Upon receipt at the loading dock EH&S will accept, RFID tag, and enter the lab's chemicals into ChemTracker before same-day delivery to the laboratory.

Columbia University
EHS Loading Dock – c/o "INSERT LAB NAME HERE"
612 West 130th Street
New York, NY 10027

How does a researcher know if they are buying a hazardous chemical? Vendor websites and online catalogs often supply hazard information directly on the product page. If safety information appears on the product page, or one of the GHS pictograms pictured at left is present, then the chemical is considered hazardous and must be delivered to the loading dock for processing. If safety information is not apparent on the product page, purchasers should review the Safety Data Sheet (SDS or MSDS) to check for the presence of a hazard pictogram.

What about other chemicals and supplies? Chemicals and other supplies that do not meet the definition of a hazardous chemical can be delivered directly to the laboratory, and should not be sent to the EH&S loading dock.

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How does the laboratory dispose of chemicals?

To support laboratory sustainability efforts at the JLGSC, clean, uncontaminated glass and plastic chemical containers can be recycled, preventing disposal in landfills or incinerators. In general, empty chemical containers should be rinsed, defaced of their labels, and placed into blue plastic recycling bins provided in the laboratory (see right). When chemical bottles leave the loading dock and the RFID tag is detected, the laboratory's inventory will be automatically updated to reflect chemical containers are no longer in the laboratory. For this reason, DO NOT REMOVE the RFID tag from any containers.

Hazardous chemicals for disposal must be picked up by an EH&S Hazardous Materials Specialist; this includes stock bottles with any solid or liquid chemical contents still inside. Each laboratory is responsible for managing their hazardous waste properly and in accordance with Columbia's 5 Ls of Hazardous Waste Management. Pick-up requests can be accessed here: https://research.columbia.edu/content/hazardous-materials-and-sustainability.

What are the benefits of RFID chemical tracking? Researchers can search for items in their chemical inventory and in the inventories of other research groups within the same building or department. Using the chemical inventory system to share infrequently used chemicals, or to redistribute surplus chemicals, can lead to significant cost savings for all research groups. The program also stores chemical safety information and connects to Columbia's Safety Data Sheet software, ChemWatch. Success in the launch of ChemTracker at Manhattanville may lead to EH&S expanding the use of RFID technology across other Columbia campuses. If there are any additional questions or concerns, reach out to EH&S at Manhattanville via mv-ehs@columbia.edu.

Keep It In the Cabinet - Decontaminate Pipettes at the Point of Use

In the Fall 2017 edition of SafetyMatters, EH&S highlighted the use of bleach to decontaminate tissue culture media prior to disposal. In keeping with the theme of tissue culture decontamination, the following guidance is offered to elaborate on procedures to decontaminate pipette tips and aspiration pipettes (Pasteur and serological) at the point of use, i.e., before removal from the protective biosafety cabinet. Pipette tips and Pasteur pipettes have the potential to cause a percutaneous injury and all pipette types can perforate a red bag. Therefore, they must be disposed of into a sharps container.

Having a sharps container at the point of sharps use, in the tissue culture room, is a good practice but resist the temptation to eject pipette tips and aspiration pipettes directly into a sharps container immediately outside the cabinet. Movement of arms in and out of the cabinet disturbs the protective laminar air flow at the face of the cabinet. Furthermore, the pipettes can drip tissue culture media into the front grille of the biosafety cabinet which will promote mold growth.

When working in the biosafety cabinet, EH&S recommends the following best practices to maintain a sterile environment and properly treat waste pipette tips and pipettes. Place a beaker containing 10% bleach, freshly made from a dated stock bottle less than 6 months of age, inside the biosafety cabinet. Eject pipette tips into the beaker. Aspirate or flush a little bleach through each Pasteur or serological pipette and leave the used pipettes in the beaker with bleach to soak.

Once the last pipette has soaked for 20 minutes, remove the beaker from the cabinet, decant the bleach down the sink, and discard pipettes directly into a sharps container. Working this way ensures that potentially infectious material does not enter the sharps container, nor the open environment of the laboratory. In addition, to reduce the likelihood of percutaneous injury, and exposure to infectious material such as viral vectors, plastic aspiration pipettes should be substituted for glass Pasteur pipettes whenever possible. VWR is one company that sells such pipettes (Cat # 414004-265).

If there are any questions or concerns, contact biosafety@columbia.edu.

Race—Pass by Jon Paul Aponte, Associate Fire Safety Officer

This fall, EH&S Fire Safety completed fire and emergency drills across Columbia's three Manhattan campuses. During these exercises, all participants are reminded of RACE/PASS procedures in case of a real fire as well as how to handle emergency situations. Missed the drill on your floor or building? Listed below are the RACE guidelines:

R - Rescue. Extraordinary heroics are not required, but personnel should be prepared to alert others nearby in the event of a fire or emergency. Emphatically and clearly share the news so as to allow the maximum possible time for egress.

A - Alarm. Near every stairwell and exit door is a red box known as a pull station. These alert first responders that there is an active fire on a particular floor. Always pull that lever if there is a fire on your floor – even if the fire alarm is already sounding.

C - Confine. Confine the fire to as small an area as possible. If the fire is in a laboratory or office, shut the door on your way out. In the event of a fire in your house or apartment, shut the door on the way out, whether it is a bedroom door or main door. Containing the heat and smoke helps ensure that a small fire does not become a larger one, which could endanger more people and property.

E - Extinguish/Evacuate. If you are capable and confident in its operation, a fire extinguisher can be used to attempt to quench the flames. If the fire cannot be controlled with a single extinguisher, shut the door on the way out and exit the building. Always evacuate through the stairs and do not use the elevator.

Fire extinguishers are most useful on small, incipient fires, e.g., trashcans, bench tops and small appliances. Bear in mind that not every fire can be controlled or extinguished with the use of a fire extinguisher. If fire is consuming a large portion of a room, exit immediately in order to maintain your own safety. To operate a fire extinguisher, use PASS:

P - Pull. The safety pin must be removed entirely from the operating lever in order for the extinguisher to function properly. Place the fire extinguisher on the floor, hold it by the cylinder and extract the pin. Take care not to squeeze the lever with the supporting hand, as the pin will be difficult to pull out.

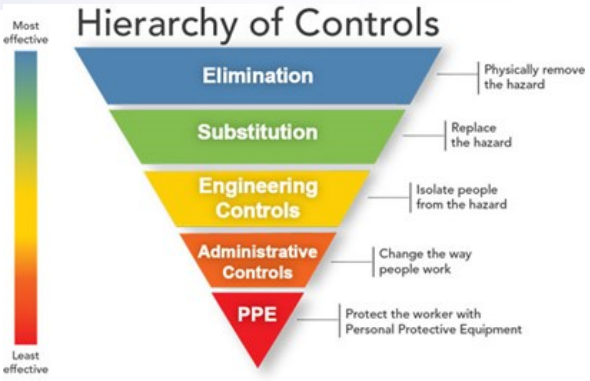
A - Aim. Once the pin has been successfully removed, aim the nozzle at the base or leading edge of the fire. This should help extinguish the combustible material which is the root cause of the fire.

S - Squeeze. Firmly squeeze the operating lever and release the contents of the extinguisher.

S - Sweep. Sweeping the nozzle back and forth over the entire fire ensures that the fire is fully and properly extinguished and reduces the chance of a rekindle.

Spotlight on Safety — Effective Substitutions of Hazardous Chemicals

by Lazlo Virag, Senior Safety Analyst



In the hierarchy of controls, elimination of a hazardous substance or its substitution with a less hazardous one capable of performing the same function is the top-tier approach to reducing the risk of exposure. Dr. Brian Ponnaiya, Research Scientist in the Center for Radiological Research shares with EH&S his approach to making an effective substitution in his laboratory.

EH&S: What prompted you to approach EH&S to discuss chemical use in your research project? What was your expectation?
Dr. Ponnaiya: Our laboratory wanted to use 2-chloroethyl-ethyl-sulfide, a highly toxic semi sulfur-mustard. The goal of the study was to examine the induction of micronuclei (a measure of DNA damage) following exposure to that chemical. Given the toxicity of the compound and not having any experience with using it, we wanted to be very cautious in our approach. One of our first actions was to contact EH&S during the initial planning of the experiments. We were expecting some guidelines to ensure that the experiments were conducted in the safest possible manner.

EH&S: EH&S suggested to substitute your choice of chemical with a less hazardous one. What did you make of that recommendation?
Dr. Ponnaiya: We welcomed the suggestion to use chlormetine, a nitrogen mustard (utilized in some chemotherapeutic agents). We discovered it is a less hazardous chemical than 2-chloroethyl-ethyl-sulfide. EH&S presented us with two different compound options but made the case that chlormentine would serve our purposes best. Further discussion led to investigation of the literature, and we determined that it was a suitable substitute and decided to proceed with the recommendation. In no way was the suggestion an intrusion by EH&S; we welcomed the idea of using a less toxic chemical. We were indeed surprised that rather than simply suggesting that we look for a less hazardous chemical, EH& provided a specific chemical compound, chlormetine. This choice proved to be a very good, and far less toxic, substitute.

EH&S: How would you describe your experience working with EH&S to set up the safest possible way of carrying out your experiments with chlormetine?
Dr. Ponnaiya: It was a pleasure to work with EH&S during the entire process. We welcomed their initial suggestion of using chlormetine as well as the continued support we received during the course of planning the experiments. In particular, Roberto Velez and Laszlo Virag from EH&S were absolutely committed in ensuring that the experiments were conducted safely, including checking our engineering controls, whilst maintaining our scientific goals.

EH&S would like to thank Dr. Brian Ponnaiya for partnering with Research Safety in finding an acceptable substitution for a toxic chemical in his research. EH&S can assist laboratory personnel in evaluating chemical hazards to identify candidates for substitution. Reach out to labsafety@columbia.edu to begin the discussion.

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Please share questions or comments with us at newsfeedback@columbia.edu

Vision Statement

Environmental Health & Safety (EH&S) provides expert guidance and timely service to the University Community through our commitment to health and safety. Employing best practices and collaboration, and by building long term relationships, we promote a productive and safety conscious work environment.