IN CASE YOU HAVEN'T "HERD"

Tufts University
Environmental Health & Safety

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Preventing and Responding to Laboratory Accidents

By Peter J. Nowak

Lab accidents can come in a wide variety of forms including chemical spills, chemical exposures, fires, explosions, cuts, trips, slips, and falls. Other possible issues could be an animal bite or exposure to a contaminated specimen or tissue. The steps taken prior and during an accident can be the difference between a lesson learned and a trip to the hospital for a potentially serious injury.

The first step in preventing accidents and injuries in a lab is:

1. Know the Hazards!

Before you start to work in a lab your supervisor should ensure you are familiar with what you will be working on. For example if you are going to be conducting experiments that involve phenol, you should read the MSDS for phenol. Know what the risks are, what personal protective equipment (PPE) you need to wear, and especially how to react if an accident occurs. In the case of phenol, it is extremely caustic and can cause severe burns. If you spill it on your clothing, remove the clothing and activate the safety shower. Rinse for at least 15 minutes and seek medical advice.

2. Prepare to React!

Accidents happen. Many times they can be prevented, but this is not always the case. Training can provide some sense on how to respond if something should go wrong. Tufts Environmental Health and Safety (TEHS) offers on-line training for general emergency response and lab safety. This can be accessed at: http://publicsafety.tufts.edu/ehs/downloads/EH&SLearnCenterOnlineInstructions.pdf

In general, if a spill or small lab fire should occur, do not panic. If it small and manageable and you have had training to either clean up the spill or extinguisher training for the small fire then it is ok to attempt. If for any reason the chemical is highly toxic or you do not think you can manage a small fire do not put yourself at risk. Evacuate, get others out and contact the Campus Police at 6-6911.

3. Focus on Prevention!

Although I have listed this last, it is the most important aspect of laboratory accidents. Using secondary containment when moving a chemical can prevent the spread of a spill. Keeping lab floors and benches clear and uncluttered will help reduce the risk of an accident occurring. Wearing PPE, such as gloves, lab coats and safety glasses will reduce the risk of bodily injury. Keeping flammable materials away from open flames such as Bunsen burners will prevent lab fires. Using common sense to make prudent and sound judgments if an emergency should arise could go a long way to minimizing injury and damages.

"The steps taken prior and during an accident can be the difference between a lesson learned and a trip to the hospital for a potentially serious injury."

Inside this issue:

What? More Inspections!

By Stephen R. Larson, TEHS Director

The primary purpose of laboratory safety inspections is to assist the laboratory staff at identifying hazards and implementing reasonable control measures. Tufts EHS makes every effort to schedule and plan inspections to minimize interference with experiments, meetings and other important laboratory activities. Inspections also document the significant efforts of laboratory staff to comply with codes, regulations and safety policies and allow Tufts EHS to provide useful information to regulatory agencies.

Another goal of inspections is to help prepare the lab staff for inspections by one or more regulatory agencies.

Unfortunately, these agencies can inspect our laboratories at any reasonable time (they define reasonable!): fire safety, radiation safety, chemical safety, and hazardous waste inspections can occur at any time.

While annoying to all, inspections should be viewed as an opportunity to demonstrate Tufts strong commitment to providing a safe workplace for its faculty, staff and students.

What Does ALARA Mean?

By Geoffrey C. Sirr Jr.

How many times have you heard the acronym ALARA mentioned at either a radiation safety training session, Radiation Hazard Control Group (RHCG) meeting or an audit / inspection conducted by your friendly Radiation Safety staff member? Most of us quickly think; "I know what that means; ALARA stands for as low as reasonably achievable." Typically, that is the end of it and we move onto something else.

Besides trying to ensure that occupational and public exposure to radiation is kept as low as reasonably achievable (ALARA) and complying with regulatory requirements, is there anything else that should be added or known about the ALARA concept?

Once a philosophy, and now regulation, ALARA is the core concept of any Radiation Safety Program. ALARA applies to all radiological situations that can give rise to personal dose including both occupational and public exposures to direct and indirect radiation from either radioactive materials, or radiation producing machines. "Licensees are required to make every reasonable effort to maintain radiation exposures, and releases of radioactive materials in effluents to unrestricted area, as low as reasonably achievable."

Dose limits are well defined in the Department of Public Health regulations (105 CMR 120.00) and are set to protect individuals from deterministic effects and unacceptable stochastic risk.

Tufts ALARA program incorporates administrative controls (e.g. ALARA I level = 125 mrem) to monitor radiation exposure and is overseen by the Radiation Hazard Control Group. Radiation dose limits are 10% of the established occupational regulatory limits, assigned to monitor individual radiation dose and to ensure exposures remain ALARA. Committee members meet on a quarterly basis to review the Radiation Safety Program performance and identify areas within the program that could be further developed or improved.

ALARA is promoted by:

1. Providing appropriate training for workers to enhance Radiation Safety awareness.

2. Posting and labeling accordingly to alert personnel to the presence of potential radiation hazards.

3. Providing appropriate facilities and equipment to contain radiation and radioactive material including shielding, engineered containment, engineered protective equipment, specified handling tools and personnel protective equipment.

4. Investigating deficiencies, conducting audits and radiological assessment to determine areas for improvement

5. Drafting radiological safety procedures or SOPs and reviewing existing policies or procedures for effectiveness

6. Radiation Safety tracking the performance of the Radiation Safety Program in RHCG minutes or metrics

More information concerning the Radiation Safety Program is detailed within the Radiation Safety Manual located at:

http://publicsafety.tufts.edu/ehs/downloads/TUSMRules&Mode-

Identifying the Infrared or UV Laser Beam

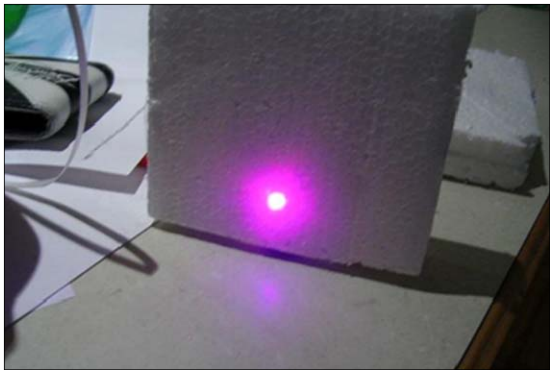
By Geoffrey C. Sirr Jr.

Special tools or materials are often employed by individuals during the beam profiling stage. This is often the case when dealing with infrared or ultraviolet bandwidths. Unlike with visible light, materials such as fog or smoke or even the unaided eye provide the essentials for quickly picking up the beam profile or stray radiation energy. However, with additional effort, and more sophisticated tools, profiling and characterization of non-visible spectra is a snap. Tools and equipment are readily available to purchase via the internet.

Sensor cards or viewing cards are inexpensive and provide beam identification for both ultraviolet and infrared laser light (Wavelength coverage from 200 nm to 1700 nm) and provide a low -cost alternative to an infrared viewer. If your budget allows, infrared viewers are very useful for nominal hazard zone (NHZ; the space within which the level of direct, reflected, or scattered radiation may exceed the applicable maximum permissible exposure) assessment and provide users the capability to characterize the direct beam and / or the surrounding work environment. It is important to continually evaluate your environment for stray radiations from intense light sources to ensure inadvertent exposures to students, employees or visitors are avoided.

Personal protective equipment is required for anyone entering the NHZ. Protecting your eyes from class 3B or IV laser radiation is afforded by wearing eyewear specifically engineered to the laser wavelength and intensity of the direct or scattered laser beam. Safety eyewear is required by regulation to be properly marked or engraved to include the wavelength and optical density value.

The purpose of defining the NHZ is to establish an area in which control measures are required. Contact the Tufts EHS Laser Safety Officer @ 617-636-3450 for assistance in determining the NHZ and for recommending the appropriate control measures for your environment.



Flammable Storage in Refrigerators and Freezers

By Shaun W. Savage

A number of laboratory explosions and/or fires throughout the country have been caused from improperly storing flammable (flashpoint less than 100°F) chemicals in standard household or laboratory refrigerators and freezers. In the event a container breaks or leaks, the combination of fuel (flammable liquid or vapor), oxygen and an ignition source (equipment electrical components such as thermostat, lights, fans and compressors) can result in an explosion. Most often the intensity of this explosion coupled with the location (laboratory) results in personal injury and extensive property damage.

To minimize the risk of explosions and/or fires from storing flammable chemicals in standard household or laboratory refrigerators and freezers personnel should ask themselves these questions

1. Do I have flammable chemicals stored in a refrigerator or freezer?

2. If Yes, Do I need to have a flammable chemical stored in a refrigerator or freezer? Would use of an ice bath prior to use be sufficient in achieving a certain temperature?

3. If a refrigerator or freezer is needed, is it a Flammable Proof/ Resistant or Explosion Proof refrigerator or freezer? If unsure, such equipment will have signs prominently posted on the door.

If there is a need to store flammable chemicals in a refrigerator or freezer, it is imperative that the laboratory purchase a Flammable Proof/ Resistant or Explosion Proof refrigerator or freezer. Such equipment provides different levels of protection by eliminating an ignition source. Flammable Proof/Resistant equipment accomplishes this by eliminating potential ignition sources inside of equipment. Explosion Proof equipment provides an additional level of protection by eliminating ignition sources inside and outside of equipment. This level of protection is aimed towards high hazard environments and is usually not necessary for standard laboratories but is still acceptable.

If a laboratory needs assistance in determining whether a refrigerator or freezer is sufficient for their storage needs please contact Tufts EHS at 617-636-3615. For information on approved vendors and pricing please contact Purchasing at 617-627-3225.

"Do I need to have a flammable chemical stored in a refrigerator or freezer?"

Internal explosion within a standard refrigerator/freezer. Note the force caused both doors to become unhinged

Fire Extinguisher Training

By Wayne G. Springer

The Fire Marshal's office has been providing portable fire extinguisher training to faculty, staff and students throughout the three campuses for the past two years. The *Bullex Intelligent Training System*™ is a revolutionary live-fire extinguisher training simulator. The I.T.S. senses where the trainee aims and sweeps the air pressurized water *SmartExtinguisher*™ and automatically varies the flames in response to the trainee's actions. This allows the trainee to learn how to effectively and safely use a portable fire extinguisher on a SMALL fire. The I.T.S. electronic control system responds to the trainees' actions, extinguishing the fire only when the trainee demonstrates the proper technique of slowly sweeping the water spray at the base of the flames. The system provides a realistic and engaging training experience.

The training sessions are available, weather permitting, April through October and take about 45 minutes for a group of 20.

If you would like to schedule fire extinguisher training for a group of 6-20 people, just email the Fire Marshal @ wayne.springer@tufts.edu or call the office at 617-627-3922.

Biosafety Cabinet (BSC) Annual Certification

By Kimberly Parker

The Biosafety Cabinet (BSC) is a key piece of equipment used frequently in labs working with infectious agents. The primary function of a BSC is to contain infectious aerosols generated by certain procedures such as vortexing, pipetting, opening containers after centrifuging, sonication, and aspiration. A High Efficiency Particulate Filter (HEPA) located within the cabinet removes all airborne particles allowing for clean air to be exhausted back into the lab and into the cabinet's work space. When used correctly, the BSC performs three primary functions:

1. Personnel protection.

2. Product protection.

3. Environmental protection.

The Biosafety Cabinet must be tested and certified on an annual basis to ensure it is functioning properly. Covino Inc. is Tufts University service provider for the Boston and Medford campuses, and B&V Testing provides service on the Grafton campus. A monthly schedule is provided below indicating what month each building is due for annual testing and certification. Each building will be posted with a more detailed schedule approximately 2 weeks in advance.

October: Arnold and M&V

November: 200 Boston Ave, Anderson, Dana/Barnum, Michael/Pearson

January: Jaharis

March:
Boston - Animal Care Facility, Dental, South Cove, HNRC ,
Medford - Bray/Lane Hall, Jackson/Talbot, 4 Colby Street, 200, 490, 530 Boston Ave,
Grafton - All

April: Stearns

In preparation for this testing, TEHS would like to remind everyone of some key points regarding the use of a Biosafety Cabinet. More detailed information on the safe use of a Biosafety Cabinet can be found on the TEHS website at: http://publicsafety.tufts.edu/ehs

- Storage of material within the BSC should be kept to a minimum.
- All surfaces of the BSC must be disinfected at the end of each experiment or in the event of a spill. We also recommend disinfection prior to beginning your work.
- The Biosafety Cabinet is designed to be running 24 hours per day. If your work practice includes turning the BSC off when not in use, be sure to run the cabinet for 5-10 minutes before beginning your experiments and after completion of the work. Any particulates within the BSC will be filtered during this time.
- The sash must be kept at the predetermined height to ensure protection. If the sash is raised too high, an audible alarm will go off indicating to the user the sash must be lowered. Never override this alarm.
- Do not obstruct the grill at the front or back of the BSC. Material should be at least 4 inches from the grill at the back of the BSC.
- Hazardous chemicals and radioactive material should never be used within a BSC.
- The use of open flames (Bunsen Burner) is not only a fire risk but the heat from the burner will disrupt the air flow which is key to providing protection. We recommend using electric incinerators or disposable inoculating loops.

New England Regional Biosafety Laboratory

By Julien M. Farland

The New England Regional Biosafety Laboratory (NE-RBL) is a 41,000 square foot facility dedicated to the study of existing and emerging infectious diseases. Scientists within the NE-RBL will conduct research to develop therapeutics, vaccines, and diagnostic tools in a safe, secure, regulatory-compliant environment.
The NE-RBL was inspected by the Centers for Disease Control in January of 2010 and the NE-RBL was added to the Cummings School's Select Agent Registration. The Town of Grafton's Board of Health Agent and Biomedical By-law Consultant inspected the NE-RBL and provided the Cummings School with a permit to operate the NE-RBL. The Tufts Cummings Institutional Biosafety Committee has approved a request from a researcher to do tuberculosis research at the NE-RBL. Future infectious disease work at the RBL will also be reviewed by that committee.
The NE-RBL is available to regional investigators—including scientists from academia, not-for-profit organizations, industry and government—requiring biosafety level 3 (BSL3) laboratories and or animal accommodations. All work must be in compliance with applicable federal and university regulations. The laboratory is located in Grafton Science Park, adjacent to the campus of the Cummings School of Veterinary Medicine at Tufts University, in North Grafton, MA.
The NE-RBL is able to serve investigators that require:

- BSL3 aerobiology and insectary capabilities;
- small animal models, including rodents, rabbits, birds and piglets;
- a high- security facility to perform work on Select Agents;
- veterinary skills and support services;
- Good Laboratory Practice (GLP) compliant studies; and

NE-RBL investigators at the Cummings School, members of the Division of Infectious Diseases, have expertise in the biology, pathogenesis, immunopathology, pathophysiology, transmission, prevention, treatment and diagnosis of enteric infections and toxin-mediated diseases associated with food and water-borne diseases. Consultation and collaboration with Division scientists is available to support the work of outside investigators.
The New England Regional Biosafety Information Summary includes this and other information about the mission and capabilities of the facility. Information is also available at http://www.tufts.edu/vet/ne-rbl/
For more information about the New England RBL and how it can assist in your research, contact:

Saul Tzipori
NE-RBL Director
508.839.7955
Saul.Tzipori@tufts.edu

Upcoming Trainings

http://publicsafety.tufts.edu/ehs/

Boston

2010

10-05-10: New Employee Orientation (NEO) and OSHA Bloodborne Pathogens (BBP) Training; 9:30-11:30am
10-18-10: Biosafety in Research Laboratories Training; 9:30-11:30am
10-19-10: Introduction to Radiation Safety Training; 9:00-11:00am
10-19-10: NEO & OSHA BBP Training; 9:30-11:30am
10-20-10: IATA/DOT Shipping Training for Dangerous Goods; 1:00-3:30pm
11-02-10: Biosafety in Research Laboratories Training; 1:00-3:00pm
11-02-10: NEO & OSHA BBP Training; 9:30-11:30am
11-15-10: Biosafety in Research Laboratories Training; 1:00-3:00pm
11-16-10: Introduction to Radiation Safety Training; 9:00-11:00am
11-16-10: NEO & OSHA BBP Training; 9:30-11:30am
11-30-10: NEO & OSHA BBP Training; 9:30-11:30am
12-08-10: IATA/DOT Shipping Training for Dangerous Goods; 1:00-3:30pm
12-14-10: NEO & OSHA BBP Training; 9:30-11:30am
12-21-10: Introduction to Radiation Safety Training; 9:00-11:00am
12-28-10: NEO & OSHA BBP Training; 9:30-11:30am

2011

01-11-11: NEO & OSHA BBP Training; 9:30-11:30am
01-18-11: Introduction to Radiation Safety Training; 9:00-11:00am
01-20-10: Introduction to Laser Safety Training; 9:30-11:30am
01-25-11: NEO & OSHA BBP Training; 9:30-11:30am
02-08-11: NEO & OSHA BBP Training; 9:30-11:30am
02-15-11: Introduction to Radiation Safety Training; 9:00-11:00am
02-22-11: NEO & OSHA BBP Training; 9:30-11:30am
03-08-11: NEO & OSHA BBP Training; 9:30-11:30am
03-15-11: Introduction to Radiation Safety Training; 9:00-11:00am
03-22-11: NEO & OSHA BBP Training; 9:30-11:30am
04-05-11: NEO & OSHA BBP Training; 9:30-11:30am
04-19-11: Introduction to Radiation Safety Training; 9:00-11:00am
04-19-11: NEO & OSHA BBP Training; 9:30-11:30am

Medford

2010

10-19-10: Introduction to Laser Safety Training; 9:30-11:30am
11-03-10: Introduction to Radiation Safety Training; 9:00-11:00am
11-17-10: Biosafety in Research Laboratories Training; 10:00-12:00pm
12-01-10: IATA/DOT Shipping Training for Dangerous Goods; 10:00-12:30pm
12-16-10: Introduction to Laser Safety Training; 9:30-11:30am

2011

01-06-11: Introduction to Radiation Safety Training; 9:00-11:00am
02-17-10: Introduction to Laser Safety Training; 9:30-11:30am
03-03-11: Introduction to Radiation Safety Training; 9:00-11:00am
04-21-10: Introduction to Laser Safety Training; 9:30-11:30am

Grafton

2010

10-04-10: Introduction to Radiation Safety Training; 9:00-11:00am
10-25-10: Biosafety in Research Laboratories Training; 10:00-12:00pm
11-09-10: IATA/DOT Shipping Training for Dangerous Goods; 10:00-12:30pm
11-18-10: Introduction to Laser Safety Training; 9:30-11:30am
12-06-10: Introduction to Radiation Safety Training; 9:00-11:00am
12-14-10: Biosafety in Research Laboratories Training; 1:00-3:00pm

2011

02-07-11: Introduction to Radiation Safety Training; 9:00-11:00am

03-17-10: Introduction to Laser Safety Training; 9:30-11:30am
04-04-11: Introduction to Radiation Safety Training; 9:00-11:00am

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Highlights in Future Issues
(We welcome your input)

- What is Annual Lab Safety Training?
- All About the Learning Center
- Eye Protection - Preventing Injuries (Not Just in the Lab)
- 2010 Occupational and Non-Occupational Injuries
- Autoclaving Biohazardous Waste - What You Need To Know

http://publicsafety.tufts.edu/ehs/

Tufts Environmental Health and Safety Directory

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Stephen R. Larson 617-636-2193
Biosafety Officer (*Grafton*)
Julien M. Farland 508-887-4483
Biosafety Officer (*Boston*)
Kathleen Joseph 617-636-0964
Environmental Health and Safety Specialist II
Thomas H. Kelley 617-636-0477
Assistant Fire Marshal
Richard Mullane 617-627-3922
Industrial Hygiene & Occupational Safety Specialist
Peter J. Nowak 617-627-3246
Biosafety Officer (*Boston/Medford*)
Kimberly Parker 617-636-2919
Health Physicist/ EHS Specialist II
Christopher G. Rock 508-887-4556
Supervisor of Safety and Environmental Protection
Shaun W. Savage 617-636-0397
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Wayne G. Springer 617-627-3922
Administrative Assistant
Natalie A. Viernes 617-636-3615

TEHS Online Features

http://publicsafety.tufts.edu/ehs/

- Accident Reporting Forms
- Biological Safety
- Chemical Safety
- Contact Us
- Environmental Management
- Ergonomics
- Fire Safety
- Indoor Air Quality
- Information Links
- Laboratory Safety
- Newsletter
- Radiation Safety
- Reporting Concerns
- Research and Laboratory Safety Guide
- Safety at Home
- Shipping Chemicals and Biologicals
- Special: Floods, Water and Mold
- Training
- Workplace Safety