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**Chemical
And
Radiation
Protection**

Lab Safety

Spectrum

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UW - Madison Safety Department Chemical and Radiation Protection
30 N. Murray St. 262-8769 <http://www.fpm.wisc.edu/safety>

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Security

I thought I could update you on things you have heard about and try to summarize conclusions.

The Chancellor asked the UW Police Chief, Sue Riseling, to help him assess the security of laboratories which contained large quantities of extremely hazardous substances. The Chief attempted to qualify the potential risk from hazardous materials abuse using a tiered approach where Tier 1 would be the substances which, if misused, posed the greatest threat to our community and Tier 5, essentially common substances. The Chancellor also requested that deans from the major research areas (e.g., Graduate School, Medical School, CALS, L&S, etc.) query their faculty and staff in regard to these tiers.

While the definitions applied to the various tiers may have been somewhat vague and confusing (after all, most labs have compounds which, by their very nature, have been defined as hazardous), the concept was to have persons from Safety cull the data and select substances and research labs which would bear further investigation. Then UW Police Department security experts would audit the facilities and discuss findings and recommendations with the appropriate dean and PI. This is happening in a few very critical areas, but it would take many months to do campus-wide.

But, you already know about security. Madison neighborhoods have "Neighborhood Watches." You probably don't leave home without "securing" your home. You lock your car when you are shopping. It is unfortunate that this same awareness often is not carried over to the lab. In reality, who would want to steal your chemicals when there are computers, walkman/diskman, wallets, watches, etc. left out for the taking? For most labs to reduce the risk of loss or theft, all that is needed is basic security and one of the key elements of "basic" security is awareness.

Most labs are like a family-oriented neighborhood. Workers are familiar with each other and those in labs around them. Many rooms and items of equipment are shared. Being aware then is not just recognizing who belongs, but also what belongs. Some chemicals can deteriorate with age and may become dangerous. Some compounds may have been made by persons long gone from the lab. Labs should have an inventory and containers should be checked at least annually. Make sure all containers are labeled and dated with a point of contact. The Safety Department collects wastes from labs weekly; call for a pick-up of unwanted compounds.



When you leave your lab, consider locking the door. A general rule of thumb: "If you are going to be out of the room for longer than 10 minutes and the room is empty, you should lock the door." If you are moving hazardous compounds from room to room, consider using a cart. That way, if the door is locked, you will not be at risk for dropping your compound while unlocking the door.

The Safety Department and UW Police post emergency response phone numbers near every phone. In an emergency (see the October, 2001 newsletter), assess the emergency situation and notify the appropriate agency (e.g., 911, UW Safety). Remember, safety is everyone's responsibility.

Material Safety Data Sheets (MSDS)

You have probably heard your co-workers mention MSDS. You may have even seen them. Your PI or Lab Manager probably showed you where your lab's MSDSs are kept or how to find them on the Internet. But, how many of you have actually looked at an MSDS? The next two newsletters will look at these "Safety Data Sheets" to discuss how the information is maintained, what it means, where to go for additional information.

The MSDS has all the information about a compound -- its hazards, physical and chemical characteristics, routes of entry into the body, first aid measures, health and physical hazards, everything you need to know to work safely with the compound or respond to an emergency. Though no specific format is mandated for MSDSs, they must contain certain information. One of the more common formats used with MSDSs is the 16-section ANSI-approved format. In our example, we will reference Sigma Chemical Co.'s Hydrochloric acid, CAS #: 7647-01-0 product #: H1758.

Section 1. Chemical, Product and Company Identification

This tells the name of the chemical as it appears on the container label and on the lab's Hazardous Chemical Inventory. The name on the MSDS will always be the same as the name on the container label.

This section also provides the manufacturer's name, address, and phone number and there may be an emergency phone number for quick response.

Section 2. Composition, Information on Ingredients

This tells exactly what is hazardous in the chemical. The chemical is identified by both its common and scientific name. If it is a chemical mixture, all hazardous components will be listed by their percentage. The substance's Chemical Abstract Services (CAS) Registry number is also given here. Thus, hydrochloric acid, or HCL has a CAS # 7647-010-0 and is also known as hydrochloride, hydrogen chloride, muriatic acid, and spirits of salt (to name a few).

If appropriate, chemical exposure limits are also given here. Section 2.6a of the *Chemical Safety and Disposal Guide* discusses the various standards and regulations governing chemical exposure. Legal limits for many chemicals are established by OSHA and are called Permissible Exposure Limit (PEL). Recommendations by the American Conference of Governmental Industrial Hygienists (ACGIH) are called Threshold Limit Values (TLV). Both the PEL and TLV specify the maximum amount of exposure a worker can have to a substance averaged over an 8-hour workday, usually in parts per million (ppm) or milligrams per cubic meter (mg/m³). In general, a chemical listed at 2 ppm is more hazardous than one listed at 200 ppm.

Other terms used by the ACGIH include: Short Term Exposure Limit (STEL), the maximum concentration most workers can tolerate for a 15-minute exposure period with a maximum of 4 periods a day with at least 60 minutes between exposure periods without adverse effects; Ceiling Limit (CL), the exposure limit never to be exceeded; Time Weighted Average (TWA), the average length of exposure that most workers can tolerate over an 8-hour workday. Thus, if the MSDS shows "8-hr TWA: 50 ppm," then this exposure level should not be exceeded when averaged over an 8-hour workday. If it shows "STEL: 100 ppm," this level should not be exceeded over a 15-minute continuous exposure.



Section 3. Hazard Identification (see box for HCL)

This section first describes the material's appearance and odor and secondly provides important information and concerns for emergency responders. Because this describes the chemical's normal appearance and odor and defines how the chemical will behave when it is released, it is important to both workers and emergency responders. Workers are expected to be trained in recognizing a chemical's hazard.

The health effects section tells the different ways the material may enter the body: inhalation (breathing), ingestion (swallowing) and direct skin and/or eye contact. It then goes on to list the actual health hazards including acute effects that show up immediately after an exposure and chronic effects that develop over time often following prolonged exposure. If the material is a carcinogenic or cancer-causing (confirmed or probably) substance, it must be stated.

Signs and symptoms are also noted in Section 3. Because of individual susceptibility, these can be many and varied. For example, they may range from minor skin irritation to chronic lung disease.

Some materials may harm a "target organ" such as the heart, liver, lungs, etc., and such information is included. Additionally, exposure to certain chemicals may aggravate a pre-existing medical condition.

Thus, sickness and even death from improper exposure can be prevented if workers are aware of the potential hazards before using a chemical.

Section 4. First Aid Measures

Even with the best training, accidental exposures may occur. In order to initiate medical treatment, one must first recognize the signs and symptoms of an exposure. Remember, some signs and symptoms may be non-specific and, even with a comprehensive medical history, unless one is aware of a certain chemical cause, may be overlooked.

In an acute exposure, the first few minutes may mean the difference between a minor injury and a major injury. Our September newsletter discussed emergency response. This part of the MSDS provides clear instructions, including antidotes for poisoning and care of the victim. If evacuation to emergency treatment is required, persons should bring a copy of the MSDS so ER persons will know exactly what they are treating.

HCL
Toxic
Toxic by Inhalation
Causes burns
Irritating to the Respiratory System
Toxic if Inhaled
Causes Burns
In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)
May develop pressure

If swallowed, wash out mouth with water provided person is conscious, call a physician
If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.
In case of skin contact, flush with copious amounts of water for at least 15 minutes, remove contaminated clothing and shoes, call a physician
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes, assure adequate flushing by separating the eyelids with fingers, call a physician



Radiation Dosimetry Service

Leola DeKock, the Health Physicist who had been processing requests for radiation dosimeters, has taken a position with the State's Radiation Protection Bureau. Until a replacement is hired, there will be no single person assigned her job. Two items to think about:

1. Whom to call: the Safety Department ONLY processes applications for dosimetry and history requests. The Medical Physics Department is responsible for the devices themselves. If your question concerns the badges / monitors, contact Medical Physics (5-3858). If you want to add a worker, remove a worker, etc., contact Safety.
2. How to communicate: The best way to communicate with dosimetry at UW Safety is to send an eMail to

dosimetry@fpm.wisc.edu

This will be answered promptly (within 24 hours). You may also leave a voice message at 2-9180, but telephone messages leave more room for misunderstanding.

Training Schedule – February - May

Chemical and Radiation Protection offers training classes. The Chemical Safety training class begins at 9:30 on the same day as the Radiation Safety training class which begins at 12:30. The training schedule from 1 February through 30 May (all classes are held at Union South) February 7, 13, 19, 25; March 7, 13, 19, 25; April 5, 11, 18, 23; May 9, 15, 21, 29; There is no sign-up; merely show up on one of the scheduled class dates. Booklets and schedules can be picked up at Room 19, Biochemistry from 11 - 2:30. The quiz used to document training is given the last hour of the class and usually begins about 11 AM for Chemical and 3:15 PM for Radiation. For a complete schedule, see our web site.

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