



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

## Common Problems Seen in UT Laboratories During Routine Building Inspections

**Uncapped or unsecured compressed gas cylinders** - When compressed gas cylinders are not secured or capped, the valve is vulnerable to damage. If this happens, the pressure inside the cylinder can cause the cylinder to become a missile powerful enough to go through a block wall. They can also cause serious injuries to any person who happens to be in the path. Another hazard associated with compressed gas cylinders is the potential for suffocation, poisoning or fire if there is a leak. Compressed gas cylinders must always be chained to a secure object (such as a wall or laboratory bench), and must remain capped at all times when the cylinder is not in use.

**Incompatible Chemicals stored together** - Many chemicals can react with each other to cause dangerous situations, either fire or toxic or poisonous fumes. For example, oxidizers should never be stored near flammable chemicals or combustible materials. Some acids are oxidizers (nitric acid and perchloric acid). Corrosives (such as acids and bases) should never be stored near chemicals that contain cyanide or other chemicals that may release poisonous fumes. If you are unsure of the compatibility of chemicals, please refer to your MSDS.

**Unlabeled containers** - When containers are left unlabeled, it can cost the University a great deal of money. The last fiscal year, identification of unknowns alone cost the university over \$70,000. This can easily be prevented if laboratory personnel will simply labeling every container in the lab, even if it only contains water. Many of the unknowns that must be identified are water. DOT regulations specify that unknowns cannot be shipped, so they must be identified. Labeling all containers also makes it easier and safer for new laboratory personnel and visitors to the lab.

**Out of date door placards** - Door placards are required to be updated yearly. In many cases, this will only involve checking the information to make sure it is still accurate and then changing the date. If any information is incorrect, it must be changed and then the date changed. If you need new door placards, please notify EHS at 4-5084. The purpose of the door placards are to notify emergency personnel of the potential

hazards within each laboratory. Please be sure to fill them out accurately. If there are no hazards in your laboratory, please note that on the door placard.

**Improperly labeled waste** - There are several problems with improperly labeled waste. Waste cannot be shipped off campus without a proper shipping name (this means no abbreviations, no pictures and no formulas). Also, the University was inspected by the state last year. The inspector was looking at hazardous waste. Things the University was cited for included improperly labeled waste (chemical names not written out), no waste label (must be the yellow and red waste label from our office), open waste containers, containers labeled “waste” and waste stored over the maximum of 90 days (do not date your waste until the container is full, then get it to EHS). If you need information on how to properly label your hazardous waste, please visit and bookmark our website at: <http://web.utk.edu/~ehss/guidelines.htm>

**Improperly stored PPE** - Personal Protective Equipment cannot properly protect you from hazardous chemicals if they are dirty. Eye protection and respirators must be stored where they will stay clean. Preferably in a drawer or cabinet in their original wrapping to keep dust and chemicals off of them. Eye protection should also be washed periodically to ensure there is no chemical residue. Any personnel who have not had proper training in their use should not use respirators. Personnel are also required to be fit tested annually in order to use respirators (full or half-face).

**Eyewash covers off** - The eyewash stations that are located in each laboratory are there for your protection. It is in your own best interest to take care of them. The time to flush them out and make sure they are clean is not when you have an emergency. They should be turned on and flushed weekly by laboratory personnel and the covers should remain on the eyewash to ensure that no chemicals, dirt or debris gets in the eyewash. If you have an emergency, whatever is in the eyewash is what you will be squirting into your already damaged eyes. For your safety and eyesight, make sure it is only clean water.

**Safety showers obstructed** - As with the eyewash, the time to evaluate your safety showers is not when you have an emergency. Many times, the area below the safety shower is cluttered with boxes, equipment or furniture. When you have an emergency, you will not have time to push these items aside. The area underneath the safety shower must remain clear at all times. Also, the maximum height for the handle for the safety showers is 69 inches from the floor. Everyone in the laboratory must be able to reach the handle.

**Extension cords running across walkways and through ceilings** - This common practice creates a fire hazard and a trip hazard (in the case of cords across walkways). If extension cords need to be run across walkways, they should be protected to prevent tripping, or from insulation being worn off by being stepped on. If cords must be run through the ceiling, contact your building maintenance personnel to install permanent wiring. Also, when extension cords are not in use, they should be unplugged to prevent shocks.

**Damaged electrical cords on equipment** - This is seen very frequently in laboratories. It usually occurs on older equipment where the plug is attached to the cord, or where the cord is attached to the equipment. It poses a fire and shock hazard. If you have a piece of equipment that has damaged insulation on the electrical cords, please contact the equipment service personnel for your department. Electrical tape is not an acceptable repair. Also, on older equipment that has fabric-insulated electrical cords, these should be replaced whether or not they are damaged.

**Obstructed electrical panels** - Electrical panels that are located in laboratories (and sometimes in corridors) are often obstructed with laboratory furniture or equipment. These panels must remain accessible at all times. There are times when maintenance personnel must access these panels.

**Obstructed fire extinguisher** - Many laboratory fires can be doused quickly by using the fire extinguishers provided by EHS. However, when laboratory personnel place furniture or equipment in front of the extinguisher, it can make it very difficult to reach the extinguisher, or to remove it from the bracket. Never place items in front of the extinguisher in a way that inhibits quick and easy access to it.

**Aged chemicals** - Many laboratories contain chemicals that are very old and unusable. Since most laboratory personnel will simply order fresh chemicals anyway, older chemicals should be disposed of. Older chemicals, many times, are broken down, have become dangerous, or have absorbed water and are no longer safe or practical to use. If your laboratory contains chemicals that are no longer used because they are old, please contact EHS for disposal.

**Improper storage of chemicals** - Large quantities of flammables should be stored in a flammable cabinet. Flammables should never be stored in a refrigerator that is not approved for flammable storage. Always follow manufacturer's storage instructions to insure that your chemicals will not undergo dangerous decomposition, or will not be stored with other chemicals that are incompatible.

### 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?

## Coming Soon!

EHS is currently in the process of developing a chemical exchange program. This program will enable you to look at a list of available chemicals online, contact us, and acquire these chemicals free of charge. Also, if you have unopened chemicals in your lab, you will be able to contact us to add them to the list rather than these unopened chemicals being added to the waste stream. When this program is up and running, we will contact your chemical hygiene officer with the details.

## Storage of Hazardous Chemicals in the Laboratory

**General Guidelines**—Label all chemical containers appropriately. Place the user's name and the date received on all purchased materials in order to facilitate inventory control of the materials. Provide a definite storage place for each chemical and return the chemical to that location after each use. Avoid storing chemicals on bench tops, except for those chemicals being used currently. Avoid storing chemicals in laboratory hoods, except for those chemicals being used currently. Store volatile toxics and odoriferous chemicals in a ventilated cabinet. Provide ventilated storage near laboratory hoods. If a chemical does not require a ventilated cabinet, store it inside a closable cabinet or on a shelf that has a lip to prevent containers from sliding off in the event of a fire, serious accident, or earthquake. Do not expose stored chemicals to heat or direct sunlight.

**Flammables**—All nonworking quantities of flammable liquids should be stored in storage cabinets listed by Underwriters Laboratories or approved by Factory Mutual or in a designated flammable liquids storage room with suitable fire protection, ventilation, and spill containment trays, and with equipment meeting the requirements of OSHA. In either storage arrangement, the flammable liquids should be segregated from other hazardous materials, such as acids, bases, oxidizers, and such. Do not store paper, cardboard, or other combustible packaging material in a flammable liquid storage cabinet.

**Peroxide-Forming Chemicals**—If stored or handled improperly, chemicals that can form peroxides, may be explosive. The following guidelines should be observed if these chemicals are stored in the laboratory or elsewhere: Label peroxidizable compounds with the date they were opened. Store peroxidizable compounds away from heat sources and light. Do not use metal containers since some metal oxides can promote the formation of peroxides. Use proper antioxidant inhibitors. [*Note:* the inhibitor may be consumed with time, making the compound again sensitive to peroxidation.] Test peroxidizable materials for peroxides every 3 months using test paper strips (diethyl and diisopropyl ether should be tested on a monthly basis). If the test strip is positive, the material should be treated to remove the peroxides or it should be discarded. [Call EHS for disposal.]

**Oxidizers**—Mineral acids, including those recognized as strong oxidizers such as nitric acid, perchloric acid, and sulfuric acid, should be separated from flammable and

combustible materials. Such mineral acids should be stored in separate rooms, separate cabinets, or break-resistant containers if large glass bottles must be stored in proximity of combustible materials. For prevention of oxidation of wooden storage shelves (or corrosion of metal shelves), acid-resistant trays or mats should be provided under bottles of nitric, perchloric, and sulfuric acids. Oxidizers should be stored to avoid contact with incompatible materials such as ordinary combustibles, flammable liquids, greases, and other materials, including other oxidizers, that could react with the oxidizer or catalyze its decomposition.

**Toxics**—The following precautions should be taken when storing toxic substances: Store chemicals known to be highly toxic (including carcinogens) in ventilated storage in unbreakable, chemically resistant secondary containers. Keep quantities at a minimum working level. Label storage areas with appropriate warning signs, such as CAUTION! REPRODUCTIVE TOXIN STORAGE or CAUTION! CANCER-SUSPECT AGENT STORAGE and limit access to those areas.

**Highly Reactive Substances**—Consider the storage requirements of each highly reactive chemical prior to bringing it into the laboratory. Consult the MSDS or other literature in making decisions about storage of highly reactive chemicals. Bring into the laboratory only the quantities of material you will need for your immediate purposes (less than a 3- to 6-month supply, the length depending on the nature and sensitivity of the materials). Label, date, and inventory all highly reactive materials as soon as received. Make sure the label states, DANGER! HIGHLY REACTIVE MATERIAL! Do not open a container of highly reactive material that is past its expiration date. Call EHS for disposal. Do not open a liquid organic peroxide or peroxide former if crystals or a precipitate present. Call EHS for disposal. Segregate the following materials: - oxidizing agents from reducing agents and combustibles, -powerful reducing agents from readily reducible substrates, -pyrophoric compounds from flammables, and -perchloric acid from reducing agents. Store highly reactive liquids in trays large enough to hold the contents of the bottles. Store perchloric acid bottles in glass or ceramic trays. Store peroxidizable materials away from heat and light. Store materials that react vigorously with water away from possible contact with water. Store thermally unstable materials in a refrigerator. Use a refrigerator with these safety features: -all spark-producing controls on the outside, -a magnetic locked door, and -an alarm to warn when the temperature is too high. Store liquid organic peroxides at the lowest possible temperature consistent with the solubility or freezing point. Liquid peroxides are particularly sensitive during phase changes. Store particularly sensitive materials or larger amounts of explosive materials in explosion relief boxes. Restrict access to the storage facility. Assign responsibility for the storage facility to one primary person and a backup person. Review this responsibility at least yearly.

**Sources:** Handbook of Laboratory Health and Safety, 2nd ed., R. Scott Stricoff and Douglas B. Walters, John Wiley & Sons, Inc. New York, 1995.  
Safe Storage of Laboratory Chemicals, Ed. David A. Pipitone, John Wiley & Sons, New York, 1984.

Prudent Practices in the Laboratory, National Research Council, National Academy Press, Washington, D.C., 1995.

## **TO VENT OR NOT TO VENT: FLAMMABLE STORAGE CABINETS**

Quick! Should all flammable storage cabinets be vented? Is venting required for all flammable storage cabinets? Most people would guess that the answer to both questions is yes. The question often arises when manufacturers build vents into their cabinets. If the cabinet has vents, then the cabinet should be vented. Right? And, if the vents are opened, or the bung plugs removed, then the cabinet is vented. Right? Not necessarily, but if you said yes, you are not alone.

Venting a flammable storage cabinet is not necessary according to the National Fire Protection Association (NFPA). According to NFPA Code 30 A-4- 3.2 "The storage cabinet shall not be required by this code to be vented for fire protection purposes, and vent openings shall be sealed with the bungs supplied with the cabinet or with bungs specified by the cabinet manufacturer."

Venting a cabinet incorrectly can compromise the ability of the cabinet to protect its contents from fire. If the integrity of the cabinet is compromised because of incorrect venting procedures, hazardous fumes can escape and create a dangerous scenario. Proper room ventilation with adequate air exchanges usually eliminates the need to ventilate cabinets.

Some state and local jurisdictions require the venting of flammable storage cabinets. Your local Fire Marshal can tell you whether local and state codes allow, recommend or require venting. Venting is only allowed or recommended with strict provisions. According to NFPA A-4-3.2: "If vented, the cabinet should be vented from the bottom with make-up air supplied to the top. Also, mechanical exhaust ventilation is preferred and should comply with NFPA 91, standard for the Installation of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying. Manifolding the vents of multiple storage cabinets should be avoided."

You can find more information regarding the NFPA Code 30 at the National Fire Protection Association Web site. Go to: <http://www.nfpa.org>.

To learn more about storing flammables in the workplace, see EZ Facts document #180, NFPA30: A Guide to Flammable and Combustible Liquids. Just click on [www.labsafety.com/refinfo/ezfacts/ezf180.htm](http://www.labsafety.com/refinfo/ezfacts/ezf180.htm)

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## **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 EH&S at 4-5084*
- • *If you need a lab checkout, please schedule it several days in advance.*

## **NEW ADDITION TO EHS!**

The Environmental Health and Safety Department is pleased to have Greg Britten join us as our new Health and Safety Specialist. If you have hazardous waste questions or concerns, or you need to schedule a pick-up of your hazardous waste, please contact Greg at the EHS office, 4-5084.

## **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

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<http://web.utk.edu/~ehss/>

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