

ENVIRONMENTAL HEALTH AND SAFETY

GENERAL SAFETY MANUAL



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**Environmental Health and Safety
General Safety Manual**

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APPENDIX A

1.0 Introduction

1.1 Purpose

The purpose of this manual is to provide a guide for establishing and maintaining healthy and safe working conditions at Penn State and to promote safe practices by all staff, faculty, and students.

This manual, along with University safety policies, is to be used as the basis of safety programs established and implemented by University units. Additional safety practices and procedures appropriate to specific units may also be in-place and must be followed.

1.2 Penn State University Statement of Responsibility

The Pennsylvania State University is committed to protecting the health and safety of its employees, students, visitors, and the environment. Penn State University employees have the responsibility to be well-informed regarding potentially hazardous materials, equipment, and activities associated with their employment.

1.3 Environmental Health and Safety Policy

The Pennsylvania State University has provided and will continue to provide safe and healthful working conditions for all faculty, staff, and students as given in University Safety Policy SY01, The Pennsylvania State University Health and Safety Policy. Each administrative unit head has the responsibility to protect his or her personnel from occupational and environmental hazards. This responsibility is of great importance and may not be delegated. Environmental Health and Safety (EHS) will work with University unit heads, faculty, and staff to prevent accidents and achieve compliance with environmental health and safety regulations.

1.4 Safety Responsibilities

Everyone working at the Pennsylvania State University has the right to expect safe working conditions and is responsible to help ensure safety for themselves and others. Everyone has an important role in safety. The following specifies areas of responsibilities for safety at the University:

1.4.1 Environmental Health and Safety

EHS has overall responsibility for the administration of the University's health and safety programs. EHS's mission is to work with the campus community to develop and implement efficient, comprehensive, and pro-active health and safety programs. Priorities are as follows:

1. Provide a safe University environment through the development of safety programs that protect the health and safety of students, faculty, staff, visitors, and the environment.
2. Assist the University community in complying with federal, state, and local regulations.
3. Provide oversight to ensure conformance with these programs.

1.4.2 University Safety Council

The University Safety Council is comprised of members representing academic colleges and administrative units, as appointed by their respective budget executives. University Safety Council representatives are commonly referred to as "Safety Officers." The duties of the University Safety Council are to develop and implement, under the guidance of Environmental Health and Safety, a comprehensive and practical occupational health and safety program, and to maintain an environment that is conducive to the safety, health, and well-being of the University community.

Additional, specific responsibilities include:

- 1.4.2.1 Attend the regularly scheduled meetings and special meetings of the University Safety Council, and report Council activities to the appropriate budget executive.
- 1.4.2.2 Establish and maintain, as chairperson, a Safety Committee within the member's area of responsibility. The size and structure of this Committee shall be dictated by the types of activities, the potential hazards inherent in those activities, and the number of persons who may be exposed to these hazards.
- 1.4.2.3 Accompany insurance company representatives on inspections of areas under the Safety Officer's jurisdiction.
- 1.4.2.4 Review and maintain copies of all "Employer's Reports of Occupational Injury or Illness" for employee accidents, or the "Incident Report" for non-employees or employees not engaged in normal employment activities, whichever report is appropriate for the occasion, and any other associated accident/illness reports.
- 1.4.2.5 Assist in the investigation of all serious accidents, and all other accidents when requested by the supervisor.

- 1.4.2.6 Initiate proper follow-up measures and ensure corrective actions are implemented when unsafe conditions, practices, or equipment are reported or observed.

1.4.3 Budget Executives and Budget Administrators

Budget executives and budget administrators have the primary responsibility to maintain a safe work environment within their jurisdiction, by monitoring and exercising control over their assigned areas.

Additional specific responsibilities include:

- 1.4.3.1 Assign a representative from each academic and administrative unit to the University Safety Council. This representative should be selected to ensure compliance with the University Health and Safety Policy and other appropriate University safety policies, rules, procedures, and practices.
- 1.4.3.2 Communicate to all faculty, employees, and students that health and safety of persons in the workplace and environment are of the highest priority at Penn State University.
- 1.4.3.3 Ensure that health and safety duties are carried out in the academic departments or administrative units for which they are responsible.
- 1.4.3.4 Ensure that obligations established by the University Health and Safety Policy are carried out. This includes assuring compliance with applicable state and federal health and safety rules, regulations, standards, and procedures. Included, for example, are regulations of the Pennsylvania Department of Environmental Protection (PADEP), and Nuclear Regulatory Commission (NRC), and policies and procedures established by Environmental Health and Safety.
- 1.4.3.5 Monitor implementation of programs designed to protect the health and safety of faculty, staff, students, and visitors:
 - 1.4.3.5.1 Consult with their University Safety Council representative and/or Environmental Health and Safety with respect to new, existing, or planned facilities or equipment that may present a health or safety hazard to determine specific measures that may need to be implemented to control these hazards before exposure to these hazards may occur.

- 1.4.3.5.2 Support measures such as training, use of protective devices, and resources to control and prevent hazards.

1.4.4 Supervisors

All supervisors (department chairs, faculty, and other employees with direct oversight of University activities and employees or students) have specific responsibilities to provide for the health and safety of those supervised. They are in a key position in the organizational structure to carry out the department's safety policies and to prevent injuries to their employees.

Specific responsibilities include:

- 1.4.4.1 Be thoroughly informed of appropriate University and Departmental safety policies, rules, and procedures and how they specifically apply to their responsibilities and authority.
- 1.4.4.2 Inform all new and current employees and students that safety and health, and concern for the environment, are priorities at Penn State and inform them about safety and health policies, rules, regulations, and procedures, as well as their specific responsibilities (see section 1.4.5 below).
- 1.4.4.3 Ensure that required safety equipment, devices, and personal protective equipment and apparel are provided and maintained, and are properly used by individuals working in their operations.
- 1.4.4.4 Provide employees and students with instruction and assistance in the proper operation of equipment, materials, and personal protective equipment involved in any operation, which may be potentially hazardous.
- 1.4.4.5 Take prompt corrective action when unsafe conditions, practices, or equipment are reported or observed.
- 1.4.4.6 Encourage prompt reporting of health and safety concerns.
- 1.4.4.7 Conduct a prompt and thorough investigation of all work-related injuries, illnesses, and accidents. Submit appropriate recommendations on all accident reports, including the “Employer's Reports of Occupational Injury or Illness” or the “Incident Report”, as appropriate, and follow through to ensure corrective measures have been implemented.

1.4.4.8 Coordinate or conduct inspections to maintain safe and healthful conditions, and address any deficiencies that are identified.

1.4.4.9 Provide for health and safety training.

1.4.4.10 Provide financial support for health and safety improvements, or request assistance from the next higher level of supervision regarding these requests.

1.4.5 Employees and Students

All University employees and students have specific responsibilities to comply with established health and safety policies, standards, rules, procedures, and regulations. Compliance with these is essential to creating and maintaining a healthy and safe environment at all University locations.

Specific responsibilities include:

1.4.5.1 Comply with applicable environmental health and safety policies, standards, rules, regulations, and procedures. These include safety-related signs, posters, warnings, and written/oral directions when performing tasks.

1.4.5.2 Refrain from performing any function or operation, which is considered hazardous or is known to be hazardous, without proper instruction and authorization.

1.4.5.3 Use only equipment and materials approved or provided by the supervisor or instructor and for which instruction has been provided by this or other experience.

1.4.5.4 Become thoroughly knowledgeable about potential hazards associated with the work area; know where information on these hazards is maintained and how to use this information when needed.

1.4.5.5 Wear or use prescribed protective equipment.

1.4.5.6 Report all unsafe conditions, practices, or equipment to the supervisor, instructor, or Safety Officer whenever deficiencies are observed.

1.4.5.7 Inform the supervisor or instructor immediately of all work-related injuries or accidents and obtain prompt medical attention when necessary.

- 1.4.5.8 Provide information necessary for the supervisor or Safety Officer to adequately and thoroughly complete the Employer's Report of Occupational Injury and Illness and any other associated accident/illness reports.

1.5 Safety Principles

This safety manual incorporates four essential principles of safety. These principles are:

- Practice Safety
- Be Concerned About the Safety of Others
- Prevent Accidents
- Respond to Emergencies

They are discussed below:

1.5.1 Practice Safety

Because practicing safety may mean different things to different people, it is the purpose of this manual to define a standard for safe work practices. Practicing safety means integrating safety seamlessly into everything we do. Practicing safety means doing something the right way, not the quick way.

1.5.2 Be Concerned About the Safety of Others

Concern for safety must include alerting others in the area in the event of an accident or emergency, as well as addressing unsafe behaviors. This may consist of reminding a friend to wear safety glasses or pulling the fire alarm to evacuate a building. Everyone is responsible for reporting hazards and hazardous conditions.

1.5.3 Prevent Accidents

Prevention is the key to safety. Prior to beginning any project, using any piece of equipment, or handling materials, it is essential that the potential hazards and safety precautions necessary to perform the work be considered. Hazards may include exposure to toxic substances, electrical circuits, mechanical equipment, or waste chemicals.

Safety precautions should include correct materials acquisition and storage, proper ventilation, and proper grounding of equipment. Equipment should be in good working order. This may include ensuring that periodic maintenance is performed. The work area should be kept neat and clean.

Information and training on hazards should be presented in a manner readily understood by employees and students. Whenever possible, information about the unique hazards and precautions necessary for any type of work should be prepared and made readily available.

1.5.4 Respond to Emergencies

Everyone must be prepared to respond quickly and effectively in an emergency. Become familiar with the work area, available exits, and associated safety equipment such as eyewash stations, fire extinguishers, sinks, and spill kits. Just a few moments spent in training and learning the locations and use of these pieces of equipment prior to an emergency could save a life.

2.0 General Safety

Some procedures may be described as basic or fundamental to safety in any laboratory, office, or other situation where potential hazards exist. These simple, somewhat “common sense” rules are important. If basic rules are followed, it is more likely that other, more complex, and perhaps less intuitive safety procedures will also be followed.

An important part of any safety program is for all persons to respect and understand the safety and health hazards associated with the materials and equipment used and to practice the following general safety principles at all times.

2.1 General Safety Practices

- 2.1.1 Known and anticipated hazards are considered for all materials or equipment being used. Labels and manufacturer's information are reviewed before unfamiliar chemicals, equipment, or new products are used.
- 2.1.2 Training is provided for all employees when hired, when given a new job assignment for which training has not been received, and when new hazards are introduced by new substances, processes, or equipment.
- 2.1.3 Material Safety Data Sheets (MSDSs) are reviewed for product specific handling and storage information.
- 2.1.4 Proper equipment, in good condition, is used and only for its intended use.
- 2.1.5 A box, chair, carton, shelves, or anything other than a ladder is not used as a ladder.
- 2.1.6 Emergency equipment (e.g. fire extinguishers, emergency eyewash/shower units, etc.) are unobstructed and in good working condition.

- 2.1.7 First aid kits are available in designated areas and stocked in accordance with University Safety Policy SY21.
 - 2.1.8 Areas where hazardous materials are present are posted in accordance with the posting shown in Appendix A. Contact EHS for copies.
 - 2.1.9 Eating, drinking, or applying cosmetics in areas where hazardous materials (radioactive, biohazardous, or chemical) are used is not permitted. Food and drinks are not stored in the same refrigerator or freezer with hazardous materials.
- 2.2 Good Housekeeping Practices
- 2.2.1 Work areas are kept uncluttered and are cleaned upon completion of operations or at the end of each workday. This is particularly important for areas with hazardous materials and equipment.
 - 2.2.2 Floors are maintained free from tripping, slipping, and falling hazards (e.g. cords, cables, wires, equipment, and tools).
 - 2.2.3 Spills are cleaned immediately and thoroughly, as per the guidelines established in this document and in accordance with appropriate facility emergency procedures.
 - 2.2.4 Emergency equipment and controls are not blocked, and hallways and stairways are not used as storage areas.
 - 2.2.5 Workbenches and shelves are not overloaded with unused equipment, chemicals, or other materials.
- 2.3 Fire Safety
- 2.3.1 Halogen lamps are not permitted on University-owned property. Refer to University Safety Policy SY27 for additional information.
 - 2.3.2 Open fires are not permitted on University properties. Refer to University Safety Policy SY13 for additional information.
 - 2.3.3 Fire drills are conducted monthly in all residence halls. Refer to University Safety Policy SY28 for additional information.
 - 2.3.4 Building fire alarms are tested annually.

- 2.3.5 Candles and other open flame devices are not permitted in University facilities. Refer to University Safety Policy SY30 for additional information.
 - 2.3.6 Fire extinguishers are present in designated locations and clearly labeled. Clear access to fire extinguishers is maintained at all times.
 - 2.3.7 Exits, aisles, and corridors are free of obstacles, hazards, and combustible materials.
 - 2.3.8 Combustible or flammable materials are maintained a safe distance from heat sources or electrical equipment. Flammable materials are stored in an approved manner, in accordance with University Safety Policy SY07.
 - 2.3.9 Exit signs are visible and properly illuminated.
 - 2.3.10 Fire rated doors, which include stair tower doors, should not be blocked open.
- 2.4 Electrical Equipment, Extension Cords, and Multiple Strip Outlets
- 2.4.1 Access to electrical equipment (e.g. plugs and switches) is maintained free from obstruction.
 - 2.4.2 Electrical apparatus is equipped with ground plugs or is properly grounded.
 - 2.4.3 Electrical coverplates are maintained in place on all switches and outlets.
 - 2.4.4 Ground fault interrupters are used as needed.
 - 2.4.5 Two prong appliances are not within a 5-foot radius, or located directly above flammable materials or sinks.
 - 2.4.6 All current transmitting parts of electrical devices are enclosed.
 - 2.4.7 Electrical connections are not handled with wet hands or when standing in or near water.
 - 2.4.8 Safety devices on electrical equipment are not bypassed.
 - 2.4.9 Electrical equipment is disconnected from electrical outlets or circuits when being adjusted, lubricated, moved, or cleaned.
 - 2.4.10 Electrical plugs, cords, and extension cords are maintained in good condition.

- 2.4.11 Extension cords use is kept to a minimum and cords are as short as possible. Extension cords are used only temporarily, are not overloaded, and are “U.L.” (Underwriter’s Laboratory) listed and grounded, and approved for the intended use.
- 2.4.12 Cords are placed in areas where they are not exposed to physical damage. They are not run through doorways or ceilings, or placed under carpets.
- 2.4.13 Under no circumstances are extension cords or electrical cords spliced.
- 2.4.14 Extension cords, multiple outlet strips, and cubes are plugged directly into a wall outlet.
- 2.4.15 Multi-strip outlets are not used in place of permanently installed receptacles. If additional receptacles are required, they are installed by an electrician.

2.5 Smoking

Smoking is not permitted in any University facility or vehicle in accordance with University Administrative Policy AD32.

2.6 Alcohol

The use, possession, and distribution of alcoholic beverages are prohibited on University property (unless specifically authorized) by University Administrative Policy AD18.

2.7 Ergonomics

Ergonomics is the interaction between people, the things they do, the objects they use, and the environments they work, travel, and play in. Ergonomic considerations include improper arrangement of office furniture and equipment, repetitive activities, poor work postures, and can lead to long term health problems that include:

- *Lower back strain*
- *Carpal Tunnel Syndrome*
- *Neck ache/strain*
- *Eyestrain*

- 2.7.1 Potential “at risk” activities, postures and work areas are identified that may cause repetitive stress injuries. The EHS “Ergonomics” web page can be found at <http://www.ehs.psu.edu/occhealth/ergonomics.cfm>, for additional information.

2.7.2 Moving and Lifting

2.7.2.1 Individuals do not attempt to carry a load that is more than can be carried safely.

2.7.2.2 Heavy items are not lifted higher than waist level.

2.7.2.3 Individuals always have a clear view over the load. If the load interferes with normal walking, help is obtained.

2.7.2.4 Supervisors see that mechanical equipment, if available, is used when manual lifting is unsafe.

2.7.2.5 Greasy, wet, slippery, or dirty objects are wiped clean before handling.

2.7.2.6 Lifts are conducted as follows:

Get firm footing. Keep feet apart and point the toes slightly outward. Bend the knees, not at the waist. Keep "leverage" in mind at all times. Tighten stomach muscles and lift with the legs. Keep the load close in to the body while keeping the back upright. Lift gradually and smoothly without jerking or twisting.

2.7.2.7 "Back and Lifting Safety Guidelines" can be found at the EHS web site, http://www.ehs.psu.edu/occhealth/back_and_lifting_safety.pdf, for additional information.

2.8 Noise/Hearing Conservation

Individuals may work in area with potentially hazardous levels of noise. Noise exposure can cause permanent hearing loss, which could be totally preventable if the appropriate precautions are taken.

2.8.1 The "rule of thumb" for determining if a work area or activity requires hearing protection is as follows: If it is difficult to understand a "normal" tone of voice at a distance of three feet, noise levels are probably exceeding safe levels.

2.8.2 Noise exposure hazards are to be limited using engineering controls whenever possible or feasible. If this cannot be accomplished, hearing protection should be provided and used. Information on noise hazards and hearing protection can be found at the EHS "Hearing Conservation Program" web site at <http://www.ehs.psu.edu/occhealth/hearing.cfm>.

- 2.9 Employee, Student and Visitor Accidents
 - 2.9.1 For accidents involving University employees, refer to University Safety Policy SY04.
 - 2.9.2 For accidents involving students, refer to University Safety Policy SY03.
 - 2.9.3 For accidents involving persons other than students or employees, refer to University Safety Policy SY05.
- 2.10 Driver/Vehicle Safety
 - 2.10.1 Traffic Safety
 - 2.10.1.1 Traffic and parking regulations are obeyed.
 - 2.10.1.2 Fire lanes are not blocked.
 - 2.10.1.3 Backing up is conducted only when individuals have a clear area behind the vehicle. Assistance is provided to the driver where rear vision is not clear in the backing operation.
 - 2.10.2 Vehicle Loading and Safety
 - 2.10.2.1 Tailgate riding is prohibited.
 - 2.10.2.2 Seating specifications for the vehicle are followed. Seats equipped with safety belts are used whenever possible.
 - 2.10.2.3 Operators are protected from shifting cargo in vehicles used to transport materials.
 - 2.10.2.4 Engines are turned off when the vehicle is not in use, is being refueled, or is located near a building air intake.
 - 2.10.2.5 Riders are not permitted in the back of open pickup trucks.
 - 2.10.2.6 Hydraulic lift gates on University vehicles are operated in a safe manner, with the operator at the control lever during the complete operation of the lift gate, both in lifting and lowering. The lift gate is in the latched, vertical position at all times when the vehicle is in motion.

- 2.11 Bicycles, Skateboards, Scooters, In-line/Roller Skates, and Similar Devices
 - 2.11.1 Bicycles, Skateboards, Scooters, In-line/Roller Skates, and Similar Devices are governed in accordance with University Safety Policy SY16.
 - 2.11.2 Bicycles shall be ridden on bicycle routes and automobile thoroughfares only.
 - 2.11.3 Bicycles are not permitted inside University owned or operated facilities.
 - 2.11.4 Roller skates, in-line skates, skateboards, scooters, sleds, and other similar devices are prohibited on roadways.

3.0 Emergency Procedures

3.1 Emergency Situations

Releases of hazardous materials and other emergencies such as fires that pose a significant threat to health and safety or that, by their nature, require an emergency response regardless of the circumstances surrounding the release or the mitigating factors are emergency situations. Examples include:

- 3.1.1 Fire, suspected fire, explosion, or other imminent danger
- 3.1.2 Conditions that are immediately dangerous or have the potential to become immediately dangerous to life or health
- 3.1.3 High levels of exposure to toxic substances
- 3.1.4 Severity of hazard is such that the person(s) in the work area is uncertain they can handle the emergency with the personal protective equipment (PPE) and response equipment that has been provided and/or the exposure limit for the PPE could easily be exceeded.

3.2 Evacuation Plans

- 3.2.1 University units are encouraged to develop and implement evacuation plans for their facilities. These plans include exit routes, designated staging areas (“areas of refuge”) within the building for physically challenged individuals, designated staging locations outside the building, and procedures to account for building occupants. Refer to the EHS web site, at http://www.ehs.psu.edu/occhealth/emergency_evac_plan.doc, for more information on developing an evacuation plan.
- 3.2.2 Evacuations of buildings can occur for several reasons. If the building alarm sounds, leave the building immediately using the nearest exit. If

located on an upper floor, use the stairway to leave the building. Elevators may be used only during building evacuations for non-fire emergencies.

3.2.3 Some individuals may require physical assistance during building evacuations. Refer to University Safety Policy 02.

3.2.4 Once outside the building, go to the designated staging location and do not re-enter the building until directed to do so by University Police, EHS, or other emergency response personnel.

3.3 Emergency Situation – Fire

3.3.1 Follow these basic “rules” for fire safety:

3.3.1.1 Never enter a room that is smoke filled.

3.3.1.2 Never enter a room if the top half of the door is warm to touch.

3.3.1.3 If an individual’s clothing is on fire, extinguish the fire by rolling the person around on the floor, covering the person with a heavy cloth (blanket), or drenching the person in a safety shower if the shower is in the immediate area of the person. Remember “stop, drop, and roll.”

3.3.1.4 Report any problems with fire alarms, fire extinguishers, or other fire protection devices to the Office of Physical Plant or appropriate maintenance staff.

3.3.2 Follow these basic procedures for handling a fire or fire-related emergency in a University owned or occupied facility:

3.3.2.1 Pull the fire alarm.

3.3.2.2 Evacuate the area.

3.3.2.3 Call 911 from a safe location.

3.3.2.4 Notify EHS and the unit Safety Officer as soon as possible.

3.3.3 For minor fire-related incidents, which are handled by facility personnel that do not necessitate activating the procedures as identified in Section 3.3.2, University Police and EHS must be notified as soon as possible.

3.3.4 Fire safety training, including fire extinguisher use, is provided to faculty, staff, and students by EHS.

3.4 Emergency Situation – Spill

- 3.4.1 Follow these procedures for spills of hazardous, highly toxic, or flammable materials, or for spills of unidentified materials:
 - 3.4.1.1 Evacuate personnel from the spill area and alert all people in the vicinity of the spill.
 - 3.4.1.2 Call 911 from a safe location.
 - 3.4.1.3 Isolate the spill area and close doors to the room where the spill occurred if it is safe to do so.
 - 3.4.1.4 Remove ignition sources and shut down equipment if it is safe to do so.
 - 3.4.1.5 Turn on exhaust equipment or open windows if it is safe to do so.
- 3.4.2 Evacuation of the building is mandatory if chemicals or contaminants could enter the air circulation system of a building.
- 3.4.3 Notify EHS and the unit Safety Officer as soon as possible.

3.5 Mercury Spills

- 3.5.1 Not every mercury spill qualifies as an emergency, but all mercury spills have the potential for creating an unsafe environment. Contact EHS for all mercury spills.
- 3.5.2 Mercury spills that occur at elevated temperatures (>90°F) are emergencies. Implement the following:
 - 3.5.2.1 Evacuate the immediate area and all people in the vicinity of the spill.
 - 3.5.2.2 Call EHS immediately.
 - 3.5.2.3 Isolate the spill area and close doors.
 - 3.5.2.4 Turn on available exhaust ventilation systems.
 - 3.5.2.5 Notify the unit Safety Officer.

4.0 Facility Maintenance, Utilities, and Construction Safety

4.1 Equipment Care and Use

- 4.1.1 Tools and equipment are kept in a clean and repaired condition. All equipment is inspected before and after use to discover any possible safety defects. Equipment needing repair is reported immediately to the supervisor.
- 4.1.2 Equipment is operated by appropriately trained employees only.
- 4.1.3 Electric tools are grounded or double insulated in an approved manner, and control switches are placed at a convenient point.
- 4.1.4 Tractors or other equipment with power take-off shafts are guarded. This equipment is shut off before the operator dismounts to make any repairs or adjustments.
- 4.1.5 Individuals use extreme caution when using powder-activated or pneumatic driven equipment (e.g., nailguns, RAM SET, etc.).
- 4.1.6 Tools are only used for the purposes for which they were designed.
- 4.1.7 Tools are kept sharp and properly lubricated.
- 4.1.8 Tools are not carried by the cord or yanked to disconnect from the receptacle.
- 4.1.9 Work is secured by using clamps or a vise.
- 4.1.10 Guards and safety shields are in place for machines and equipment with rotating or moving parts.
- 4.1.11 Pressurized or vacuum machinery is shielded and protected against bumping and overheating.

4.2 Electrical Circuits

- 4.2.1 Fuses of a larger capacity are not used if equipment keeps blowing fuses. If a fuse blows, find the cause of the problem before replacing it. No fuse is installed in an electrical circuit that carries more amperage than the rating of the wiring for the circuit.
- 4.2.2 Electrical vault rooms are not used for storage and are locked at all times.

- 4.2.3 Authorized personnel only may work on electrical panels, alter existing wiring, or install electrical wiring.
- 4.2.4 All new wiring installed at Penn State University complies with the National Electrical Code (NFPA 70).
- 4.2.5 No electrical panel, switch, or wiring is left open without protection. Workers red-tag, close, and/or seal these items when not working in the immediate vicinity.
- 4.2.6 Proper clearance (three feet) is maintained to allow access to and operation of all electrical panels and switchgear.
- 4.2.7 Work is not conducted on electrical circuits or equipment with wet clothing or shoes, or while hands or feet are immersed in water. GFI-protected circuits are required on electrical outlets installed near water-use areas.
- 4.2.8 Individuals do not work alone where electrical hazards exist.

4.3 Receiving and Storing Operations

- 4.3.1 Appropriate tools are used when opening boxes or crates.
- 4.3.2 Heavy materials are stored on bottom shelves and light material on top.
- 4.3.3 Items are not stacked too high.
- 4.3.4 Chemicals and hazardous materials are stored in areas designated for such use.
- 4.3.5 Lighting is adequate in storage and receiving areas.
- 4.3.6 Gas cylinders are delivered to University General Stores by vendors in accordance with University Safety Policy SY25. Exceptions to this include lecture bottles and specialty gases. It is General Stores' responsibility to deliver cylinders to campus facilities.

Cylinder storage requirements include:

- 4.3.6.1 All cylinders, including empties, are to be adequately secured by a strap rack, heavy gauge chain, or clamp to prevent them from falling while in use, being transported, or being stored.
- 4.3.6.2 Cylinder storage areas shall be posted with the name of the gas (es) being stored.

- 4.3.6.3 Cylinders that contain different types of gases should be grouped by hazard. Stored oxygen shall be separated from flammable gas cylinders by a minimum of twenty feet, or by a fire resistant partition with a height of no less than the cylinders'.
- 4.3.6.4 Empty and full cylinders are to be stored separately.
- 4.3.6.5 Cylinders are not stored near flammable substances, in continued dampness, or near salts or other corrosives. They are not stored near elevators, ramps, or paths of normal egress, or where heavy objects may strike or fall on them.
- 4.3.6.6 Cylinders may be stored in the open if proper safeguards have been provided to prevent corrosion and protection from the elements.
- 4.3.6.7 Cylinders shall be stored in a location that prevents tampering and vandalism.

4.4 Ladders/Elevated Platforms

- 4.4.1 Wooden scaffolding planks, walkboards and ladders are not painted.
- 4.4.2 Ladders are stored in locations where they will not be exposed to the elements, and where there is good ventilation.
- 4.4.3 Ladders are long enough to do the job safely. Individuals do not stand on the top two steps of a stepladder. The top three feet of an extension ladder are to extend beyond the anchor point.
- 4.4.4 Ladders are not placed in front of a door that opens towards them unless the door is blocked, locked, or guarded.
- 4.4.5 Stepladders are fully spread and locked when used.
- 4.4.6 Fiberglass ladders are preferable to aluminum or wood ladders when working around electrical equipment. Rubber shoes are worn if an aluminum ladder is used.
- 4.4.7 Ladders are not used in a strong wind.
- 4.4.8 Ladder feet are leveled before individuals climb on the ladder.
- 4.4.9 Ladders are to be used by only one person at a time.

- 4.4.10 Individuals are to face the ladder and hold onto each rung when climbing or descending.
- 4.4.11 No attempt is made to reach beyond normal arm's length while standing on the ladder, especially to the side.
- 4.4.12 Ladders are secured at the bottom to prevent kickout, and secured at the top with non-conductive material if they are tall or unstable.
- 4.4.13 Elevated platforms are erected properly and securely.

4.5 Light Fixtures

- 4.5.1 Maintenance staff is contacted when a light bulb is broken off in the socket. The light bulb is replaced with a light bulb of the same wattage and type.
- 4.5.2 Individuals use caution when handling all fluorescent tubes; they contain mercury and phosphorus. Used fluorescent tubes are treated as hazardous waste, and are not to be disposed of in trash receptacles.
- 4.5.3 Safety glasses or goggles are worn for eye protection when changing fixtures. Individuals wear goggles when it is necessary to stand directly below a person working overhead.
- 4.5.4 All electrical currents are shut off when working on light fixtures. Lockout and tagout procedures are followed when required.

4.6 Trenching, Shoring and Excavation

- 4.6.1 Barricades are installed around all open excavations and marked with flashers.
- 4.6.2 Excavated material is shored or retained two feet or more from the edge of the excavation.
- 4.6.3 Banks more than five feet high are shored or laid back to a stable slope.
- 4.6.4 Sides of trenches in unstable or soft material of five feet or more in depth are shored to protect employees.
- 4.6.5 Ladders are used to provide access in trenches four feet deep or greater.
- 4.6.6 Excavations are checked when a rainstorm or hazard-increasing incident occurs.

4.7 Asbestos

Asbestos fibers are naturally occurring and extremely aerodynamic. Because of this, almost everyone is exposed to asbestos. Asbestos fibers can become a health risk if inhaled at high concentrations over extended periods of time. Asbestos is only dangerous if it becomes airborne. As long as asbestos-containing materials are not damaged, the asbestos fibers do not become airborne, and do not pose a health hazard to building occupants.

- 4.7.1 Asbestos-containing materials are found in many University buildings and facilities. Some examples are: pipe insulation, structural fireproofing, acoustical ceiling plaster, laboratory fume hood linings, soapstone laboratory bench tops, oven door gaskets, floor tiles, ceiling tiles, wall panels, roofings, caulking, etc.
- 4.7.2 The University's current policy is that of in-place management. Asbestos-containing materials are therefore only disturbed or removed when necessary, generally only during building renovation, demolition, or when the material is found to be damaged.
- 4.7.3 Additional information is available at the EHS web site, "Asbestos Management Program," which can be found at http://www.ehs.psu.edu/occhealth/Asbestos_management_program_manual.pdf.

4.8 Lead-Based Paint

Lead-based paint is a source of lead poisoning. Ingestion and inhalation of lead dust that is created as lead-based paint chips and peels, or from improper sanding or scraping of lead-based painted surfaces can lead to exposure.

- 4.8.1 Any building constructed or surface painted prior to 1978 is assumed to contain lead-based paint.
- 4.8.2 The University's current policy is that of in-place management. Lead-based paint is appropriately handled during renovations and demolitions.
- 4.8.3 Additional information is available at the EHS web site, "Lead and Other Heavy Metal Exposure/Disposal Control Procedures" which can be found at http://www.ehs.psu.edu/occhealth/lead_paint_sop.pdf.

5.0 Chemical and Hazardous Material Safety

Many facilities within the University contain chemicals and hazardous materials that are essential for their operation. The university has numerous policies regulating both the storage and disposal of these materials as detailed below.

5.1 Storage

- 5.1.1 Chemical containers, including safety cans and wash bottles, are labeled with contents, capped, and in good condition. Contents label should include full name of material; formula and abbreviations are not sufficient. The original label should be defaced if it is not consistent with the current contents.
- 5.1.2 Chemicals are dated upon receipt.
- 5.1.3 An updated annual chemical inventory is maintained.
- 5.1.4 Chemicals are not stored on, above, or next to a desk.
- 5.1.5 Corrosive chemicals are not stored above eye level.
- 5.1.6 Chemicals are segregated by hazard.
- 5.1.7 Excess solvents are stored in approved safety cans or solvent storage cabinets.
- 5.1.8 Approved safety cans are equipped with self-closing lids, and flame arrestors are intact.
- 5.1.9 All containers are kept closed except when in use.
- 5.1.10 All containers of hazardous materials that are stored in fifty-five-gallon containers or larger are required to be stored in secondary containers if there is the potential for release of the material to the soil, storm water, drains, etc.

5.2 Waste Disposal

- 5.2.1 Hazardous chemical waste is disposed of in accordance with University Safety Policy SY20.
- 5.2.2 Evaporation of chemicals in chemical fume hoods or other means, if not part of an experimental procedure, is not acceptable.
- 5.2.3 Waste chemicals are not poured down the drain to the sanitary sewer unless conducted in accordance with University Safety Guideline SYG1 or with approval from EHS.
- 5.2.4 Chemical, infectious, and radiological waste containers are labeled and chemical compositions specified.

- 5.2.5 Biohazard disposal containers are properly used.
- 5.2.6 Infectious waste is disposed of in accordance with University Safety Policy SY29.
- 5.3 Emergency Equipment
 - 5.3.1 Emergency eyewash and shower units are unobstructed and in good working condition.
 - 5.3.2 Eyewash and drench hoses are flushed, at a minimum, weekly.
 - 5.3.3 Safety showers are flushed, at a minimum, annually.
- 5.4 Compressed Gas Cylinders
 - 5.4.1 Cylinders are properly secured in an upright position, with cylinder clamps/chains fastened to a solid support.
 - 5.4.2 Cylinders are tightly capped and numbers kept to a minimum.
 - 5.4.3 Flammable materials are stored a minimum of 20 feet from cylinders containing oxidizers.
 - 5.4.4 Oxygen cylinders are kept free of oil or grease to prevent possible explosion.
 - 5.4.5 Regulators, proper connections, and tubing are kept in good condition. The correct regulator is always used and oxygen regulators are never lubricated.
 - 5.4.6 Flammable gas tubing is secured and labeled.
 - 5.4.7 Flame arrestors may be required on flammable gas supplies.
 - 5.4.8 If toxic gases are in use, proper leak sensors or alarms are in place, regularly checked, and calibrated.
 - 5.4.9 If toxic gases or gases with poor warning properties are used, redundant systems and shutoffs are in place.
 - 5.4.10 Refer to University Safety Policy SY25 for additional information on compressed gas cylinders.

5.5 Personal Protective Equipment

- 5.5.1 Glove use is selected according to hazard.
- 5.5.2 Eye protection/chemical splash goggles are worn where appropriate.
- 5.5.3 Respiratory protection is not used unless specifically approved by EHS.
- 5.5.4 Other personal protective equipment (PPE) is provided as needed.

5.6 Mercury Use

The use and storage of mercury and mercury-containing thermometers, barometers, and manometers is eliminated whenever possible.

5.7 Spill Kits

- 5.7.1 Chemical spill kits are maintained in areas where hazardous chemicals are stored and employees are properly trained in their use.
- 5.7.2 Laboratory or facility staff do not attempt to use any of these kits for fuming acids, hydrofluoric acid, mixed products, or poisons.
- 5.7.3 Laboratory staff not trained in spill clean-up or not comfortable addressing spills should notify EHS or 911 immediately in the event of a spill (see section 3.4).

5.8 Chemical Fume Hoods

- 5.8.1 Hoods are operational and are posted with the date of the last inspection by EHS. Report any malfunctioning hood or hood without an inspection tag to EHS.
- 5.8.2 Sashes are able to open and close and the glass is intact.
- 5.8.3 Hoods are free of excess chemical storage and equipment.
- 5.8.4 Sashes are maintained down or closed when not being accessed.

5.9 Laboratory Safety

- 5.9.1 Explosion-proof or “explosion safe” refrigerators or freezers only are used to store flammable materials. Non-explosion proof refrigerators or freezers are labeled “No Flammables Allowed.”

- 5.9.2 Pregnant women or other employees who are concerned about the specific hazards they may be working with are encouraged to discuss this concern with their supervisor and to request that EHS conduct a work site review of the potential hazards.
- 5.9.3 Glass Dewars are wrapped or shielded.
- 5.9.4 Vacuum pump belt guards are in place.
- 5.9.5 Pressurized or vacuum apparatus is shielded and safeguarded against bumping or overheating. This equipment is checked for leaks or other damage before using.
- 5.9.6 Damaged glassware (including chipped, etched, or cracked) is not used in the laboratory.
- 5.9.7 Laboratories review hazardous operations in advance of beginning work and prepare specific standard operating procedures.
- 5.9.8 Laboratory personnel are not to work alone where the risk of personal injury is high, unless other personnel are aware of their presence and can come quickly to aid.
- 5.10 Training
 - 5.10.1 Training is offered to employees annually and within 120 days of hire for the Pennsylvania Worker and Community Right-To-Know regulation.
 - 5.10.2 Employees receive training from EHS on the proper procedures to follow when storing or disposing of hazardous materials within ninety days of hire.

6.0 Radiological Safety

6.1 Radiation Producing Equipment

- 6.1.1 Radiation producing equipment includes the following: analytical x-ray instruments; industrial, medical and veterinary radiographic instruments; electron microscopes; electron beam welders; x-ray vacuum spectroscopy systems; x-ray gauging devices; and, any electrical equipment that produces radiation incidental to its operation for other purposes, if the dose equivalent rate averaged over an area of 10 square centimeters exceeds 0.5 mrem (0.005 mSv) per hour at 5 centimeters from an accessible surface.

- 6.1.2 EHS is responsible for implementation, coordination, and enforcement of the radiation producing instrument safety program at all Penn State University locations except the Hershey Medical Center. EHS will evaluate radiation-producing instruments according to the guidance, recommendations, and regulations of State and Federal agencies and in accordance with University Safety Policy SY15.
- 6.1.3 Contact EHS for evaluation of any acquired equipment that may produce ionizing radiation.

6.2 Radioactive Material Use

- 6.2.1 The Rules and Procedures for Users of Radioactive Material at University as approved by the University Isotopes Committee have been adopted to provide for the safe use of radioactive material. They are distributed to help inform workers at PSU how to meet the requirements of federal and state regulations, license and insurance conditions, and University requirements.

The Rules and Procedures cover the safe handling of all radioactive material and assure compliance with all applicable regulations. They can be found at the EHS web site, http://www.ehs.psu.edu/radprot/rad_rules.pdf.

- 6.2.2 The possession, use, disposal, and transfer of all licensed radioactive material on University-controlled property by University personnel or others and by University personnel at other locations are covered by the Rules and Procedures for Users of Radioactive Materials. This includes all of the non-University Park locations except the Milton S. Hershey Medical Center. The medical center is covered by rules that are administered by committees separate from the University Isotopes Committee. Contact EHS prior to beginning work with any radioactive material.

APPENDIX A

SATELLITE ACCUMULATION AREA

Please Post

Do you know your responsibilities for proper handling of hazardous waste?

Please review the following requirements to ensure that you comply with environmental regulations and safe handling procedures.

TRAINING: Environmental regulations require training of people who generate or handle hazardous waste. Training must take place within 90 days of date-of-hire; and annually thereafter.

Training is offered on a regular schedule by Environmental Health and Safety (EHS). Check EHS Homepage: www.ehs.psu.edu for available dates and times.

CONTAINER LABELING: All hazardous waste containers must have a red waste tag at the time waste is first placed into the container. The red Chemical Disposal Label must accurately identify the content of the container.

EHS supplies secondary containers and red tags. Call EHS if you need supplies or additional instructions.

CONTAINER CLOSURE: Hazardous waste containers must be closed at all times during storage, except when waste is being added or removed.

Keep containers closed. Regulations do not permit open funnels in waste containers.

STORAGE: For safety and environmental reasons, hazardous waste must be stored in a designated "Satellite Accumulation Area". These areas must be inspected weekly for container leakage, labeling, chemical compatibility and to determine that total volume does not exceed 55 gallons. Closed, properly labeled containers that are partially filled may remain in a Satellite Accumulation Area indefinitely.

If you have full waste containers, please fill out a Chemical Manifest form available on our web page, www.ehs.psu.edu.