Environmental Health & Safety Newsletter

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An Avoidable Tragedy

Excerpted from Occupational Hazards
August 1997

That summer day last August probably started out the same as many others for Dartmouth professor Karen Wetterhahn.

A world-renowned research chemist, she was working on a project to examine the effects of heavy metals on processes such as cell metabolism and the transfer of genetic information.

During a transfer procedure conducted under a fume hood, a drop, maybe two, of the rare toxic compound dimethylmercury spilled onto her latex gloves. In that instant, as the solution permeated the gloves and entered her body through her skin, Wetterhahn became a participant in her own experiment.

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Inside This Issue

Hand Protection

Need Gloves?!!?

Debora Bell
Hazardous Materials Specialist

Gloves will usually go "hand-in-hand" with the type of job or work being done. A great deal of glove selection depends on the work that you are doing and the lengths of time it takes to complete the task. For example, welders use leather gauntlet type gloves to protect their hands and lower arms from hot metal work. Workers using petroleum solvents might need neoprene or nitrile type gloves.

The science industry uses all types of gloves to protect against harsh chemicals or other agents and substances. The best method of determining if you need gloves is to search the instrument or machinery operator manuals or material safety data sheets for any physical or health hazards indicating the need for skin protection. If there are any comments that some form of skin protection is required, then you need gloves. If you are lucky, the publications mentioned above will provide the type of glove that is recommended.

Gloves are designed to be temperature resistant, abrasion or cut resistant, chemical resistant, or only need to keep your hands clean. Gloves are available in a variety of sizes, lengths, thickness, felt lined or powdered, and with or without cuffs. Once you determine what type of work is being done, you can begin the proper glove selection.

In choosing the proper glove, it is important to answer the following questions:

- What physical hazards or environmental elements are you protecting your hands from?

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Mercury attacks the central nervous system. By January, Wetterhahn was losing her balance. Her speech was slurred and she was having trouble seeing and hearing. She was diagnosed with mercury poisoning, her blood containing 80 times the lethal dose. Three weeks after the diagnosis, she lapsed intoa coma from which she would never wake. Karen Wetterhahn died of acute mercury poisoning on June 8, 1997.

Her death has caused many researchers to question if their current methods of hand protection are adequate. John S. Winn, Ph.D., chairman of Dartmouth's chemistry department said the tragedy has "opened the eyes" of many university researchers.

According to the Occupational Safety and Health Administration, all academic institutions need to make their scientists aware of the limitations of disposable gloves. Disposable latex and PVC gloves were not developed for use with hazardous or otherwise aggressive chemicals.‡

Hand Protection

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- Do my wrists and arms need protection?
- Is there a potential for liquids to travel up the sleeves?
- Is there a restriction on particle contamination when using lined or powdered gloves?
- Do you require better sensitivity and dexterity? If so, then unlined gloves are preferred.
- What is my glove size? Take a tape measurement of your hand around the palm. This is your glove size. Most gloves come in small, medium and large sizes.

Glove	XS	S	M	L	XL
Hand	6-7"	7-8"	8-9"	9-10"	10-11"

All personal protective equipment (PPE) has limitations. When selecting glove types, it is recommended that you determine the time frame limitations for that particular glove. Most chemical resistant gloves have a limit in minutes for breakthrough. Ask your safety supplier to provide you with a glove selection guide that lists all the chemicals you will be using.

Other limitations include thickness. Don't think that if you wear two layers of gloves that you will get double the protection. Here are some other general rules to consider:

- LATEX – Good for most alcohols, aldehydes, mild acids, or mild bases. Not good for petroleum based compounds, aromatics, chlorinated solvents or strong oxidizers.
- PVC – Good for bases, alcohols, oil products, 30% ammonia, 30% chromic acid, hydrochlorite, triethanolamine, or formaldehyde. Not good for ketones.
- NEOPRENE – Good for petroleum products, solvents, bases, dilute mineral acids, aliphatic hydrocarbons, refrigerants, or alcohols. Not good for strong oxidizers or acids.
- NITRILE – Good for petroleum products, alcohols, chlorinated solvents, or bases. Not good for strong oxidizers or ketones.
- SILVER SHIELD – Good for aromatics, chlorinated solvents, oxygenated solvents, aliphatics, acids, or bases.

You should check your gloves for leaks or thin spots on a weekly basis. To check for leaks, hold the glove by the wrist end and pinch closed. Swing the glove over and over while holding the wrist end. Next, gently squeeze the stored air inside and listen for any air escaping. Keep gloves clean and dry.

Ask your supplier for package deals. Most companies' give you price breaks on large orders. In addition, you should never consider that one size fits all as a means to cut costs. What you can do is purchase two main types of gloves in the sizes needed for your operation. Sometimes it is more cost effective to order one type of glove that will meet most of your chemical compatibilities. Most laboratories are using latex gloves because they are thin for dexterity, fit most hands and are disposable, but they are not recommended for protection from most chemicals.

EH&S can recommend specific gloves for your operation. Feel free to call us at (909) 869-4697 or visit our website at www.csupomona.edu/ehs.‡

Chemistry Lab Fire

University of Texas at Austin

On Tuesday October 19, 1996 at 9:30 a.m., a fire broke out in a chemistry lab in Welch Hall at the University of Texas at Austin. Many lessons can be learned from this incident. What follows is a summary of a story for the local newspaper in Austin regarding the fire:

"The fire began in an organic-synthetic chemistry lab. A post-doctoral fellow tried to dispose of sodium metal, a water reactive. The sodium metal was exposed to alcohol and poured down the sink. A tiny amount of residual metal came into contact with water and produced a small fire in the sink. The post-doc tried to remove a container of waste acetone from the sink as the flame grew. The waste bottle hit the side of the sink and broke, causing the original flame to grow."

The professor in charge of the lab was quoted as saying that he was relieved that no one was injured in the fire, and he hoped people did not try to assign blame for something that was completely an accident. Here are some more details on the fire:

- The research left the lab and called 911. Another student in the area saw the fire and pulled the alarm.
- Students remained in the building unaware of the fire.
- The fire caused no injuries, but 40,000 square feet of the building was damaged, at an estimated cost of $300,000.
- Half of Austin's fire fighting force responded; taking six hours to extinguish the six-alarm fire.
- Unlabeled containers and improperly stored flammable chemicals were encountered during the fire.
- This was the 5th fire in the last 2 ½ years.
- The mixing and disposal of sodium metal in California is considered unpermitted treatment and disposal, fines could amount to $55,000 per day.
- Waste acetone or any hazardous waste should not be stored in a sink.‡

Trench Wall Collapse

Humboldt State University

A Eureka man was critically injured Monday when a trench collapsed on him. Charles "Tiny" Hubler, an employee of Wayne Maples Plumbing and Heating, was working on sewer lines at Humboldt State University when the trench wall caved in about 10:30 a.m., said Jere Buck, Arcata Fire Protection District assistant chief.

Hubler was reported in critical but stable condition at Mad River Community Hospital on Monday night, after rescue workers spent more than two hours in an effort to save his life. Firefighters from Arcata and Eureka worked frantically with a backhoe, placing shoring in the trench to ensure it would not collapse again.

As they worked, they conducted repeated atmosphere tests to be sure the collapse had not ruptured gas lines. Hubler was buried up to the top of his chest and was not breathing when firefighters arrived, Buck said. When soil was removed from around the man's chest he resumed breathing on his own.

As rescuers worked their way down the soil turned to a heavy blue clay, Buck said. This made it difficult to get Hubler's feet free from around the pipes on which he had been working. "That was a matter of actually trying to saw through the clay," Buck said. "It was slow. "Buck said Hubler also apparently suffered a blow to the head in the trench collapse.

The rescue was particularly disturbing for the firefighters because many know Hubler as a former colleague. Hubler worked for many years as a firefighter for the Eureka Fire Department, Buck said, he continued to see him professionally because he inspected much of the work Hubler did for Wayne Maples.

Buck said the Arcata Fire Department has been training for an event such as this. Every Monday for six weeks, he said, the department has been conducting "confined space training." Several people who know Hubler said if anyone can survive an accident like this, the 6'5", 270-pound "Tiny" can.‡

Pest Control

Excerpted from Environmental Protection Agency
August 1993

The Environmental Health & Safety Department has received a number of calls in the past 6 months regarding vermin and insect infestations. To avoid these infestations, there are a number of things you can do to reduce the likelihood that you will be visited by these unwelcome guests.

Indoors

- Keep doors shut when not in use
- Place weather stripping on doors
- Caulk and seal openings in walls
- Install air curtains
- Keep vegetation, shrubs, and wood mulch at least 1 foot away from structures
- Allow food and beverages only in designated areas
- If indoor plants are present, keep them healthy. When small insect infestations appear, remove them manually.
- Keep areas as dry as possible by removing standing water and water-damaged or wet materials
- In the science lab, store animal foods in tightly sealed containers and regularly clean cages. In all areas, remove dust and debris.
- Routinely clean lockers and desks.
- Frequently vacuum carpeted areas.
- Store food and waste in containers that are inaccessible to pests. Containers must have tight lids and be made of plastic, glass, or metal. Waste should be removed at the end of each day.
- Place screens on vents, windows, and floor drains to prevent cockroaches and other pests from using unscreened ducts or vents as pathways.
- Create inhospitable living conditions for pests by reducing availability of food and water – remove food debris, sweep up all crumbs, fix dripping faucets and leaks, and dry out wet areas.
- Improve cleaning practices, including promptly cleaning food preparation equipment after use and removing grease accumulation from vents, ovens, and stoves. Use caulking or paint to seal cracks and crevices.
- Promptly repair leaks and correct other plumbing problems to deny pests access to water.
- Routinely clean floor drains, strainers, and grates. Seal pipe chases.
- Keep areas dry. Avoid conditions that allow formation of condensation. Areas that never dry out are conducive to molds and fungi. Increasing ventilation may be necessary.
- Store paper products or cardboard boxes away from moist areas and direct contact with the floor or the walls. This practice also allow for ease in inspection.
- After use, promptly clean mops and mob buckets; dry mop buckets and hand mops vertically on rack above floor drain.,
- Clean trash cans regularly, use plastic liners in trash cants, and use secure lids.

Outdoors

- Regularly clean trash containers and gutters and remove all waste, especially food and paper debris.
- Secure lids on trash containers.
- Repair cracks in pavement and sidewalks.
- Provide adequate drainage away from the structure and on the grounds.
- Prune branches to improve plants and prevent access by pests to structures.

Pests seek habitats that provide basic needs such as air, moisture, food and shelter. Prevention and reduction of pest infestation depends on whether or not students, faculty, and staff clean up food leftovers, food in lockers, gum under desks, paper clutter, etc. Once the pest has been identified and the source of its activity pinpointed, habitat modifications – primarily, exclusion, repair, and sanitation efforts – may greatly reduce the prevalence of the pest.‡

Cold Weather and Carbon Monoxide Poisoning

Excerpted from U.S. Department of Agriculture

Exposure to carbon monoxide is of greater concern during winter months because the traditional sources of ventilation, such as windows, vents, and garage doors, are often closed to protect against the cold, according to the Occupational Safety and Health Administration. Employers are required under OSHA health standards to ensure that worker exposure to the colorless and odorless gas is kept below a threshold of 50 parts of the gas per million parts of air measured over an eight-hour workday.

If the level of carbon monoxide exceeds that level, employers are required to remove workers from the work area and take specific steps to ventilate or reduce the level of gas in the area. Any machinery or appliance powered by gasoline, propane, or other fossil fuels – such as trucks, forklifts, and power washers – generate carbon monoxide that could be potentially hazardous when exhausted indoors, OSHA said.

Once inhaled, carbon monoxide severely restricts the blood system's ability to carry oxygen to body tissues. Initial symptoms may include headaches, tightness across the chest, nausea, drowsiness, and dizziness. Acute poisoning may result in permanent damage to parts of the body that require large amounts of oxygen, such as the heart and brain.

Employers should consider installing an effective ventilation system and consider switching from fossil-fueled to battery-powered machinery where possible.

In homes, furnaces, hot water heaters, and stoves that burn natural gas, heating oil, wood or other kinds of fuel are also potential sources of carbon monoxide. Chimneys and flues should be inspected before each heating season for blockage by creosote buildup, which can block ventilation and allow pollutants to leak into the home. Charcoal grills can be a potential source of carbon monoxide and should never be used in enclosed spaces such as a home, garage, vehicle, or tent. Never bring grills with live coals indoors after use, as coal is a source of carbon monoxide.‡

Good Housekeeping

By Peter Ashbrook and Cindy Klein-Banay
University of Illinois

At the risk of sounding like your mother nagging you to clean your room, we are visiting the issue of good housekeeping because we believe it is so important.

The underlying concept of waste minimization is the prudent use of resources; you must know what you have to use. If laboratory chemicals, supplies, and equipment are scattered all over the place, there is no way you can develop a good understanding of what your resources are.

A cluttered laboratory is not necessarily a sign that people don't care about good housekeeping; laboratory operations are susceptible to chaos by their very nature. In most laboratories, several different procedures are run each day, often concurrently. When unexpected things happen, such as unplanned visitors, equipment breakage, or exciting new discoveries, clean up from the procedures may be delayed. Clutter also can build up when you try to do too many things at once. Then, the next day comes, and some crisis demands immediate attention, so things pile up even more. Because the mundane tasks of housekeeping require so much consistency and attention, it is easy to see how laboratories get cluttered and disorganized.

Doing an annual spring-cleaning is one part of the whole process of waste minimization. One of the guidelines to waste minimization is that the process should be reviewed on a regular basis. Waste minimization achievements is necessary. In the same way, periodically cleaning and organizing your laboratory are valuable waste minimization practices.

The benefits of good housekeeping go far beyond waste minimization. They include improved productivity, improved research results (no confusion about reagents), reduced exposure to hazardous chemicals, better access to personal protective equipment (such as gloves and usable hoods), and a more pleasant work environment. When visitors come to the laboratory, their views are heavily influenced by first impressions; having a well organized, uncluttered laboratory makes those impressions good ones. First

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impressions matter greatly whether your visitors are from a funding agency, a regulatory agency, or some other group in between.

Start the year on the right foot by spending a few hours cleaning up your laboratory! You'll be glad you did.

What exactly does good housekeeping mean? Here are some suggestions:

- Properly label all chemical containers, including solutions, waste, and especially water.
- Store chemicals in an organized manner according their hazard characteristics.
- Clean laboratory equipment immediately after use and store it in an organized manner when not in use.
- Minimize clutter.
- Dispose of wastes, surplus chemicals, and surplus equipment in a timely manner.
- Keep an inventory of chemicals and their locations in the laboratory.

Give attention to chemical use and storage, but also take a look at equipment and clutter. Set aside some time on a regular basis to clean up your laboratory.‡

Don't Let Conflict Get the Upper Hand

Excerpted from the National Safety Council Newsletter – January/February 1998
Here are some tips for dealing with conflict to help keep everyone's stress level down.

- Deal with complaints right away.
- Take the time to hear the whole complaint; listen until the speaker is finished.
- Try to determine the reason for the complaint; it could be something different from what the person is saying.
- Help everyone recognize shared goals – don' t get bogged down with disagreements on how to reach them.
- Keep discussions focused on specific problems –
- Help find ways to work together to meet goals.
- If someone is angry with you, ask for specific examples of what you did or said. Apologize if warranted; if not let it go.
- Learn to live with the fact that you're not going to be able to make everyone happy.
- Don't make promises you can't keep.
- If you can't reach an understanding, take the dispute to a third party.
- If the dispute may turn violent, talk to your manager and security personnel right away.

Make Your Own Sports Drink

Excerpted from Occupational Health & Safety
July 7, 1997

Most sports drinks are surprisingly simple in composition, no matter how fancy the label. For about half the cost, you can go to your favorite store, buy the ingredients yourself, and mix up your bottle of thirst quencher.

The recipe:

- 8 ounces of water (avoid sparkling water, because the gas makes it more difficult to drink).
- One teaspoon of lemon juice.
- ¼ teaspoon of salt.
- Four teaspoons of sugar.

Mix well and enjoy….

Electronic Access

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