UNIVERSITY OF TENNESSEE

Safety First

VOLUME 2, ISSUE 1
FALL 2001

The information in this newsletter has been provided by Pamela Massey, Department of Environmental Health and Safety

Importance of Labeling Containers and Hazardous Waste

Why, might you ask, are we in the Department of Environmental Health and Safety (EHS) so particular about how you label containers and waste in your laboratory? Hopefully this little column will at least partially answer that question.

Unknowns

Nearly every laboratory contains at least one container of something (usually, but not always, water) that does not have a label on it. But, you know what it is, right? But then, you graduate/transfer/retire and whoever moves into the lab has no idea what is in that container, so they set it aside in a corner for several (maybe 10-20) years. Then, someone decides to clean out the lab and comes across this container with no label. Not knowing what it is, they bring it to us. Since it could be almost anything, there is great risk in opening this container to test it (and since DOT regulations require that no unknown chemicals may be shipped, it must be identified). Because of the risks (some chemicals are explosive or highly toxic), there is a hefty charge to have unknowns identified. The University spent over $70,000 last fiscal just identifying unknowns, not including the cost of shipping them. This could have easily been avoided, had laboratory personnel simply put a label on every container, regardless of the contents or container size. Many of these unknowns that came to us were water, but many were not. So when we fuss about unlabeled containers in your laboratory, humor us and label them, we fuss with good reason.

Hazardous Waste

There are many EPA and DOT regulations, which govern how hazardous chemicals and waste, are labeled. Some of these regulations include:

1. Hazardous chemical waste must be labeled with an approved yellow waste label (these are available through the EHS office).

2. All chemical constituents must be included on the label. These must be chemical names. Formulas, trade names, chemical structures and abbreviations are not acceptable.

3. The date must be on the container when it becomes full or is moved from the lab to the waste room or taken to a waste pick-up. Storage cannot exceed 90 days from this transfer date.

4. Do not store dated waste in your lab. After it becomes full, date it and remove it from the lab at the very next opportunity.

(Note: using the smaller string tags to label your waste does not eliminate the necessity of putting a date on the label.)

For more detailed information on how to properly label your hazardous waste, please see our web page at http://web.utk.edu/~ehss/guidelines.htm.

Questions Every Laboratory Worker Should Be Able To Answer

Who is your Chemical Hygiene Officer?

Where is your Chemical Hygiene Plan?

To what chemicals are you exposed?

Where can copies of the Material Safety Data Sheets (MSDS) for those chemicals be obtained?

What are hazards associated with these chemicals?

How do you protect yourself from these hazards?

SPECIAL POINTS OF INTEREST:

- *Weekly chemical waste pickup for Walters Life Science Building: Wednesdays, from 1:00-2:00 pm. The waste room is located on the second floor, outside the hallway where compressed gas cylinders are stored.*
- *Weekly chemical waste pickup for Science and Engineering Research Facility: Wednesdays, from 2:00– 3:00 pm. Room # 207-B (on the loading dock)*
- *To schedule a safety seminar for your department or lab, call EHS at 4-5084*

If you need a lab checkout, please schedule it a week in advance.

Respiratory Protection in the Laboratory

There are several kinds of respiratory protection available for use in the laboratory. Probably one of the most widely used devices is the chemical fume hood. Always check the chemical fume hood to make sure it is operable before using. Do not use if the blower is not working. Perchloric acid should only be used in specially designed perchloric acid hoods. Hazardous chemicals should never be used in biological cabinets or laminar flow hoods, as these vent back into the room.

Another commonly used device is the dust mask. Dust masks are not to be used to protect against chemicals that give off vapors, but rather are strictly to protect against particulates. They are useful when working with lightweight, powdery substances. They are also helpful when handling items, which cause an allergic reaction. Dust masks must not be used where the oxygen concentration is lower than 19.5%.

Also found in some laboratories are half-face and full-face respirators. There are many requirements to wearing a respirator. Among the requirements are that the personnel must be properly fit-tested and trained in the use of the respirator. Without a fit-test and proper training, the respirator may fail and the health or life of the individual wearing the respirator could be in immediate danger. There are several things that the user must know before donning a respirator. Among these is the concentration of oxygen. Respirators do not generate oxygen (unless you have an atmosphere-supplying respirator which will have an attached oxygen tank). The hazard must be known and the proper cartridges selected. The concentration of the substance in the air must be known. The IDLH (immediately dangerous to life and health), maximum PEL (permissible exposure limit), and STEL (short-term exposure limit) must be known. If you are asked to use a respirator and are unsure how to find the answers to all these questions, you have the right to refuse until you are properly trained. Also, a respirator over facial hair will fail the positive and negative pressure tests and will not offer the proper level of protection against hazardous chemical vapors. Call EHS at 974-5084 or see http://web.utk.edu/~ehss/resp/respirat.htm for more information on respirators and training.

What You Will Find on the EHS Web Page

The Department of Environmental Health & Safety has a great web site loaded with lots of useful information. This website is located at: http://web.utk.edu/~ehss/The home page provides information regarding our mission statement, our organizational structure, a listing of the primary services provided and contact information of EHS personnel. In addition, there are links to various other health and safety related sites including where to find MSDS.

There is information regarding the various programs offered by EHS which include: Arsenic Control Program, Bloodborne Pathogen Program, Campus Safety Manual, Chemical Hygiene Program, Emergency Contingency Plan, Emergency Response Plan, Eye and Face Protection Program, Flame-Resistant Clothing Policy, Hazard Communication and Right-to-Know, Hearing Conservation Program, Heat Stress Policy, Lead Awareness Program, Respiratory Protection Program, and Safety and Health Plan for Employees.

Under the heading of “Topics,” you will find copies of all editions of this newsletter in .pdf format, as well as Eye Safety, Fall Prevention for Office Workers, First Aid for Eye Injuries, First Aid for Heat Stress, First Aid for Hypothermia, Guidelines for Handling Hazardous Chemical

Waste, Hand Safety, Hand Tool Safety, Hazardous Waste Minimization Basic Practices, How Noise Affects Hearing, Lifting Awkward Loads, Lifting Basics, Mechanics of Lifting and Ergonomics Information.

There are also several training modules, which can be used to comply with yearly training requirements. The training modules currently available are: Bloodborne Pathogens, Compressed Gas, Fire Extinguisher, and Hazard Communication.

All of the information on this website is there for your benefit. Please make use of it. Also, feel free to contact us if you have any questions about the content of our website or if you have suggestions for our website.

Inspections

Thanks to the efforts of several EHS personnel and to many laboratory faculty, staff and students, the University avoided some stiff penalties last summer during a routine state inspection. While this inspection was the first in several years, we are supposed to be inspected annually. We all need to keep on our toes to prevent potential future fines, which will likely be charged to the individual department in which the problem occurred. Also, there is more than one agency that is required to inspect the University, so we should always be expecting a state inspection. On another note, with this last inspection, we were given 30 days to correct any problems before the inspector returned for a follow-up inspection. We can, however, be fined on the spot, if the inspector so chooses, so we must be ever vigilant in keeping our laboratories ready for state or federal inspectors.

Eye and Face Protection

Did anyone ever tell you how wonderful your eyes are? I'm not suggesting anything unprofessional here. What I mean is, eyes are remarkable organs that permit you to see the things around you. They are intricate in design and very delicate. They are easily irritated and injured. Dust and other objects hurt your eyes, and chemicals burn them easily. Many eye injuries result in permanent damage, such as partial or total loss of vision in one or both eyes. This is serious stuff, and it's why you must use eye and face protection routinely.

Selection criteria. How do you know what type of eye protection is appropriate for the hazards you encounter? Each lab has different hazards. Will one type of eye protection work for everyone? The American National Standards Institute (ANSI) published recommendations for safe practices and selection of proper types of eye and face protection for various hazards. This publication is known as ANSI Z87.1. OSHA recognizes ANSI's expertise, and in its own law, makes these "recommendations" into requirements.

Eye and face protection meeting ANSI approval, and complying with OSHA, has the following markings on the lens or frame: "ANSI Z87.1"; and an identifying mark of the manufacturer — usually a trademark or initials. This is important for two reasons. It will

help you if you're involved in selecting new equipment, and it will help you decide which particular device is suitable.

Prescription lenses. The device must fit comfortably (within reason) over prescription glasses. Otherwise, the prescription lenses should be built into the protective device and comply with the Z87.1 Standard. Let's face it; eye and face protection won't help you if you can't see!

There are several types of devices available for each type of hazard. This helps because all employees are not created equal. No two people can wear the same device exactly the same way and get exactly the same protection, except perhaps identical twins. But some people may be uncomfortable with a particular style, perhaps because their nose is too big or too small for a proper fit. If you are having a similar problem with your goggles, ask your supervisor for a different style.

Common laboratory hazards that require the use of eye and face protection:

1. **Chemicals and chemical splashes**. Goggles that fit snugly to your face and leave little or no space for liquids to pass through are required. Eyecup goggles, like old-fashioned pilot's goggles, have two lenses. Each lens fits securely over an eye; hence the name "eyecup." They may look strange, but they won't let chemicals reach your eyes. Goggles with soft frames are very effective. Many models are large enough to fit over prescription glasses. The flexible frame makes a good seal because it adjusts to the contours of your face. Goggles need ventilation to cut down fogging — splash-resistant goggles is required to have hoods or caps over the vent openings to prevent splashes from getting inside. Using appropriate goggles, without adequate splashguards, is dangerous. Chemicals may get trapped inside the goggles near your eyes.

2. **Flying particles** are usually generated from glassware when a reaction gets carried away. Most types of safety glasses with side shields or goggles will provide protection. For light-duty, or low-risk work, any approved glasses with side shields will do. Goggles suitable for chemical splashes are also acceptable for flying particles and are preferred in situations where chemicals may be mixed with the glass particles.

Acids, bases, and other corrosive materials:

Approved safety goggles provide adequate protection against most chemicals, but they leave your face exposed. They alone will not protect you from chemicals that may cause severe burns on contact. Face shields protect your entire face. Some models reach the chest to provide additional protection for the neck. Face shields come in an assortment of thick nesses, sizes and materials. They protect against most types of splashes and even flying particles. However, a shield is a secondary form of personal protective equipment

(PPE). It can still have gaps or spaces between its edge and your face and chest. It doesn't take much for a splash or a piece of glass to find the right angle and pathway to reach your eyes. Whenever you use a face shield, wear goggles or safety glasses under it. When used with a shield, safety glasses with side shields are considered adequate protection for most chemical splashes. Some newer face shields have goggles built into them. Your supervisor, or the manufacturer's instructions, will tell you if they are safe to use without additional protection.

Taken from *Laboratory Safety Pocket Guide*, Paul Mercier, Genium Publishing Corp. Schenectady, NY 1996.

Do You Know the Hazards of the Chemicals You Work With?

Substance
Ethidium bromide
(Dromilac, homidium bromide)
CAS 1239-45-8

Formula
$C_{21}H_{20}BrN_3$

Physical Properties
Dark red crystals
mp 260 to 262 °C
Soluble in water (5 g/100 mL)

Odor
Odorless solid

Major Hazards
Potent mutagen

Toxicity
Acute toxic effects from exposure to ethidium bromide have not been thoroughly investigated. Ethidium bromide is irritating to the eyes, skin, mucous membranes, and upper respiratory tract.
Although there is no evidence for the carcinogenicity or teratogenicity of this substance in humans, ethidium bromide is strongly mutagenic and therefore should be regarded as a possible carcinogen and reproductive toxin.

Flammability and Explosibility
Ethidium bromide does not pose a flammability hazard (NFPA rating = 1).

Reactivity and Incompatibility

No incompatibilities are known.

Storage and Handling

Ethidium bromide should be handled in the laboratory using the "basic prudent practices" described in Chapter 5.C. Because of its mutagenicity, stock solutions of this compound should be prepared in a fume hood, and protective gloves should be worn at all times while handling this substance. Operations capable of generating ethidium bromide dust or aerosols of ethidium bromide solutions should be conducted in a fume hood to prevent exposure by inhalation.

Accidents

In the event of skin contact, immediately wash with soap and water and remove contaminated clothing. In case of eye contact, promptly wash with copious amounts of water for 15 min (lifting upper and lower lids occasionally) and obtain medical attention. If ethidium bromide is ingested, obtain medical attention immediately.

In the event of a spill, mix ethidium bromide with an absorbent material (avoid raising dust), place in an appropriate container, and dispose of properly. Soak up aqueous solutions with a spill pillow or absorbent material.

Disposal

Excess ethidium bromide and waste material containing this substance should be placed in an appropriate container, clearly labeled, and handled according to your institution's waste disposal guidelines.

The information in this LCSS has been compiled by a committee of the National Research Council from literature sources and Material Safety Data Sheets and is believed to be accurate as of July 1994. This summary is intended for use by trained laboratory personnel in conjunction with the NRC report *Prudent Practices in the Laboratory: Handling and Disposal of Chemicals*. This LCSS presents a concise summary of safety information that should be adequate for most laboratory uses of the title substance, but in some cases it may be advisable to consult more comprehensive references. This information should not be used as a guide to the non-laboratory use of this chemical.

To find information like this on other commonly used laboratory chemicals see:
http://www.hhmi.org/research/labsafe/lcss/lcss.html

EMERGENCY NUMBERS

Environmental Health & Safety - 974-5084
UTIA Safety Officer - 974-1153
UT Police - 974-3114
Knox County Emergency - 911
Poison Control Center - 1-800-288-9999
Health Department / East Tennessee Regional Office - 546-9221
Food & Drug Administration - 545-4601
American Red Cross - 1-800-564-1234

University of Tennessee

Environmental Health & Safety
916 22nd Street
Knoxville, TN 37916

Phone: 865-974-5084
Fax: 865-974-0094

Email: pjmassey@utk.edu
Gbritten@utk.edu
jpayne7@utk.edu
susan@utk.edu (UTIA only)

If a job or project cannot be done safely, it should not be done