



# **CAMPUS SAFETY HANDBOOK**

**MIDDLE TENNESSEE STATE UNIVERSITY  
Environmental Health & Safety Services**

**Revised October 2021**

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## SAFETY GUIDELINES FOR ACADEMIC DEPARTMENT CHAIRS

### Introduction

All faculty, staff, students, and administrators should work together to create and maintain a safe working and learning environment. In academic departments, chairs have supervisory responsibilities to provide leadership on safety issues. Faculty and staff who supervise student workers or who work with students in labs, shops, studios, and other places where there are potentially hazardous machines, equipment, substances, or materials also have special responsibilities for helping ensure the safety of all those involved. Chairs, faculty, and staff must also be concerned with the safety of students in normal classroom situations and in events they sponsor which are attended by the public. In addition, all university personnel are required to follow all safety regulations and procedures, and to report immediately to the appropriate persons all accidents and injuries, and to report potentially dangerous situations which might result in accidents and injuries.

### Specific Guidelines for Academic Department Chairs

1. Academic department chairs should read or review the **Campus Safety Handbook** annually and provide departmental leadership to ensure a safe learning and working environment.
2. Academic department chairs should appoint annually a faculty or staff member to serve as the departmental safety program coordinator. The coordinator should read or review the **Campus Safety Handbook** thoroughly, should assist the chair in making monthly safety inspections and filing written reports as outlined and prescribed by the university safety officer, should bring safety issues to the attention of the chair and faculty as needed throughout the year, and should participate in safety training when it is offered by the university safety officer. The safety coordinator and the department chair should work together to see that all safety standards and regulations are met and observed.
3. Academic personnel who work in labs, shops, studios and other work places that have potentially hazardous machines, equipment, materials, or substances should read or review the safety manuals annually, fill out the Classroom/Laboratory Safety Analysis Form in Appendix E, conduct regular safety inspections in their work area, take appropriate training when offered by the university safety officer, and take all appropriate and prescribed measures and precautions to insure a safe working environment. Special attention should be given to precautionary procedures and safeguards and to the use of protective equipment, and to make certain all personnel in the area follow the safeguards and use the protective equipment
4. Academic department chairs should address general safety issues each fall with all full-time faculty, adjunct faculty, staff, and graduate teaching assistants. Procedures for emergency situations should be discussed. Everyone should be aware of the nearest unobstructed building exit for all classrooms and workplaces and should at the first class or group meeting in the semester or term see that all students are aware of those exits. All course syllabuses should contain a request for students with disabilities who would need assistance in an emergency evacuation to self-disclose that need to the instructor no later than the second day of class or second group meeting. Following the self-disclosure, the instructor should discreetly secure volunteers from the class or work group to assist in evacuating students who require help. The instructor should make sure that



the volunteers are given proper instructions on methods of evacuating students with disabilities, and particularly those who use motorized and non-motorized wheelchairs.

5. Academic department chairs should see that all accidents and injuries within their units are properly reported as soon as possible after they occur and no later than three business days after the occurrence to both the Human Resources Department and the Environmental Health and Safety Department. Departmental clerical personnel and faculty should also help ensure that all accidents and injuries are reported as soon as possible.

## **SAFETY GUIDELINES FOR PROGRAMS SPONSORED BY ADMINISTRATIVE (NON-ACADEMIC) UNITS**

### **Introduction**

In programs sponsored by Administrative units, the sponsor shall have supervisory responsibilities to provide leadership and guidance on safety issues. Sponsors and those under their direction who provide programmed activities where there are potentially hazardous machines, equipment, substances or materials also have special responsibilities for helping ensure the safety of all those involved. In addition, sponsors are required to follow all safety regulations and procedures, and to report immediately to the appropriate persons all accidents and injuries, and to report potentially dangerous situations which might result in accidents and injuries.

### **Specific Guidelines for Sponsors of Programs by Administrative Units**

1. Sponsors should read or review the **Campus Safety Handbook** and provide leadership to ensure a safe environment for all those involved in the program.
2. The Sponsor should appoint a staff member to serve as the safety program coordinator. The coordinator should read or review the **Campus Safety Handbook** thoroughly, should assist the sponsor in making safety inspections and filing written reports as outlined and prescribed by the university safety officer, and should participate in safety training when it is offered by the university safety officer.
3. Sponsors who provide activities in labs, shops, studios and other work places that have potentially hazardous machines, equipment, materials, or substances should fill out the Classroom/Laboratory Safety Analysis Form in Appendix E, conduct regular safety inspections in their work area during the course of the program, take appropriate training when offered by the university safety officer, and take all appropriate and prescribed measures and precautions to insure a safe environment for those participating in the program. Special attention should be given to precautionary procedures and safeguards and to the use of protective equipment, and to make certain all participants in the area follow the safeguards and use the protective equipment.
4. Sponsors should address general safety issues prior to the start of a program with all participants. Procedures for emergency situations should be discussed. Everyone should be aware of the nearest unobstructed building exit for all classrooms and laboratories and should at the first class or group meeting see that all students are aware of those exits. All introductory program material should contain a request for students with disabilities who would need assistance in an emergency evacuation to self-disclose that need to the program sponsor no later than the end of the first day of the program.

5. Sponsors should see that all accidents and injuries are properly reported as soon as possible after they occur and no later than three business days after the occurrence to both the Human Resources Department and the Environmental Health and Safety Department. Departmental clerical personnel should also help ensure that all accidents and injuries are reported as soon as possible.

## CHAPTER 1 MTSU INJURY AND ILLNESS PREVENTION PROGRAM

### Safety Policy Statement

It is the policy of Middle Tennessee State University, as defined in the *Middle Tennessee State University Policies and Procedures Manual*, that accident prevention shall be considered of primary importance in all phases of operation and administration. It is the intention of Middle Tennessee State University's administration to provide safe and healthy working conditions, and to establish and require safe practices at all times by all employees and students.

The prevention of accidents is an objective affecting all levels of our institution and its operations. It is, therefore, a basic requirement that each supervisor make the safety of all employees within his or her area of supervision an integral part of his or her regular management function. It is equally the duty of each employee to accept and follow established safety regulations and procedures.

Every effort will be made to provide adequate training to employees. However, if an employee is ever in doubt about how to do a job or task safely, it is his or her duty to ask a qualified person for assistance. A qualified person is someone with a recognized degree or professional certificate and extensive knowledge and experience in the subject field who is capable of design, analysis, evaluation and specifications in the subject work, project, or product; or a person with specific training, knowledge and experience in the area for which he or she has the responsibility and the authority to control. Employees are expected to assist management in accident prevention activities. Unsafe conditions must be reported immediately. Fellow employees who need help should be assisted. Everyone is responsible for the housekeeping duties that pertain to his or her job.

Every injury that occurs on the job, even a slight cut or strain, must be reported to management and the Safety Officer as soon as possible. Under no circumstances, except emergency trips to the hospital, should an injured employee leave the work site without reporting an injury. Please work safely. Safety is everyone's business.

### Introduction to Our Program

State and federal law, as well as university policy, make the safety and health of our students and employees the first consideration in operating our institution. Safety and health considerations must be a part of every operation, and every employee's responsibility at all levels. It is the intent of Middle Tennessee State University to comply with all laws concerning the operation of the institution and the health and safety of our students, employees, and visitors. To do this, we must constantly be aware of conditions in all areas that can produce or lead to injuries. No employee or student is required to work under unsafe or dangerous conditions. Cooperation of everyone in detecting hazards, reporting dangerous conditions, and controlling workplace hazards is critical to effective implementation of this program. Employees should inform their supervisor immediately of any situation beyond their ability or authority to correct. Employees will not be disciplined or suffer any retaliation for reporting a safety violation in good faith.

## **Safety First Priority**

The personal safety and health of each student and employee of Middle Tennessee State University is of primary importance. Prevention of occupationally-induced injuries and illnesses is of such consequence that it will be given precedence over operating productivity whenever necessary. To the greatest degree possible, administration, management, and faculty will provide all necessary mechanical and physical resources required for maintaining standards of personal safety and health.

## **Individual Cooperation Necessary**

Middle Tennessee State University maintains a safety and health program which conforms to general industry standards. To be successful, such a program must embody proper attitudes towards injury and illness prevention on the part of supervisors and employees. It requires the cooperation in all safety and health matters, not only of the employer and employee, but between the employee and all co-workers. Only through such a cooperative effort can a safety program in the best interest of all be established and maintained. Safety is no accident; think safety and the job will be safer.

## **Safety Program Goals**

The objective of Middle Tennessee State University is a safety and health program that will reduce the number of injuries and illnesses to an absolute minimum, not merely in keeping with, but surpassing the best experience of similar operations by others. Our goal is zero accidents and injuries.

## **Safety Rules for All Employees**

MTSU cannot anticipate every workplace hazard. Safety is a cooperative undertaking requiring an ever-present safety consciousness on the part of every employee. If an employee is injured, positive and prompt action must be taken to see that the employee receives adequate treatment. No one likes to see a fellow employee injured by an accident. Therefore, all operations must be planned to prevent accidents. To carry out this policy, the following rules will apply:

1. All employees shall follow the safe practices and rules contained in this handbook and such other rules and practices communicated on the job. All employees shall report all unsafe conditions or practices to the proper authority, usually the supervisor on the job. If appropriate corrective action is not taken within a reasonable time, employees may report the unsafe conditions or practices to MTSU Environmental Health and Safety Services for review. Employees have the right to notify the Tennessee Department of Labor and request an inspection if they believe that unsafe and/or unhealthful conditions exist at their workplace. Both MTSU Environmental Health and Safety Services and the Tennessee Department of Labor will, on request, withhold the names of employees who file complaints, pursuant to the **MTSU Occupational Safety and Health Plan**, the Williams-Steiger Occupational Safety and Health Act of 1970, and the Tennessee Occupational Safety and Health Act of 1972.
2. Supervisors shall be responsible for implementing these policies by insisting that employees observe and obey all rules and regulations necessary to maintain a safe work place and safe work habits and practices.

3. Good housekeeping must be practiced at all times in the work area. Clean up all waste and eliminate any dangers in the work area.
4. Suitable clothing and footwear must be worn at all times. Personal protection equipment (hardhats, respirators, eye protection) will be worn whenever needed.
5. All employees will participate in regular safety meetings conducted by their supervisor as often as appropriate for the nature of the work performed. This may range from weekly in maintenance positions to each semester for administrative and faculty positions.
6. Anyone under the influence of intoxicating liquor or drugs, including legally prescribed drugs which might impair motor skills and judgment, shall not be allowed on the job.
7. Horseplay, scuffling, and other acts which tend to have an adverse influence on safety or well-being of other employees are prohibited.
8. Work shall be well planned and supervised to avoid injuries in the handling of heavy materials and while using equipment.
9. No employee shall be permitted to work while his or her ability or alertness is so impaired by fatigue, illness, or other causes that it might expose the employee or others to injury.
10. There will be no consumption of intoxicating liquor or drugs on the job.
11. Employees should be alert to see that all guards and other protective devices are in proper places and adjusted, and shall report deficiencies promptly to their supervisor.
12. Employees shall not handle or tamper with any energy source, electrical equipment, machinery, air lines, water lines, or utilities in a manner which is not within the scope of their duties, unless they have received appropriate training and specific instructions.
13. All injuries should be immediately reported to the supervisor so that arrangements can be made for medical or first aid treatment from an authorized workers' compensation provider as identified by Human Resource Services.
14. When lifting heavy objects, employees should use the large muscles of the leg instead of the smaller muscles of the back.
15. Employees should not throw things, especially material and equipment. They should dispose of all waste properly and carefully in accordance with all applicable regulations and bend all exposed nails so they do not hurt anyone removing the waste.
16. Footwear appropriate for the work environment shall be worn at all times. Shoes with thin or torn soles are never appropriate.

### **Safety and Health Training**

Employee safety and health training is another requirement of an effective injury and illness prevention program. Training is one of the most important elements of any injury and illness prevention program. Such training is designed to enable employees to learn their jobs properly,

bring new ideas to the workplace, reinforce existing safety policies, and put the injury and illness prevention program into action.

Training is required for both supervisors and employees alike. The content of each training session will vary, but each session will attempt to teach the following:

- 1) The success of Middle Tennessee State University's injury and illness prevention program depends on the actions of individual employees as well as a commitment by the University.
- 2) Each employee's immediate supervisor will review the safe work procedures unique to that employee's job, and how these safe work procedures protect against hazards.
- 3) Each employee will learn when personal protective equipment is required or necessary, and how to use and maintain the equipment in good condition.
- 4) Each employee will learn what to do in case of emergencies occurring in the workplace.

Supervisors are also vested with special duties concerning the safety of employees. The supervisors are key figures in the establishment and success of Middle Tennessee State University's injury and illness prevention program. They have *primary responsibility* for actually implementing the injury and illness prevention program, especially as it relates directly to the workplace. Supervisors are responsible for being familiar with safety and health hazards to which employees are exposed, how to recognize them, the potential effects of these hazards, and rules and procedures for maintaining a safe workplace. Supervisors shall convey this information to the employees at the workplace, and shall investigate accidents.

Each university department must conduct periodic safety meetings as often as appropriate for the nature of its operations. The purpose of the meeting is to convey safety information and answer employee questions. The format of most meetings will be to review, in language understandable to every employee, the content of the injury prevention program, special work site hazards, serious concealed dangers, and material safety data sheets. At each safety meeting, the supervisor will review a portion of the university's safe work practices contained in this booklet, or other safety related information. Whenever a new practice or procedure is introduced into the workplace, it will be thoroughly reviewed by the department for safety. A sign-up sheet will be passed around each meeting and notes of the meeting may be distributed afterwards. A copy of the notes will also be placed in a file maintained in each department for employee training. Employee attendance is mandatory.

### **Employee Responsibility for Training**

Teaching safety is a two-way street. Middle Tennessee State University can preach safety, but only employees can practice safety. Safety education requires employee participation.

A meeting of all department employees should be conducted at least every semester by each University department for the purpose of safety instruction. The employees will discuss the application of the University's injury and illness prevention program to actual job assignments. They will also read and discuss a section of the handbook and review application of general safety rules to specific situations.

Remember, the following general rules apply in all situations:

- 1) No employee should undertake a job that appears to be unsafe.
- 2) No employee is expected to undertake a job until he or she has received adequate safety instructions and is authorized to perform the task.
- 3) No employee or student should use chemicals without fully understanding their toxic properties and without the knowledge required to work with these chemicals safely.
- 4) No employee or student should remove any mechanical safeguards from any equipment.
- 5) All employees should immediately report any unsafe conditions to their supervisor or Environmental Health and Safety Services.
- 6) Any employee suffering a work-related injury or illness must report that injury or illness to his or her supervisor at once.
- 7) All employees should use personal protective equipment when and where required. All such equipment must be properly maintained.

### **Accident Prevention Responsibilities**

All employees have a personal responsibility to prevent accidents. They have a responsibility to themselves, their families, their your fellow workers, and to the University. They will be expected to observe safe practice rules and instructions relating to the efficient handling of their work.

Their responsibilities include the following:

- Incorporate safety into every job procedure. No job is done efficiently unless it has been done safely.
- Know and follow safe practice rules.
- Know that disciplinary action may result from a violation of the safety rules.
- Report all injuries immediately, no matter how slight the injury may be.
- Caution fellow workers when they perform unsafe acts.
- Don't take chances.
- Ask questions when there is any doubt concerning safety.
- Don't tamper with anything they do not understand.
- Report all unsafe conditions or equipment to their supervisors immediately.

## **MTSU Campus Safety Handbook Availability**

A copy of this handbook will be provided, free of charge, to each employee at the time of employment and as updates are published. Replacement copies will be provided on request. A copy of this handbook will also be available in the work area.

## **Hazard Identification and Abatement**

This written safety and health plan sets out a system for identifying workplace hazards and correcting them in a timely fashion.

## **Safety Audits**

The best method to establish a safer workplace is to study past accidents, worker compensation claims, and safety and health complaints. Middle Tennessee State University hopes to avoid similar problems in the future by reviewing past injuries. Therefore, whenever there is an accident, and in many cases upon review of past accidents, employees may be requested to participate in a safety audit interview. During the interview, there will be questions about the nature of the investigation and the workplace safety related to the incident. Employees should answer these questions honestly and completely. Also, employees should volunteer any personal observations and/or suggestions for improved workplace safety.

In addition to other preventative practices, there will be a group discussion of the cause of the accident and methods to avoid the type of accidents and injury situations experienced in the past. Work rules will be reviewed and modified based upon the study of these accidents.

The supervisor, when present, is responsible for inspecting the working area both before employees begin and while they are working, but this does not mean employees are no longer responsible for inspecting the workplace also. Each day, before employees begin work, they should inspect the area for any dangerous conditions, and should inform their supervisor of anything significant so other employees, students, and guests can be advised. Employees may also be given written communications regarding unsafe conditions or serious concealed dangers. They should review this communication carefully and adjust workplace behavior to avoid any danger or hazards. If employees are unclear or unsure of the significance of this written communication, they should contact their supervisor and review their planned actions before starting to work. It is better to wait and check, than to go ahead and possibly cause an injury to themselves and others.

Administrators, managers, and supervisors must provide written notice to employees of any serious concealed dangers of which they have actual knowledge. In addition to providing written notice of all serious concealed dangers to employees, managers and supervisors are required to report serious concealed dangers to MTSU Environmental Health and Safety Services and the appropriate vice president within fifteen days of detection, or immediately if such danger would cause imminent harm, unless the danger is abated. A hazard is a serious danger if it is causing or is likely to cause death or serious physical harm. Serious physical harm is any impairment of the body in which part of the body is made functionally useless or is substantially reduced in efficiency on or off the job. Such impairment may be permanent or temporary, chronic or acute. Injuries involving such impairment would usually require treatment by a medical doctor. Serious physical harm is also any illness that could shorten life or significantly reduce physical or mental efficiency by inhibiting the normal function of a part of the body. If the danger cannot be corrected,



then all employees will be warned to take protective action so that the danger will not result in any injuries.

### **Workplace Inspections**

Periodic work place safety inspections will be conducted monthly by the department head or supervisor, when conditions change, or when a new process or procedure is implemented. During these inspections the inspector will review the injury and illness prevention policy and Middle Tennessee State University code of safe work practices. In addition to the examination of records, periodic work place safety inspections may also be conducted by MTSU Environmental Health and Safety Services.

### **Accident Investigation**

A primary tool used to identify the areas responsible for accidents is a thorough and properly completed accident investigation. When an accident occurs, the employee's supervisor or lead employee should begin the accident investigation with the following:

- Beginning with where the accident occurred
- Who was involved
- What exactly happened
- When did the accident occur (specific times are best)
- How did the accident occur, and
- If there are any witnesses, get statements.

The results of each investigation will be reduced to writing and submitted for review by administration or management and Middle Tennessee State University Environmental Health and Safety Services. If the accident resulted in serious injury, the procedure will be directed by the university's attorneys.

If a formal police report or other official investigation is conducted by any government agency, the employee should get the name and badge number of the official, or a business card, and find out when a copy of the official report will be available to the public. If the employee is requested to make a statement, he or she has the right to have the University attorney attend the statement at no cost to the employee.

### **OSHA Records Required**

Copies of required accident investigations shall be maintained by MTSU Environmental Health and Safety Services. A written report is maintained on each accident, injury or on-the-job illness requiring medical treatment. A record of each such injury or illness is recorded by MTSU Environmental Health and Safety Services on OSHA Log and Summary of Occupational Injuries Form 300 according to its instructions. Supplemental records of each injury are maintained by MTSU Environmental Health and Safety Services on the Middle Tennessee State University Report of Injury or Illness. Every year, a summary of all reported injuries or illnesses is posted by MTSU Environmental Health and Safety Services no later than February 1, for one month, until March 1, on OSHA Form 300. These records are maintained for five years from the date of preparation. Certification of employee safety training shall be maintained by the employee's department.

## **Safety Equipment**

Proper safety equipment is necessary for the protection of employees. The University provides protective equipment that meets or exceeds all applicable safety standards.

Employees shall use all safeguards, safety appliances, or devices furnished for their protection and comply with all regulations that may concern or affect their safety. They shall wear their gear properly -- all snaps and straps fastened, cuffs not cut or rolled.

Supervisors shall advise employees as to what protective equipment is required for the job.

Certain jobs require standard safety apparel and appliances for the protection of the employee. The supervisor is aware of the requirements and will furnish his or her employees with the necessary approved protective appliances. These items shall be worn and effectively maintained as a condition of your continued employment and part of our mutual obligation to comply with the Occupational Safety and Health Act.

Safety goggles, glasses, and face shields shall correspond to the degree of hazard, i.e., chemical splashes, welding flashes, impact hazard, dust, etc. Employees shall not alter or replace an approved appliance without permission from their supervisor.

Rubber gloves and rubber aprons shall be worn when working with acids, caustics or other corrosive materials.

Specified footwear must be worn.

No jewelry shall be worn around power equipment.

Hearing protection appliances (approved muffs or plugs) shall be worn by all employees working within any area identified as having excess noise levels. Supervisors will instruct employees in the proper use of safety appliances and apparel.

## **Smoking and Fire Safety**

Fire is one of the worst enemies of any facility. All employees should learn the location of fire extinguishers and learn how to use them.

- Employees can help prevent fires by observing the smoking rules:
- Smoking is not allowed in any buildings.
- If employees are not sure about where they may smoke, they should ask their supervisor.

### **Agreement to Participate**

Employees are required to study and abide by the guidelines contained in this handbook. Employees who have additional questions should discuss the workplace situation with their supervisor. In order to fulfill safety responsibilities employees should:

- Attend all MTSU sponsored training and safety meetings.
- Read all posters and warnings.
- Listen to instructions carefully.
- Follow the Code of Safe Work Place Practices contained herein.
- Participate in accident investigations as requested.
- Accept responsibility for the safety of themselves and others.
- Maintain all required documentation.

### **Further Information**

OSHA standards and publications are available on the internet at <http://www.osha.gov/>.

## CHAPTER 2 GENERAL CODE OF SAFE WORK PRACTICES

### General Fire Safety

The Murfreesboro Fire and Rescue Department (MFRD) is well acquainted with our campus, its location and specific hazards.

All fire doors, shutters, and dampers must be maintained in good operating condition. Fire doors, shutters, and dampers should be unobstructed and protected against obstructions, including their counterweights. Fire door, shutter, and damper fusible links must be in place.

All automatic sprinkler water control valves, if any, air, and water pressures should be checked routinely. The inspection of automatic sprinkler systems is assigned to Facilities Services. Sprinkler heads should be protected by metal guards if they could possibly be exposed to damage. Proper clearance, a minimum of 24 inches, must be maintained below sprinkler heads.

Portable fire extinguishers are provided throughout the MTSU campus and are mounted in readily accessible locations. Fire extinguishers are inspected and serviced regularly, and the date of the last inspection is noted on their tags. Employees and graduate students may be instructed periodically in the use of extinguishers and fire-protection procedures at the discretion of the department head. Employees should notify Facilities Services of any damage to fire-protection equipment.

### Open Flames and Candles

Lighting devices such as tiki lamps, oil lamps, torches, etc., are absolutely prohibited in all MTSU facilities.

The use of candles and the burning of incense in MTSU residential facilities is prohibited except in conjunction with recognized religious activities and with written authorization of the director of Housing and Residential Life or Greek Life as appropriate. Unused or decorative candles/incense are prohibited in MTSU residential facilities.

The use of candles or the burning of incense in other MTSU facilities may be approved by department heads under the following conditions:

- The department assumes management responsibility for enforcing these conditions. The department also assumes financial responsibility for any damage to the building or contents resulting from candle or incense usage.
- Candles/incense should not be left unattended while burning.
- Candles must be of low-flame variety and must be placed in a sturdy, non-combustible container.
- When in use, candles should be completely enclosed in a tip-resistant non-combustible container. The container, if tipped over, must be capable of containing the entire candle, melted wax, and any convected heat within the container.

- Containers must have a tightly fitting lid that, when closed, will totally extinguish a lit candle.
- All readily combustible materials, such as drapes or curtains, must be secured at least three (3) feet away from the open flame.
- Candles/incense must not be used near heat or smoke detectors or sprinkler heads to prevent activating the device.
- Cone incense must be burned in a noncombustible container or a noncombustible surface with adequate insulating properties to avoid damage to the surface upon which placed. Approved use of stick incense must be burned in such a manner that hot ashes do not contact any combustible material or cause damage to any surface upon which they fall.

### **Environmental Controls**

All employees must be aware of the hazards involved when working with chemicals and the procedures that need to be used when an accident does occur. A training program will give instructions on how to handle the chemical being used and first aid to be applied to victims of chemical exposure. First aid and caution signs will be conspicuously posted to alert individuals on a constant basis. Safety Data Sheets (SDS) identifying the chemicals utilized in the workplace, their symptoms, and effects must be available. The workers must know what the acceptable level of exposure to a chemical is and what safety systems must be in place when working with a chemical. Staff should also be aware of new chemical products which may be available that are less harmful, and they must ensure that facilities are adequately ventilated when using chemicals on the premises.

Spray painting operations shall be conducted in a UL listed, engineered spray booth constructed for this specific purpose and must be equipped with an appropriate exhaust system. Individual departments shall conduct periodic inspections of the booth and note the date on an inspection tag posted on the booth. Field fabricated spray booths are prohibited on campus.

Where welding is taking place, the welder must be aware of ventilation available, the type of respirator that can be used in the area, and if exposure time or other means will suffice as a safe and adequate measure when welding as to the fumes that will be emitted. Welders should also be supplied with protective clothing and a flash shield during welding operations. A fire extinguisher must be readily available in the work area.

When forklifts and other vehicles are used in buildings or other enclosed areas, carbon monoxide levels must be kept below maximum acceptable concentration.

Noise levels also present a potential hazard. Noise levels within a facility must be at acceptable levels and if not, steps must be taken to reduce the level using recommended engineering controls.

When fibrous materials such as asbestos are being handled, necessary precautions must be taken to protect the employee from the material. The material must be labeled, along with signs conspicuously posted that these materials are being used in the area. Employees should be trained in effective methods used to prevent emission of airborne asbestos fibers, silica dust, and other similar hazardous materials. Some of the recommended methods of controlling the

emission of these materials are by using water and vacuuming, rather than blowing and sweeping, the materials.

Written standards must be developed for each job that include a description of job tasks, necessary equipment, required personal protective equipment, and related hazards.

Employees should be screened before assignment to tasks that may expose them to hazards they are not physically capable of handling. An employee who takes an assignment which requires physical labor must be trained to lift heavy loads properly. If the work assignment involves dealing with equipment that produces ultra-violet radiation, the employee must be properly protected or given the correct protective clothing. An employee posted to an assignment on a roadway where there is heavy traffic must be given the designated protective clothing (bright colored traffic orange warning vest) and safety training regarding the hazards of this job.

### **Hazardous Chemical Exposures**

In any organization which utilizes chemical substances, a training program on the handling, hazards, storage, exposure risks, symptoms of chemical exposure, and first aid needs to be part of any new employee's training. There must also be follow-up training sessions as to any new chemical or processes that may be initiated by the University. Follow-up training sessions act as a reinforcement of safety standards that need to be followed daily.

In a training program, employees will learn acceptable levels of chemical exposure, proper storage and labeling of chemicals, and usage of protective clothing and equipment for handling chemicals. They will also learn about potential fire and toxicity hazards, when not to have a chemical in a confined area, or to store in closed containers, usage of eye wash fountains and safety showers, and the necessary posting of open and dangerous areas. It is important that an employee recognize the Threshold Limit Values or Permissible Exposure Limits of airborne contaminants and physical agents in the workplace.

A procedural manual or set of instructions must be part of the program with periodic inspections that clearly indicate whether employees may be mishandling a chemical or endangering themselves or others. Part of the manual or procedures must establish a standard of when and how to deal with chemical spills, neutralizing, and disposing of spills or overflows. Each laboratory where hazardous chemicals are used or stored shall have these procedures included in a Chemical Hygiene Plan specific to that laboratory.

These procedures or Chemical Hygiene Plan must also be available in an area that is easily accessible for reference usage.

First Aid training and equipment will be routine in any facility where chemicals are used. Employees must know how to handle equipment in emergency situations, what equipment needs to be used, and whether the equipment is adequate for the situation.

Respirators may be used either as protective safety equipment or for emergency usage. Therefore, the employee should recognize that respirators need to be stored in a clean, sanitary, convenient location and inspected on a regular basis. Employees should be aware which respirators are approved by NIOSH for particular applications. A written respiratory protection program, hazard assessment, employee training, fit testing, and employee physical examinations are required where respirators are used in the workplace.

Ventilation is another major factor in the design of any facility. Whether by natural means or mechanical, the system must be designed to control dust, fumes, solvents, gases, smoke, or vapors which may be generated in the workplace. It is also important that a medical or biological monitoring system be in operation if appropriate to the hazard level of the chemicals used or stored. If internal combustion engines are used in the facility, or if there is a chance of leakage or mixture with a chemical that could create a toxic gas, atmospheric gas levels must be monitored. If chemicals are used and stored in a facility, they should be in an isolated area that meets the OSHA, EPA, National Fire Code, and Standard Building Code requirements for chemical use or storage. Quantities stored should not exceed immediate needs or regulatory restrictions.

## **Hazard Communication**

When hazardous substances are used in the workplace, a hazard communication program dealing with Safety Data Sheets (SDS), labeling, and employee training will be in operation. SDS materials will be readily available for each hazardous substance used. An annual training program plus regular question and answer sessions on dealing with hazardous materials will be given to keep employees informed.

The program will include an explanation of what an SDS is and how to use and obtain one; SDS contents for each hazardous substance or class of substances; explanation of the Right to Know, identification of where employees can see the employer's written hazard communication program and where hazardous substances are present in their work area, the health hazards of substances in the work area, how to detect their presence, and specific protective measures to be used, as well as informing them of hazards of non-routine tasks and unlabeled pipes.

## **Electrical**

### **General**

Employees assigned to install or maintain electrical wiring and devices will be aware of the OSHA electrical safety standards and shall comply. Employees will be required to report any hazard to life or property that is observed in connection with a job, electrical equipment, or lines. Employees will be expected to make preliminary inspections or appropriate tests to determine conditions before starting work. When equipment or lines are to be serviced, maintained, or adjusted, employees must follow the appropriate lockout-tagout procedure.

Powered equipment such as electrical tools or appliances must be grounded or of the double insulated type. Extension cords being used must have a grounding conductor. The workplace supervisor must be aware that multiple plug adapters are prohibited.

If ground-fault circuit interrupters are installed on each temporary 15 or 20 amperes, 120-volt AC circuit at locations where construction, demolition, modifications, alterations, or excavations are being performed, temporary circuits must be protected by suitable disconnecting switches or plug connectors with permanent wiring at the junction.

No employee shall tamper with electrical fuse boxes or circuit breakers. No employee shall alter existing wiring or install electrical wiring or equipment without specific authorization.

Combustible material must be 18 inches or more away from any light bulb.

## Appliance and Extension Cords

All appliance and extension cords must be maintained in good repair, without splices or fraying; must be approved by Underwriters' Laboratories (UL) or must be in compliance with the National Electrical Code.

Extension cords shall not be run through doors, windows, or other openings in walls, floors, or ceilings. Extension cords should not be used outside of the room where the receptacle is located.

Appliance and extension cords shall not be spliced for any reason. Broken or damaged cords shall be replaced.

All electric cords shall be properly grounded when in use. For example, a 3-prong plug may not be plugged into a household type 2-conductor extension cord; also, adapters are not permitted to allow 3-wire cords to be plugged into 2-wire cords or receptacles.

Household type extension cords may not exceed 8 feet in length and may only have a single outlet at the female end.

**Fuses:** Replacement fuse capacities must not exceed that of the circuit. Placing pennies behind fuses, strapping burned-out fuses, or making other direct contact is prohibited. These practices are extremely hazardous and can result in fire or electrocution.

## Appliances

All appliances must be maintained in good repair; must be approved by Underwriters' Laboratories (UL) and must be in compliance with the National Electrical Code.

Appliances found to be unsafe shall be removed.

Appliances available for use shall be considered in use.

Small appliances, where authorized outside of cafeterias or food service areas, shall be placed on non-combustible surfaces.

Small appliances, where authorized outside of cafeterias or food service areas, may be no closer than 18 inches from any combustible wall, unless that wall is shielded by a metal covering extending at least 12 inches above the appliance.

Any large draw or amperage appliances(s) shall be plugged directly into electrical outlet or provided with individual electrical service.

- a. Examples but not limited to:
  - i. Microwave
  - ii. Coffee makers
    1. K-Cup Style
    2. Espresso makers
  - iii. Insta-pots
  - iv. Convection cooking devices
  - v. Any device which draws over 800 watts of electricity



## **Material Handling**

There must be safe clearance for motorized material handling equipment, such as forklifts, through aisles and doorways.

Aisle ways routinely used by motorized material handling equipment must be designated, permanently marked, and kept clear to allow unhindered passage.

Motorized vehicles and mechanized equipment will be inspected by the vehicle or equipment operator daily or prior to use.

Vehicles must be shut off and brakes must be set prior to loading or unloading.

Containers of combustibles or flammables, when stacked while being moved, must be separated by packing materials or cribbing sufficient to provide stability.

If dock boards (bridge plates) are used when loading or unloading operations are taking place between vehicles and docks the detailed precautions found in Chapter 9 of this handbook must be observed.

Trucks and trailers will be secured from movement during loading and unloading operations.

Dock plates and loading ramps will be constructed and maintained with sufficient strength to support imposed loading.

Hand trucks must be maintained in safe operating condition.

Chutes must be equipped with sideboards of sufficient height to prevent the handled materials from falling off.

Provisions must be made to brake the movement of the handled materials at the delivery end of rollers or chutes.

Pallets must be inspected before being loaded or moved.

Hooks with safety latches or other arrangements will be used when hoisting materials, so that slings or load attachments will not accidentally slip off the hoist hooks.

Securing chains, ropes, chokers, or slings must be adequate for the job to be performed.

When hoisting material or equipment, provisions must be made to assure no one will be passing under the suspended loads.

Safety Data Sheets will be available to employees handling hazardous substances.

### **Safety Posters and Other Required Safety Documents**

Middle Tennessee State University is required to post certain employment related information. The required information is maintained on the bulletin board at Human Resource Services where employees can find the following required posters:

OSHA Safety and Health Protection on the Job

Notice of Workers Compensation

Notice to Employees: Unemployment Insurance and Disability Insurance

Access to Medical and Exposure Records

Log and Summary of Occupational Injuries and Illnesses (Posted 1 February through 1 March for the previous year)

Hazardous Chemical Right to Know Poster

A copy of this handbook will be maintained by each University department.

Safety Data Sheets for Middle Tennessee State University's campus are available in each using department. When employees of any other employer are required to work on campus, such as for service calls, installations, or construction, the job site will maintain a collection of - Safety Data Sheets that describe any hazards unique to that site. The other employer's job site coordinator or supervisor will be provided with the exact location of the SDS information. In addition to these required safety postings, emergency numbers are maintained in each departmental office.

### **Work Environment, General**

Work areas must be clean and orderly. Work surfaces must be kept dry or appropriate means taken to assure the surfaces are slip-resistant. Spills must be cleaned up immediately. All combustible scrap, debris and waste must be stored safely and removed promptly. Metallic or conductive dust must be prevented from entering or accumulating on or around electrical enclosures or equipment.

Waste containers in work areas must be covered. Oily and paint-soaked rags are combustible and should be discarded in sealable metal containers only. Paint operation and storage areas must be cleaned regularly.

All oil and gas fired devices should be equipped with flame failure controls that will prevent flow of fuel if pilots or main burners are not working.

All pits and floor openings must be covered or otherwise guarded.

## **Walkways**

All aisles and passageways must be kept clear. Also, aisles and passageways in shop or storage should be clearly marked. Wet surfaces must be covered with non-slip material and all holes properly covered or marked with warning guards. All spills must be cleaned up immediately, and a caution sign placed on all wet or drying surfaces.

In cases of passageways used by forklifts, trucks or other machinery, a separate aisle should be used for walking, if available. If no separately marked aisle is available, employees should use extreme caution. Employees should also be aware that walking in a passageway used by machinery is like walking in the middle of a street used by cars: They may have the right of way, but the heavier vehicle cannot always see a pedestrian and cannot always stop in time. The key to moving around in such circumstances is to stop, look and listen and then to move when there is no danger. Employees should make eye contact with the drivers of moving vehicles to confirm that the drivers see them.

Equipment must be properly stored so that sharp edges do not protrude into walkways. Changes in elevations must be clearly marked, as must passageways near dangerous operations like welding, machinery operation or painting. If the walkway or stairway is more than thirty inches above the floor or ground, it must have a guardrail.

If an employee becomes aware of any breach of these standards, he or she should inform the workplace supervisor.

## **Floor and Wall Openings**

Employees should use caution when working near floor and wall openings. All floor openings (holes) should be guarded by a cover, guardrail, or equivalent barrier on all sides except at the entrance to stairways and ladders. Toe boards must be installed around the edges of a permanent floor opening. Skylights must be able to withstand at least 200 pounds pressure. Glass used in windows, doors, and walls (including glass block) must be able to withstand a human impact, and if required by code, be shatterproof safety glass. Before beginning work at a new location, inspect it to ensure that all floor openings which must remain open, such as floor drains, are covered with grates or similar covers. In roadways and driveways, covers with capacity to carry a truck rear axle load of at least 20,000 pounds must protect all manholes and trenches. In office and classroom buildings, fire resistive construction requires that doors and hallway closures be properly rated and equipped with self-closing features. Employees should always be sure that there are at least two fire emergency exits accessible from their location at all times.

## **Work Area, General**

Fire extinguishers must remain accessible at all times. Means of egress should be kept unblocked, well-lighted and unlocked any time the building is occupied. Excessive combustibles (paper) may be not stored in work areas.

All stairwells must remain clear at all times. Furnishings or storage are not permitted in stairwells at any time.

Aisles and hallways must be kept clear at all times. Workplaces are to be kept free of debris, floor storage and electrical cords.

Adequate aisle space is to be maintained. File cabinet drawers should be opened one at a time and closed when work is finished.

Proper lifting techniques are to be used by employees to avoid over exertion and strain when carrying loads.

No employee will be permitted to work when under the influence of alcohol or any other intoxicating substance.

### **Driving**

Drive safely. If vehicles are used during the workday, seat belts and shoulder harnesses are to be worn at all times. Vehicles should be locked when unattended to avoid theft of university or personal property. Do not exceed the speed limit. Vehicles must be parked in legal spaces and must not obstruct traffic when off campus. On campus vehicles must not be parked in handicapped spaces, fire lanes, or at fire hydrants, and must not obstruct traffic. Defensive driving must be practiced by all employees.

### **Tool Maintenance**

Faulty or improperly used hand tools are a hazard. All employees shall be responsible for ensuring that tools and equipment (both University and employee-owned) used by them or other employees at their workplace are in good condition and in compliance with applicable safety standards. Hand tools such as chisels, punches, etc., which develop mushroom heads during use, must be reconditioned or replaced, as necessary. Broken or fractured handles on hammers, axes, and similar equipment must be replaced promptly. Worn or bent wrenches should be replaced. Appropriate handles must be used on files and similar tools.

Appropriate safety glasses, face shields, etc., must be worn while using hand tools or equipment which might produce flying materials or be subject to breakage. Eye protection must be worn when driving in tempered spuds or nails.

Check your tools often for wear or defect. Jacks must be checked periodically to assure they are in good operating condition. Tool handles must be secured tightly into the heads of tools. Tool cutting edges should be kept sharp enough so the tool will move smoothly without binding or skipping. When not in use, tools should be stored in a dry, secure location.

### **Ladders**

Check ladders each and every time before you climb. Ladders should be maintained in good condition: joints between steps and side rails should be tight; hardware and fittings securely attached; and movable parts operating freely without binding or undue play. Non-slip safety feet should be provided on each ladder. Ladder rungs and steps should be free of grease and oil. Employees are prohibited from using ladders that are broken, missing steps or rungs, or that have broken side rails or other faulty equipment.

It is prohibited to place a ladder in front of doors opening toward the ladder except when the door is blocked open, locked, or guarded.

It is prohibited to place ladders on boxes, barrels, or other unstable bases to obtain additional height.

Be careful when you climb a ladder. Face the ladder when ascending or descending. Do not use the top step of ordinary stepladders as a step. When portable ladders are used to gain access to elevated platforms, roofs, etc., the ladder must always extend at least 3 feet above the elevated surface.

It is required that when portable ladders are used, the base must be so placed that slipping will not occur, unless it is lashed or otherwise held in place.

All portable metal ladders must be legibly marked with signs reading "CAUTION" - "Do Not Use Around Electrical Equipment." Employees are prohibited from using ladders as guys, braces, skids, gin poles, or for other than their intended purposes. Only adjust extension ladders while standing at a base (not while standing on the ladder or from a position above the ladder). Metal ladders should be inspected for tears and signs of corrosion. Rungs of ladders should be uniformly spaced.

### **Portable Power Tools**

Portable power tools pose a special danger to employees because they are deceptively small and light, yet they can do great bodily harm if used improperly or poorly maintained. These rules apply to all power tools, but are especially important when handling portable saws, drills, and power screw drivers.

Check your equipment before you use it. All grinders, saws and similar equipment should be equipped with appropriate safety guards. Power tools should not be used without the correct shield, guard, or attachment recommended by the manufacturer.

Portable circular saws must be equipped with guards above and below the base shoe. Circular saw guards should be checked periodically and before each use to assure they are not wedged up, thus leaving the lower portion of the blade unguarded.

All rotating or moving parts of equipment should be guarded to prevent physical contact. All cord-connected, electrically operated tools and equipment should be effectively grounded or of the approved double insulated type. Effective guards must be in place over belts, pulleys, chains, sprockets, on equipment such as concrete mixers, air compressors, etc. If portable fans are provided, they must be equipped with full guards or screens having openings 1/2 inch or less.

Do not attempt to lift heavy objects without proper equipment. Hoisting equipment with hoist ratings and characteristics appropriate for the task will be made available for lifting heavy objects.

Power tools are either battery operated or wired. If battery operated, do not under-estimate their power. A small electric drill or power screwdriver can cause a severe injury if it lands in the wrong place. While not usually a shock hazard, the battery pack contains toxic chemicals and does emit a low voltage electric current. Do not drop or incinerate a battery pack or a tool with a self-contained power source.

Hard wired equipment can be portable or fixed. Typically used with extension cords, the more powerful hard-wired equipment presents a double safety problem: the actual equipment plus its electrical power source. Ground-fault circuit interrupters must be provided on all temporary electrical 15 and 20 ampere circuits used during periods of construction. Pneumatic and hydraulic hoses on power-operated tools should be checked regularly for deterioration or damage.

## **Power Mowers and Related Equipment**

Operators of power mowers and related equipment shall be responsible for examining the area to be cut for loose objects and debris, such as wire or sticks, that can be thrown by the rotating blade.

Engines will be shut off and smoking materials put out when refueling.

Keep hands and feet from under the machine.

Fuels will be transported and dispensed only from approved safety cans.

Steep slopes will be avoided, whether using a push or riding mower.

Appropriate foot, eye, head, and hearing protection shall be worn when operating power mowers and related equipment.

## **Mechanical Lockout-Tagout**

**Point of Operation Devices:** Point of operation devices shall protect the operator by:

- \* Preventing and/or stopping normal movement of the machine if the operator's hands are inadvertently placed in the point of operation, or
- \* Preventing the operator from inadvertently reaching into the point of operation or withdrawing his/her hands if they are inadvertently located in the point of operation, or
- \* Preventing the operator from inadvertently reaching into the point of operation at all times, or
- \* Requiring application of both of the operator's hands to machine operating controls and locating such controls at such a safety distance from the point of operation that moving components complete their travel or stop before the operator can reach into the point of operation with his/her hands, or
- \* Enclosing the point of operation before an operation can be initiated, so as to prevent an operator from reaching into the point of operation prior to closure or prior to cessation of motion.

A gate or movable barrier device shall protect the operator.

**Presence Sensing Devices:**

- \* A presence sensing point of operation device, if provided, shall protect the operator by interlocking into the control circuit to prevent or stop motion if the operator's hand or other part of his/her body is within the sensing field of the device during operation.
- \* The device may not be used on machines using full revolution clutches.

- \* The device may not be used as a tripping means to initiate operation.
- \* The device shall be constructed so that a failure within the system does not prevent the normal stopping action from being applied to the machinery when required, and prevents further operation until the failure is corrected. The failure shall be indicated by the system.
- \* The safety distance from the sensing field to the point of operation shall be greater than the distance determined by the following formula:

$D_s = 63 \text{ inches/second} \times T_s$  where:

$D_s$  = minimum safety distance (inches);

63 inches/second = hand speed constant; and

$T_s$  = stopping time of the press measured at approximately 90° position of crankshaft rotation (seconds).

- \* Guards shall be used to protect all areas of entry to the point of operation not protected by the presence sensing device.

#### **Pull-Out Devices:**

- \* Pull-out devices, where provided shall protect the operator and shall include attachments for each of the operator's hands.
- \* Attachment shall be adjusted to prevent the operator from reaching into the point of operation or to withdraw the operator's hands from the point of operation before operation.
- \* A separate pull-out device shall be provided for each operator if more than one operator is used on a machine.
- \* Each pull-out device in use shall be visually inspected and checked for proper adjustment at the start of each operator shift, following a new set-up, and when operators are changed. Necessary maintenance or repair or both shall be performed and completed before the machine is operated.

**Partial Enclosures:** Partial enclosures must be provided on both sides of the point of operation to prevent the operator from reaching around or behind the machine and into the point of operation during operation. Partial enclosures shall not themselves create a pinch point or shear hazard.

**Holdout or Restraint Devices:** A holdout or a restraint device shall protect the operator and shall include attachments for each of the operator's hands. Such attachments shall be securely anchored and adjusted in such a way that the operator is restrained from reaching into the point of operation. A separate set of restraints shall be provided for each operator if more than one operator is required on a machine.

### **Two Hand Control Devices:**

- \* When used in press operations requiring more than one operator, separate two hand controls shall be provided for each operator, and shall be designed to require concurrent application of all operators' controls to activate the slide. The removal of a hand from any control button shall cause the slide to stop.
- \* The safety distance between each two-hand control device and the point of operation shall be greater than the distance determined by the following formula:

$D_s = 63 \text{ inches/second} \times T_s$ , where:

$D_s$  = minimum safety distance (inches);

63 inches/second = hand speed constant; and

$T_s$  = stopping time of the press measured at approximately 90° position of crankshaft rotation (seconds).

### **Furnaces and Kilns**

Everyone operating metal pouring furnaces or kilns shall be required to wear appropriate eye protection, gloves, aprons, and other personal protective equipment. No part of the body, particularly skin and eyes, should be exposed during the pouring or removal of heated items.

Employees operating metal pouring furnaces or kilns shall be provided with appropriate eye protection, gloves, aprons, and other personal protective equipment. Students may be required to furnish appropriate eye protection, gloves, aprons, and other personal protective equipment at their own expense.

Portable fire extinguishers of the appropriate class and rating shall be immediately available when any furnace or kiln is in use.

### **Automotive Facilities**

Floors, walking surfaces, racks, lifts, and tools shall be kept free of grease, oil, or other lubricant spillage at all times.

Floors, walking surfaces, racks, and lifts shall be kept free of debris and trash at all times.

Drop lights shall be approved by Underwriters' Laboratories, equipped with shatter proof globes or shields, and cords shall not be spliced for any reason.

Oily or greasy rags shall be placed in a self-closing metal container that shall be emptied daily. The container shall be kept closed and shall not be left open for any reason.

Cleaning of parts, tools, floors, or other materials may only be done with soap and water, or appropriate solvents intended for that purpose. Gasoline or other flammable liquids should *never* be used for cleaning under any circumstances.



Flammable and combustible liquids should be stored only in approved safety cans or storage cabinets in compliance with OSHA standards and National Fire Codes.

Smoking shall be in compliance with the MTSU smoking policy and must be 50 or more feet away from any flammable liquid container or fuel pump. This includes any vehicle occupants.

Portable fire extinguishers of the appropriate class and rating shall be immediately available in readily accessible locations.

Engines and machinery shall not be operated in enclosed areas unless adequate ventilation or a mechanical exhaust system is used.

### **Steam, Boiler, HVAC, Mechanical Rooms, and Data Communication Closets**

Steam, boiler, HVAC (Heating, Ventilation, and Air Conditioning), mechanical rooms, and data communication closets shall be always kept clean and orderly.

Steam, boiler, HVAC, mechanical rooms, and data communication closets shall not be used for storage of any type.

### **First Aid**

**First Aid Kits:** First-aid kits and required contents, where provided, shall be maintained in a serviceable condition. Unit-type kits have all items in the first-aid kit individually wrapped, sealed, and packaged in comparable sized packages. The commercial or cabinet-type kits do not require all items to be individually wrapped and sealed, but only those which must be kept sterile. Items such as scissors, tweezers, tubes of ointments with caps, or rolls of adhesive tape, need not be individually wrapped, sealed, or disposed of after a single use or application. Individual packaging and sealing shall be required only for those items which must be kept sterile in a first-aid kit.

First-aid kits shall contain at least the following items:

#### 10 Package Kit:

- 1 Pkg. Adhesive bandages, 1" (16 per pkg.)
- 1 Pkg. Bandage compress, 4" (1 per pkg.)
- 1 Pkg. Scissors\* and tweezers (1 each per pkg.)
- 1 Pkg. Triangular bandage, 40" (1 per pkg.)
- 1 Pkg. Antiseptic soap or pads (3 per pkg.)
- 5 Pkgs. of consulting physician's choice

#### 16 Package Kit:

- 1 Pkg. Absorbent gauze, 24" x 72" (1 per pkg.)
- 1 Pkg. Adhesive bandages, 1" (16 per pkg.)
- 2 Pkgs. Bandage compresses, 4" (1 per pkg.)
- 1 Pkg. Eye dressing (1 per pkg.)
- 1 Pkg. Scissors\* and tweezers (1 each per pkg.)
- 2 Pkgs. Triangular bandages, 40" (1 per pkg.)
- 1 Pkg. Antiseptic soap or pads (3 per pkg.)
- 7 Pkgs. of consulting physician's choice

24 Package Kit:

- 2 Pkgs. Absorbent gauze, 24" x 72" (1 per pkg.)
- 2 Pkgs. Adhesive bandages, 1" (16 per pkg.)
- 2 Pkgs. Bandage compresses, 4" (1 per pkg.)
- 1 Pkg. Eye dressing (1 per pkg.)
- 1 Pkg. Scissors\* and tweezers (1 each per pkg.)
- 6 Pkgs. Triangular bandages (1 per pkg.)
- 1 Pkg. Antiseptic soap or pads (3 per pkg.)
- 9 Pkgs. of consulting physician's choice

36 Package Kit:

- 4 Pkgs. Absorbent gauze, 24" x 72" (1 per pkg.)
- 2 Pkgs. Adhesive bandages, 1" (16 per pkg.)
- 5 Pkgs. Bandage compresses, 4" (1 per pkg.)
- 2 Pkgs. Eye dressing (1 per pkg.)
- 1 Pkg. Scissors\* and tweezers (1 each per pkg.)
- 8 Pkgs. Triangular bandages, 40" (1 per pkg.)
- 1 Pkg. Antiseptic soap or pads (3 per pkg.)
- 13 Pkgs. of consulting physician's choice

Scissors shall be capable of cutting 2 layers of 15 oz. cotton cloth or its equivalent.

The first-aid kits are maintained at the ten, sixteen, twenty-four or thirty-six package level.

Emergency phone numbers shall be posted and maintained either on or in the cover of each first-aid kit and at or near all phones.

**Eye Washes and Emergency Showers:** Where the eyes or body of any person may be exposed to injurious chemicals and/or materials, suitable facilities for quick drenching or flushing of the eyes and body are provided, within the work area, for immediate emergency use. Eye washes and emergency showers shall always remain unobstructed and available for use.

**Requesting Assistance:** All emergencies occurring on campus are to be reported to the appropriate response agency.

1. For Police/ Law Enforcement Assistance call the University Police Department Dispatcher at 615-898-2424.
2. For Fire/ Emergency Medical Assistance call the Murfreesboro Fire and Rescue Department (MFRD) at 911 or 615-893-1311
3. All emergencies occurring at off campus sites, such as the airport and farm, are to be reported by dialing 911.

### First Aid Station

MTSU Health and Human Services provides basic first aid services at the Campus Recreation Building during normal business hours.

## **CHAPTER 3 CHEMICAL SAFETY**

### **Introduction**

The objective of this chapter is to provide guidance to all Middle Tennessee State University employees, students, and participating guests who use hazardous materials so that they may perform their work safely. Many of these materials are specifically explosive, corrosive, flammable, or toxic; they may have properties that combine these hazards. Many chemicals are relatively non-hazardous by themselves but become dangerous when they interact with other substances, either in planned experiments or by accidental contact. This chapter of the Employee Safety Handbook also describes the recommendations and requirements established to govern the use of substances that pose an exposure risk. All personnel using chemicals are expected to be familiar with these guidelines and conduct their operations accordingly.

To avoid injury and/or property damage, persons who handle chemicals in any area of the university must understand the hazardous properties of the chemicals with which they will be working. Before using a specific chemical, safe handling methods must always be reviewed. Supervisors are responsible for ensuring that the equipment needed to work safely with chemicals is provided. The university provides this equipment to employees.

### **Hazard Communication Plan**

On May 25, 1986, the Occupational Safety and Health Administration (OSHA) placed in effect the requirements of a new standard called Hazard Communication (29 CFR 1910.1200). This standard establishes requirements to ensure that chemical hazards in the workplace are identified and that this information, along with information on protective measures, is transmitted to all affected employees.

This section describes how Middle Tennessee State University employees are informed of the potential chemical hazards in their work area so they can avoid harmful exposures and safeguard their health. Components of this program include labeling, preparing a Safety Data Sheet (SDS), and training.

Middle Tennessee State University departments are required to maintain all SDS received with incoming chemical shipments. The University commonly uses small quantities of many different hazardous materials; the hazards change, often unpredictably; and many materials are of unknown composition. SDS must be obtained and maintained for all chemicals in the workplace that are hazardous because of toxicity, flammability, or reactivity.

### **Responsibilities of Supervisors/Management**

Identify potential chemical hazards for respective work areas.

Ensure that all chemicals are properly labeled with, at a minimum, the chemical name, common name, and manufacturer.

Obtain/maintain copies of safety data sheets, as required, of each hazardous material used in the work area and make them accessible to employees during work hours.

Have the written Hazard Communication Program available to all employees.

Provide hazard-specific training for employees.

### **Responsibilities of Employees**

Attend safety training and meetings.

Perform operations in safe manner.

Notify management immediately of any hazards or injuries.

### **Responsibilities of the Environmental Health and Safety Services Group.**

Develop a written Hazard Communication Program.

Maintain a central file of general electronic safety data sheets for emergency use.

Provide generic training programs on request.

Assist supervisors in developing hazard-specific training programs.

Advise and assist affected departments of the Hazard Communication Standard written policy and implementation requirements.

Evaluate operations for compliance with OSHA mandated standards.

Provide technical guidance to personnel regarding the selection of appropriate work practices and engineering controls.

Investigate all reported incidents that result in chemical exposure of personnel or the environment and recommends corrective actions to reduce the potential for recurrence.

Supervise cleanup operations where incidents have resulted in significant chemical contamination.

### **Responsibilities of the Department Safety Coordinator**

Maintain a central file of Safety Data Sheets for all chemicals used or stored in the department or department managed facilities.

Review and update department chemical container labels.

Provide departmental training programs.

Assist department supervisors in developing hazard-specific training programs within the department.

Oversee the Hazard Communication Standard written policy and implementation plans.

Alert students, guests, and contractors to hazardous materials in department work areas.

Alert contractors that they must provide information and SDS to any potentially exposed department employees on hazardous materials that they bring to the department's area of responsibility.

### **Responsibilities of the Supervisor**

Employ and enforce the use of appropriate practices, engineering controls, and personal protective equipment that reduce the potential for exposure as low as reasonably achievable.

Inform employees under his/her supervision of the potential hazards associated with the use of hazardous chemicals and provides proper training and instruction in work practices, engineering controls, and emergency procedures.

Review operating procedures with EH&S, Department Chairpersons, Chemical Hygiene Officer (CHO), University Staff and Laboratory Supervisors before the initiation of an operation or when significant changes occur in an ongoing operation.

Report to Health and Human Services and EH&S of any incident that involves the exposure of personnel to hazardous chemicals.

Report to the EH&S any incident that results in danger of environmental contamination from hazardous chemicals.

Provide any necessary assistance during accident investigations.

### **Responsibilities of Other University Personnel**

Know and comply with safety practices required for the assigned task. Wear appropriate protective clothing.

Report all unsafe conditions to the supervisor.

Attend appropriate training in safety procedures for handling and using hazardous materials.

Report to the supervisor when pregnant to review working conditions.

Report to the immediate supervisor and EH&S all facts pertaining to incidents resulting in exposure or environmental contamination to chemicals.

### **Knowledge of Potential Chemical Hazards**

The number of hazardous chemicals and the number of reactions between them is so large that prior knowledge of all potential hazards cannot be assumed. Therefore, when the chemical properties of a material are not fully known, it should be assumed to be hazardous and used in as small quantities as possible to minimize exposure and thus reduce the magnitude of unexpected events.

### **General Safety Precautions**

The following general safety precautions should be observed when working with chemicals:

- \* Keep the work area clean and orderly.
- \* Use the necessary safety equipment.
- \* Carefully label every container with the identity of its contents and appropriate hazard warnings.
- \* Store incompatible chemicals in separate areas.
- \* Substitute less toxic materials whenever possible.
- \* Limit the volume of volatile or flammable material to the minimum needed for short operation periods.
- \* Provide means of containing the material if equipment or containers should break or spill their contents.
- \* Provide a back-up method of shutting off power to a heat source if any hazardous chemical is involved.
- \* Obtain and read the Safety Data Sheets.

## Practices and Controls

The practices and engineering controls included in this section provide general safeguards that are recommended for the use of chemicals. To select the appropriate safeguards, knowledge is required of the physical and chemical properties, the proposed use, the quantity needed, the chemical hazards, and the applicable health and safety standards. Careful judgment is therefore essential in planning any activity that involves chemicals. Environmental Health and Safety Services is available to assist the supervisor in selecting the appropriate safeguards. Safety Data Sheets provide details of chemical and physical properties, hazards, and safe operational procedures for specific chemicals.

Wear gloves appropriate to the task. Discard or decontaminate as appropriate after each use and immediately after any obvious contact.

Wear appropriate eye protection. The type of eye wear used will depend upon the hazard presented by the operation and chemical in use. Contact lenses should be removed.

Do not eat, drink, smoke, chew gum or tobacco, or apply cosmetics where chemicals are used or stored.

Do not pipette by mouth - use mechanical aids.

Wash hands immediately after the completion of any procedure. Wash immediately after an exposure, or if appropriate, shower the affected area.

Provide respirators for emergency use where appropriate. (Personnel who will use respirators must have medical approval and be properly trained before use.)

### **Operational Practices:**

Label all primary and secondary containers and place warning signs on entrances to work or storage areas. For information concerning appropriate labels and signs, call Environmental Health and Safety Services.

Limit entry to personnel authorized by the supervisor to work or storage areas. Women who are pregnant must consult with their physician before the start of any activity involving chemicals.

### **Maintenance and Emergency Storage Areas:**

Cover work surfaces with stainless steel or plastic trays, absorbent paper with a moisture-proof lining, or other impervious material. Decontaminate or discard the protective covering materials after the procedure has been completed.

Conduct aerosol-generating procedures or procedures involving volatile chemicals in a chemical vapor hood, a glove box, or other suitable containment equipment. Examples of aerosol-producing operations: opening of closed vessels; transfer operations; preparation of mixtures; blending; sonification; open vessel centrifugation.

Capture vapors or aerosols produced by analytical instruments with local exhaust ventilation or ventilation into a chemical vapor hood.

Decontaminate obviously contaminated equipment.

Transport chemicals in tightly closed containers placed within a durable outer container.

Maintain an inventory of all chemicals including the quantities acquired, dates of acquisition, and final disposition.

Keep working quantities to a minimum; do not exceed the amounts required for use in one week. This does not include amounts stored in a designated area or a central cabinet.

Dissolve finely divided powdered chemicals, if possible, into a liquid. This reduces the possibility of generating an aerosol.

Use mixtures that are as dilute as possible.

Place contaminated materials in a closed plastic bag and sealed primary container. Place the primary container in a durable box before transporting.

Label each primary container with content, amount, physical state, and percentage breakdown when dealing with a mixture. Each box must have a complete list on contents or description written on a Hazardous Material packing list. To obtain blank packing lists, contact the supervisor or Departmental Safety Coordinator.

### **Chlorinated Hydrocarbons**

The chlorinated hydrocarbons have many industrial as well as laboratory uses. At Middle Tennessee State University, they are commonly used as cleaners, degreasers, paint removers, solvents, and extractants.

#### **Hazards:**

Most of these compounds have an anesthetic (narcotic) effect, causing workers to feel "drunk," become unconscious, or even die if the amount of inhaled vapor is excessive. Individuals working around moving machinery can be subject to accidents when their judgment and coordination are impaired by the anesthetic effects of inhaled solvents. Usually, it is the anesthetic effect that is responsible for sudden unconsciousness of persons exposed to solvents in tanks, pits, and other confined spaces. Trichloroethylene, ethylene dichloride, and chloroform are examples of compounds that are powerful anesthetics.

Some, but not all, of the chlorinated hydrocarbons are strong poisons that damage the liver, kidneys, nervous system, and/or other parts of the body. This damage may be permanent or even cause death, although recovery from lesser exposures does occur. Single exposures to higher concentrations of vapors, as well as repeated exposure to small concentrations can produce symptoms of poisoning. These symptoms most often come on gradually, with nausea, loss of appetite, vomiting, headaches, weakness, and mental confusion most often noted. Carbon tetrachloride, tetrachloroethane, and 1,1,2-trichloroethane are examples of compounds that are strong poisons.

All chlorinated hydrocarbons on repeated contact with the skin can cause rashes (dermatitis) because of their ability to remove the protective fats and oils from the skin. A few of these solvents are known to be capable of entering the body through contact with the skin. In addition, many of



these compounds are highly irritating to the membranes around the eyes and in the nose, throat, and lungs. Examples of chlorinated hydrocarbons that have irritant properties are ethylene dichloride and chloroform.

Some compounds are human suspect carcinogens, such as carbon tetrachloride and chloroform. In studies on laboratory animals, several chlorinated hydrocarbons have been linked to the production of cancer. These compounds are ethylene dichloride, perchloroethylene, and trichloroethylene. At present, there is no direct evidence associating these compounds with an increased risk of cancer in humans.

When heated, these compounds can decompose, forming highly toxic fumes of phosgene, hydrochloric acid, and chlorine.

Most of the chlorinated hydrocarbons are nonflammable; however, there are exceptions. The Table below lists important characteristics of some of the common chlorinated hydrocarbon solvents.

Common name	Chemical name	TLV* (ppm)	Volatility** (mm Hg)	Flammability
Acetylene dichloride***	1,2-dichloroethylene	200	200	Moderate
Carbon tetrachloride***	Tetrachloromethane	5	115	Nonflammable
Chloroform***	Trichloromethane	10	200	Nonflammable
Ethylene dichloride	1,2-dichloroethane	10	80	Moderate
Methyl chloroform	1,1,1-trichloroethane	350	132	Nonflammable
Methylene chloride	Dichloromethane	100	435	Nonflammable
Perchloroethylene	Tetrachloroethylene	50	18	Nonflammable
Tetrachloroethane	1,1,2,2-tetrachloroethane	1	8	Nonflammable
Trichloroethane	1,1,2-trichloroethane	10	25	Nonflammable
Trichloroethylene	Trichloroethylene	50	76	

\* The threshold limit value (TLV) is expressed as parts of pure solvent vapors per million parts (ppm) of air. The lower this number the greater the hazard.

\*\* The vapor pressure at 77F (25C). The higher this number the greater the hazard.

\*\*\* Designated as a carcinogen by OSHA.

Because of their inherent properties, these compounds are harmful to varying degrees.

For questions concerning the hazards of a specific compound(s), contact EH&S, Chemical Hygiene Officer, Department Chairperson and/or the Laboratory Supervisor.

### Precautions:

The above table includes information on the TLV, the volatility, and the flammability of the compounds listed. These three characteristics always must be taken into careful consideration in selecting a compound in order to minimize the health hazards connected with its use.

If there is a possibility of skin or eye contact, wear the appropriate protection equipment. Gloves made of impervious material should be worn for hand protection. Barrier creams are in no instance as protective as impervious gloves. However, if finger dexterity is an absolute requirement, a solvent resistant ointment may be used in some instances.

Control by local exhaust ventilation or chemical vapor hoods is necessary for high vapor concentrations.

Chlorinated hydrocarbons should be stored in cool, dry, and well-ventilated areas. Containers should be checked for leaks because metal corrosion can occur from hydrochloric acid produced by the decomposition of the solvent. Decomposition may occur under conditions of high temperature, exposure to moisture, and exposure to ultraviolet light.

Compounds, both in the original containers and in containers used by employees, must be labeled so that the potentially injurious substances are plainly identified.

Chlorinated hydrocarbons must be placed in an organic liquid waste can for disposal. When the waste can is full hazardous waste disposal personnel must be called to pick it up.

### **Fiberglass**

Fiberglass is found in many materials (such as flexible duct, Nema G-10, and electrical wire insulation) used at the University.

#### **Hazards:**

Irritation of the exposed skin, a common complaint among persons working with this material, is the result of the mechanical irritation from small glass fibers. The sensation varies from an itch to a prickling or burning sensation. Common locations involved are the arms, face, or neck.

Another cause of dermatitis is contact with fiberglass binders or coating materials.

Except for skin irritation, there is no other known health hazard associated with exposure to fiberglass particles. Results of medical research, including examinations of hundreds of persons who have worked in fiberglass plants for as long as 25 to 30 years, give evidence that fiberglass is inert and non-injurious to the person's overall health. It will not cause silicosis, a lung disease associated with exposure to some minerals.

#### **Precautions:**

Persons with skin problems should consult a physician before working with fiberglass.

Wear loose-fitting clothing and change daily.

Adherent fibers on the skin should be washed off with an ample amount of lukewarm or cool water.

Air hoses and brooms should not be used to clean off fibers from the body because these methods may drive the fibers into the skin.

Showering at the end of a work shift is advisable.

Plastic binders should be fully cured before working on fiberglass laminates.

Use vacuum pickup units when machining fiberglass parts.

Practice good housekeeping.

Some skin protective creams may be of benefit.

At home, clothing should be washed separately in a tub or basin. Washing machines should not be used. Ideally, rubber gloves should be worn. The tub or basin should then be fully rinsed.

### **Flammable Liquids**

Flammable and combustible liquids include oils, greases, tars, oil base paints, lacquers, and flammable gases. Flammable aerosols (spray cans) are also treated here. These are collectively known as Class B combustibles.

Water should not be applied to fire in a flammable or combustible liquid. The use of water may float burning liquids, causing the fire to spread more rapidly. In flammable and combustible liquids fires are usually extinguished by excluding the air around the burning liquid. This is accomplished by one of several approved types of fire extinguishing agents, e.g., carbon dioxide, and ABC multipurpose dry chemical. A fire extinguisher used on a flammable and combustible liquid must be Class B, AB, BC, or ABC.

Technically, flammable and combustible liquids do not burn. However, under appropriate conditions, they generate sufficient quantities of vapors to form ignitable vapor-air mixtures. As a general rule, the lower the flash point of a liquid, the greater the fire and explosion hazard. For example, gasoline will generate ignitable vapors at 45 degrees (F) below zero while diesel fuel will not until it is heated to over 100 degrees (F). The flash point of a liquid is the minimum temperature at which it gives off sufficient vapor to form an ignitable mixture with the air near its surface or within its containment vessel.

Many flammable and combustible liquids also pose health hazards.

It is the responsibility of the user to ensure that all flammable and combustible liquids are properly identified, labeled, handled, and stored. If assistance is required, contact EH&S, Chemical Hygiene Officer, or the Laboratory Supervisor.

**Classifications:** Flammable and combustible liquids are defined and divided into classes as shown below:

**Flammable Liquids (Class I).** Liquids having flash points below 100F (37.8C) and having vapor pressures not exceeding 40 pounds per square inch (absolute) at 100F (37.8C). Class I Flammable Liquids are subdivided as follows:

**Class IA.** Liquids having flash points below 73F (22.8C) and boiling points below 100F (37.8C). Flammable aerosols (spray cans) are included in Class IA.

**Class IB.** Liquids having flash points below 73F (22.8C) and having boiling points at or above 100F (37.8C).

**Class IC.** Liquids having flash points at or above 73F (22.8C) and below 100F (37.8C).

**Combustible Liquids (Classes II and III):** Liquids having flash points at or above 100F (37.8C). Combustible liquids in Class II and Class III are subdivided as follows:

**Class II.** Liquids having flash points at or above 100F (37.8C) and below 140F (60.0C).

**Class IIIA.** Liquids having flash points at or above 140F (60.0C) and below 200F (93.4C).

**Class IIIB.** Liquids having flash points at or above 200F (93.4C).

**Unstable (Reactive) Liquids:** These are liquids that in the pure state, or as commercially produced or transported, will vigorously polymerize, decompose, combine, or become self-reactive under conditions of shock, pressure, or temperature. Use of such materials must have prior approval from the Department Chair or Director on a case-by-case basis.

**Fire Hazards:** Fires involving flammable and combustible liquids are especially dangerous because they release heat quickly, causing the fire to spread rapidly. The handling and use of these products present the most significant single source of fire hazard. Misuse or improper storage threatens not only the employee and the entire building, but all fellow employees, students, and guests.

Liquids with flash points below room temperature (Class IA and IB liquids) continually emit sufficient quantities of vapors to be ignitable, except when chilled to temperatures below their flash points. Even when chilled, if spilled on a floor or work surface, they will heat rapidly and pose severe fire and explosion hazards.

Liquids with flash points above room temperature (Class IC, II, IIIA, and IIIB liquids) can easily be heated to the point at which they will create flammable vapor-air mixtures.

Flammable liquid vapors are heavier than air. They can travel for appreciable distances and accumulate in low places. Since it is the vapor of flammable liquids that burns, the fire hazard may not be confined to the immediate vicinity of actual use. Vapors can be ignited several hundred feet from the point of vapor generation. Flammable liquid vapors generally have low ignition-energy requirements and can often be ignited by small sparks from electrical motors, switches, relay contacts, etc.

### **Precautions:**

Recommended precautions are based on the properties of the liquid to be used and the intended application. The user cannot make a correct decision on necessary precautions unless the properties of the liquid are known, and the intended use is reviewed from a safety standpoint.

There must be sufficient ventilation to preclude the accumulation of flammable vapors. Flammable liquids should be used in a fume hood or with local exhaust ventilation. Normal room ventilation may be sufficient to permit small-scale use of flammable liquids (milliliter quantities). However, if larger quantities of liquid must be used in such facilities, it will be necessary to provide

additional ventilation by opening doors and windows or providing some form of temporary exhaust ventilation.

Extreme care must be exercised when using flammable liquids in closed spaces with minimal ventilation. Even milliliter quantities of flammable liquids can cause the build-up of explosive mixtures in a confined space.

**Containers:** The maximum allowable sizes of containers and portable tanks are identified in the table below:

Container	Flammable Liquids			Combustible Liquids	
	Class IA	Class IB	Class IC	Class II	Class III
Glass or approved plastic*	1 pt	1 qt	1 gal	1gal	1 gal
Metal (other than Department of Transportation (DOT) drums)	1 gal	5 gal	5 gal	5 gal	5 gal
Safety cans**	2 gal	5 gal	5 gal	5 gal	5 gal
Metal drums (DOT specifications)	60 gal	60 gal	60 gal	60 gal	60 gal
Approved portable tanks	660 gal	660 gal	660 gal	660 gal	660 gal

**NOTE:** Container exemptions: (a) Medicines, beverages, foodstuffs, cosmetics, and other common consumer items, when packaged according to commonly accepted practices, are exempt from these requirements.

\* Glass or approved plastic containers of no more than 1 gallon capacity may be used for Class IA or IB flammable liquids if (1) such liquid either would be rendered unfit for its intended use by contact with metal or would excessively corrode a metal container so as to create a leakage hazard or (2) the user's process either would require more than 1 pint of a Class IA liquid or more than 1 quart of a Class IB liquid, of a single assay lot, to be used at one time.

\*\* Approved safety cans of various materials and capacities are available from various vendors.

### **Cabinets:**

Storage cabinets must be designed and approved for the anticipated usage. Approved metal storage cabinets are available in various sizes from several vendors.

Not more than 120 gallons of Class I, Class II, and Class IIIA liquids, combined, may be stored in a storage cabinet. Of this total, not more than 60 gallons may be of Class I and Class II liquids, combined, and not more than three such cabinets may be located in a single fire-separation area.

### **Refrigerators:**

Ordinary domestic refrigerators must not be used for the storage of flammable liquids because they contain certain built-in ignition sources (such as electrical contacts).

These sources of ignition may initiate a fire or an explosion if flammable vapors are present. In special cases, ordinary refrigerators have been modified to specifications approved for storage of flammable liquids. Refrigerators are now available commercially that are specifically designed

and approved for storage of flammable materials. All refrigerators used for storage of flammable liquids must bear an appropriate label.

### **Allowable Quantities**

It is necessary to consider the needs of all users, and/or departments in aggregate for each building or fire-separation area to adequately manage exposure hazards. The restrictions set forth below provide guidance for lower usage levels. In general, quantities in excess of three-months usage should not be stored.

The maximum allowable quantities of flammable and combustible liquids outside designated and approved storage rooms or facilities are listed below:

- \* Less than one gallon of Class I and Class II liquids combined, in glass or plastic containers, is the maximum allowed outside of approved storage cabinets when not actually in use.
- \* One gallon is the maximum allowable container size for general dispensing of Class I and Class II liquids unless in an approved safety can.
- \* Where more than one laboratory unit is in a single fire-separation area, all Class I and Class II liquids must be stored in approved storage cabinets or approved safety cans. Ten gallons of Class I and Class II liquids, combined, in approved safety cans, is the maximum allowable outside of approved storage cabinets. Five gallons of Class IIIA liquids is the maximum allowable outside of approved storage cabinets or safety cans.
- \* For laboratories in single fire-separation areas, 10 gallons of Class I and Class II liquids, combined, is the maximum quantity allowable outside of approved storage cabinets or approved safety cans.
- \* For single fire-separation areas other than laboratories, 25 gallons of Class I and Class II liquids, combined, is the maximum allowable quantity outside of approved storage cabinets.
- \* For single fire-separation areas other than laboratories, 60 gallons of Class IIIA liquids is the maximum allowable outside of approved storage cabinets.

### **Fluorocarbon Solvents**

Fluorocarbon solvents are organic compounds containing fluorine. Common names for some members of this family are Freon-TF, Freon-MF, and Freon-BF.

#### **Hazards:**

The vapors are four to five times heavier than air and tend to accumulate in tanks, pits, and low places. This displaces the oxygen, which can cause suffocation, or the vapors themselves may be toxic in high concentrations.

Fluorocarbon solvents will dissolve and extract the natural oils present in the skin. If contact is prolonged, the skin may become dry and perhaps cracked. The vapors have little or no effect on the eyes. If the liquid is splashed in the eyes, temporary redness may be produced.

Lower boiling liquids may cause freezing if splashed on the skin or in the eyes.

Fluorocarbon vapors decompose when exposed to high temperatures. Toxic fumes such as hydrofluoric acid, hydrochloric acid, and phosgene may be formed.

Fluorocarbon solvents are nonflammable.

### **Precautions:**

Contact your supervisor if fluorocarbon solvents are to be used in enclosed areas such as tanks and pits. The procedures for entering a permit-required confined space must be implemented.

Avoid contact with hot surfaces, electric heating elements, or open flames. Good ventilation is necessary if toxic vapors are formed.

Wear gloves made of neoprene or equivalent when there is the possibility of prolonged or repeated skin contact with the liquid. Wear appropriate protective clothing and eye goggles identified on the product MSDS if the liquid may be splashed.

## **Hazardous Gases**

**General Precautions:** The following general precautions for compressed gas cylinders must be followed:

- \* Large cylinders of hazardous gases should not be purchased if it is possible to use small cylinders.
- \* The color coding must not be used on the cylinder to identify its contents. These colors have not been standardized by the suppliers. Read the label placed on the cylinder.
- \* The responsible department head must be notified of all hazardous gases ordered to ensure that adequate facilities are available (e.g., vapor hoods, safety showers, alarms, fire extinguishers, respirators, etc.) and that the user is aware of the hazardous properties of the material.
- \* Cylinders should be returned to the vendor as soon as possible after use. It is not uncommon for gas cylinders to develop leaks during storage. Arrangements for pickup of used cylinders are made by contacting the appropriate vendor. Before pickup, the cylinder valve must be closed, the regulator or needle valve must be removed, and the valve cover put back on the cylinder.
- \* Arrangements should be made for immediate pickup of cylinders that are leaking or have valves that are stuck open. The Laboratory Supervisor, Chemical Hygiene Officer, and/or EH&S should be notified of the hazard.

### **Cylinder Storage:**

- \* Storage areas should be dry, cool, and well ventilated. Indoor storage areas shall be enclosed by a minimum one hour rated fire separation.
- \* Indoor flammable gas storage areas shall be equipped with explosion-proof electrical equipment and lighting in compliance with the most recent edition of the National Electrical Code for hazardous occupancies.
- \* Cylinders, charged or empty, should be grouped by type of gas and the groups should be segregated according to compatibility.
- \* Cylinders, charged or empty, should not be stored in direct sun light above 125 degrees Fahrenheit or subjected to artificially created low temperatures.
- \* Protective valve safety caps shall be kept on all cylinders except when in actual use.
- \* Cylinder valves shall be kept closed on all cylinders except when in actual use.
- \* Cylinders shall be secured and supported upright to prevent damage, tampering, or their being knocked over.

### **Liquefied Petroleum Gas (LPG):**

- \* Containers and first stage regulating equipment shall be located outside of buildings unless installed on a powered industrial truck in compliance with OSHA standards and National Fire Codes.
- \* Containers shall be in proximity to buildings and other facilities in compliance with OSHA standards and National Fire Codes.
- \* Filling of LPG containers shall be performed outside 25 or more feet from any wall opening of any building or any part of any wood frame structure.

**Anhydrous Ammonia:** All containers of anhydrous ammonia shall be located outside of all buildings that are not specifically designed for that purpose.

### **Acetylene:**

- \* Acetylene shall not be generated, piped, or used at a pressure in excess of 15 psi gauge or 30 psi absolute.
- \* Acetylene cylinders shall be stored and used in an upright position.
- \* Acetylene stored in quantities in excess of 2000 cubic feet shall be stored only in buildings or storage rooms that are specifically designed for that purpose in compliance with OSHA standards and National Fire Codes.

**Oxygen (non-medical):** Oxygen cylinders shall be stored a minimum of 20 feet away from all fuel gas cylinders or combustible materials or separated by a non-combustible barrier a minimum of 5 feet high with a minimum fire resistance rating of 1/2 hour.



## Peroxidizable Compounds

Isopropyl ether, ethyl ether, dioxane, tetrahydrofuran, and other alkyl ethers form peroxides on exposure to air and light. Because these chemicals are packaged in an air atmosphere, peroxides can form even though the containers have not been opened. The longer the storage period of these chemicals, the greater the amount of dangerous peroxides that may form. Experience has shown that isopropyl ether is by far the worst offender.

**Hazards:** Peroxides are highly unstable and explosive chemicals that may detonate if subjected to high temperature, shock, or friction. Concentration by evaporation or distillation of the ether increases the risk of detonation.

### Precautions:

- \* Ethers containing an inhibitor should be purchased when possible.
- \* Ethers should be kept in cans rather than glass bottles.
- \* Ethers should be stored in as cool a location as feasible (but not stored in refrigerators unless explosion-proof).
- \* Ethers should always be tested for peroxide content before any distillation procedure and, should not be used if peroxides are found to be present.
- \* Safety shields should be placed in front of reaction vessels or distillation apparatus in hoods when they involve ethers.
- \* At least 10% bottoms in distillation should be left.
- \* Any container of uncertain age or condition must not be opened, particularly when the cap or stopper is tightly stuck.
- \* Suspect containers must be removed and disposed of by the hazardous waste disposal contractor at the end of each semester. Contact the EH&S-IHLS for information on pickup dates.
- \* Containers of isopropyl ether must have a label indicating the date of purchase attached to the outside surface. These labels should be applied by stockroom personnel. When the container is opened, the opening date should also be recorded on the label.
- \* These containers must be disposed of one year after purchase, or three months after opening. Call the EH&S-IHLS for pick-up of containers for disposal.

## Polychlorinated Biphenyls (PCBs)

PCBs are a broad class of nonflammable, synthetic, chlorinated hydrocarbon insulating fluids formerly used in many capacitors and transformers at Middle Tennessee State University. Synonyms include askarel, aroclor, inerteen, pyranol, therminol, and many others. It is believed that all equipment containing PCBs was removed from campus in the early 1980's. However, this information is provided in the event of the discovery of vessels or equipment containing PCBs.

**Hazards:** Prolonged skin contact with PCB oils can cause skin irritation and occasionally the formation of temporary acne-like cysts. Eye contact can cause severe irritation and inflammation. Breathing the vapor or mist from heated oil can cause respiratory irritation. PCBs are listed as suspect carcinogens. Because of their inert character and stability under extreme physical stresses, PCBs do not break down in the environment. PCBs are widely dispersed in the environment and can accumulate in foods found in the human diet.

**Precautions:** When working with PCB-contaminated equipment or on PCB spills, exposed personnel must wear protective equipment, including Viton gloves, coveralls, and splash goggles. Small spills can be absorbed in vermiculite or oil dry. Place waste material in plastic bags and call the Laboratory Supervisor, Department Chairperson, and EH&S-IHLS. All equipment containing PCBs must be disposed of by the hazardous waste disposal contractor.

### **Calibration of Gas Detection Systems**

This section covers the calibration of systems to detect flammable, toxic, or pyrophoric gases being used at Middle Tennessee State University.

**Specifications of Calibration:** The specifications of the calibration technique and the frequency of calibration must be described in the Operational Safety Procedure governing the operation of apparatus with which the gas-detecting system is associated. It is recommended that calibrations of these systems be performed by an approved outside contractor or other qualified personnel. In all cases calibrations must be carried out by an independent party. Calibration of these systems should not be carried out by the department operating the apparatus.

## CHAPTER 4 CONFINED SPACES

### ON-CAMPUS MEMO



TO: Dr. Diane Miller, Dr. Deb Sells, Lucinda Lea, Joe Bales and Chris Massaro  
FROM: John W. Cothran, Senior Vice President  
SUBJECT: Permit Required Confined Spaces  
DATE: May 29, 2009

OSHA has a number of regulations that require our attention as a campus. One of these relates to persons entering permit required confined spaces. Currently, MTSU lacks the resources to manage, staff and train persons for entry into these spaces as required by OSHA. This directive serves to address this issue. Should anyone either through their instructional responsibilities or through functional responsibilities have need to have work done in permit required confined spaces as defined below, this work should be done by a qualified licensed contractor who is trained and has the ability to properly enter such spaces. The following below describes these spaces and should be used to assist in determining when a contractor is required to do the work.

The term "permit-required confined space" refers to those spaces that meet the definition of a "confined space" and may pose health or safety hazards, thereby requiring a permit for entry.

A confined space:

- Has limited or restricted means of entry or exit
- Is large enough for an employee to enter and perform assigned work, and
- Is not designed for continuous occupancy by the employee.

These spaces may include, but are not limited to, underground vaults, tanks, storage bins, pits and diked areas, vessels, sewers, and silos.

A permit-required confined space is one that meets the definition of a confined space and has one or more of these characteristics:

1. Contains or has the potential to contain a hazardous atmosphere,
2. Contains a material that has the potential for engulfing the entrant,
3. Has an internal configuration that might cause an entrant to be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross section, and/or
4. Contains any other recognized serious safety or health hazards.

The directive to use qualified contractors is effective immediately. Please pass this along to all of your departments and activities. Should anyone have any questions concerning this directive, they should contact the Environmental Health and Safety Office (5784).

c: Dr. Sidney McPhee  
Mr. James Floyd  
Mr. David Gray  
Mr. Gerald Caudill  
Mr. Terry Logan



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## **CHAPTER 5 ELECTRICAL SAFETY**

### **Policy**

It is the policy of Middle Tennessee State University to take every reasonable precaution in the performance of work to protect the health and safety of employees and the public and to minimize the probability of damage to property. The electrical safety requirements contained in this chapter are the minimums acceptable to Middle Tennessee State University.

### **Employee Responsibility**

All Middle Tennessee State University personnel are responsible for all aspects of safety within their own divisions, colleges, and departments. The Environmental Health and Safety Services Group is responsible for providing information, instruction, and assistance, as appropriate, concerning Middle Tennessee State University electrical safety requirements and procedures.

Individual employees are responsible for their own and their co-workers' safety. This means you must:

- \* Become acquainted with all potential hazards in the area in which you work.
- \* Learn and follow the appropriate standards, procedures, and hazard-control methods.
- \* Never undertake a potentially hazardous operation without consulting with appropriate supervisor.
- \* Stop any operation you believe to be hazardous.
- \* Notify a supervisor of any condition or behavior that poses a potential hazard.
- \* Wear and use appropriate protective equipment.
- \* Immediately report any occupational injury or illness to your supervisor.

### **Supervisor Responsibility**

Each employee acting in a supervisory capacity has specific safety responsibilities. These include:

- \* Developing an attitude and awareness of safety in the people supervised and seeing that individual safety responsibilities are fully carried out.
- \* Maintaining a safe work environment and taking corrective action on any potentially hazardous operation or condition.
- \* Ensuring that the personnel he/she directs are knowledgeable and trained in the tasks they are asked to perform.
- \* Ensuring that safe conditions prevail in the work area and that everyone is properly informed of safety regulations and procedures.

- \* Ensuring that contract personnel are properly protected by means of instructions, signs, barriers, or other appropriate resources.
- \* Ensuring that no employee assigned to potentially hazardous work appears to be fatigued, ill, emotionally disturbed, or under the influence of alcohol or drugs (prescription, over the counter, medicinal, or otherwise).

### **Management Responsibility**

Management at every level has the responsibility for maintaining the work environment at a minimal level of risk. Each director or manager:

- \* Is responsible for being aware of all potentially hazardous activities within the area of responsibility.
- \* May assign responsibility or delegate authority for performance of any function, but remains accountable to senior administration for any oversight or error that leads to injury, illness, or damage to property.

### **Working with Energized Equipment**

This section contains safety requirements that must be met in constructing electrical equipment and in working on energized electrical equipment. Special emphasis is placed on problems associated with personnel working on hazardous electrical equipment in an energized condition. Such work is permissible, but only after extensive effort to perform the necessary tasks with the equipment in a securely de-energized condition has proven unsuccessful, or if the equipment is so enclosed and protected that contact with hazardous voltages is essentially impossible.

### **Definitions**

**Authorized Person:** An individual recognized by management as having the responsibility for and expertise to perform electrical work in the course of normal duties. Such individuals are normally members of electronic or electrical groups.

**Backup Protection:** A secondary, redundant, protective system provided to de-energize a device, system, or facility to permit safe physical contact by assigned personnel. A backup protective system must be totally independent of the first-line protection and must be capable of functioning in the event of total failure of the first-line protective system.

**Companion:** A co-worker who is aware of potential danger and occasionally checks the other worker.

**Electrical Hazard:** A potential source of personnel injury involving, either directly or indirectly, the use of electricity.

**Direct Electrical Hazard:** A potential source of personnel injury resulting from the flow of electrical energy through a person (electrical shocks and burns).

**Indirect Electrical Hazard:** A potential source of personnel injury resulting from electrical energy that is transformed into other forms of energy (e.g., radiant energy, such as light, heat, or energetic

particles; magnetic fields; chemical reactions, such as fire, explosions, the production of noxious gases and compounds; and involuntary muscular reactions).

First-Line Protection: The primary protective system and/or operational procedure provided to prevent physical contact with energized equipment.

General Supervision: The condition that exists when an individual works under a supervisor's direction but not necessarily in the continuous presence of the supervisor.

Grounding Point: The most direct connection to the source of a potential electrical hazard such as the terminals of a capacitor. Such a point must be indicated by a yellow circular marker.

Grounds, Electrical: Any designated point with adequate capacity to carry any potential currents to earth. Designated points may be building columns or specially designed ground-network cabling, rack, or chassis ground. Cold water pipes, wire ways, and conduits must not be considered electrical grounds.

Grounds, Massive: Large areas of metal, concrete, or wet ground that make electrical isolation difficult or impossible.

Implied Approval: Approval is implied when a supervisor, knowing the qualifications of an individual, assigns that individual a task, or responsibility for, a device, system, or project.

Qualified Person: An individual recognized by management as having sufficient understanding of a device, system, or facility to be able to positively control any hazards it may present.

Shall, Should, and May: **SHALL** indicates a mandatory requirement; **SHOULD** indicates a recommended action; and **MAY** indicates an optional or permissive action, not a requirement or recommendation.

Safety Watch: An individual whose sole task is to observe the operator and to quickly de-energize the equipment, using a crash button or circuit breaker control in case of an emergency, and to alert emergency personnel. This person should have basic CPR training.

### **Type of Hazards**

The degree of hazard associated with electrical shock is a function of the duration, magnitude, and frequency of the current passed by the portion of the body incorporated in the circuit. The current that can flow through the human body with contacts at the extremities, such as between the hand or head and one or both feet, depends largely on the voltage. Body circuit resistance, even with liquid contacts (barring broken skin) will probably be not less than 500 ohms. The current flow at this resistance at 120 volts is 240 milliamperes. Recognition of the hazards associated with various types of electrical equipment is of paramount importance in developing and applying safety guidelines for working on energized equipment. The attitudes and habits of personnel and the precautions they routinely take when working on energized equipment are extremely important.

## **Protective Systems**

Equipment must be designed and constructed to provide personnel protection. First-line and backup safeguards should be provided to prevent personnel access to energized circuits.

Periodic tests must be established to verify that these protective systems are operative.

## **Battery Rooms and Stationary Battery Locations**

Storage batteries shall be accessible only to authorized qualified persons. Non-sealed batteries shall be in separate rooms or enclosures and arranged to prevent the discharge of electrolytes or gases into other rooms or enclosures.

Ventilation shall be provided that is adequate to prevent the accumulation of explosive gases.

All wiring shall be in compliance with OSHA standards and National Fire Codes.

Racks, trays, floors, and other surfaces shall be of substantial construction and resistant to the corrosive effects of the acids and electrolytes.

## **CHAPTER 6 EMERGENCIES**

### **Organization**

Middle Tennessee State University requires that an organized effort be made to protect personnel from further injury and to minimize property damage during every emergency. Preservation of life shall have top priority in all emergency operations.

All of Middle Tennessee State University's resources can be made available to respond to an emergency. Each supervisor must know what to do during an emergency in his or her area and must be certain that his or her employees understand their roles. Departments and personnel with assigned emergency operations responsibilities are identified in the **MTSU Emergency Operations Plan**. All other departments and personnel should follow instructions of emergency response personnel or MTSU standard operating procedures in an emergency.

### **Supervisor Responsibilities**

#### **Before an emergency, the supervisor must:**

Ensure that those under his or her supervision are familiar with the plan for the building or facility, particularly the recommended exit routes and how to report an emergency.

Maintain familiarity with the shutdown procedures for all equipment used by those under his or her supervision.

Know the location and use of all safety equipment, including portable fire extinguishers, in his or her area of responsibility.

#### **During an emergency, the supervisor must:**

Render assistance to the person in charge during an emergency, as required.

Keep employees, students, and guests from reentering an evacuated area until reentry is safe.

#### **PERSONS WITH DISABILITIES:**

- If you have a disability, you should notify your instructor in each of your classes or your supervisor that you have a disability and will require assistance in case of an emergency.
- Instructors or supervisors must notify emergency response personnel, either police or fire department, of any persons with disabilities in their classes or area of responsibility.



## No Loitering Policy

Employees, students, and visitors not involved in the emergency must stay away from the scene and follow the instructions issued by the person in charge. The sounding of a fire alarm means immediate evacuation by the nearest exit. Employees, students, and visitors must not reenter an area that they have evacuated until notified that it is safe to return.

## Employee Responsibilities

Employees, students, and visitors, other than emergency-response personnel, involved in any emergency are expected to act as follows:

- \* If there is threat of further injury or further exposure to a hazardous material, remove all injured persons, if possible, without exposing yourself to injury or the hazardous material, and leave the immediate vicinity. If there is no threat of further injury or exposure to a hazardous material, or if the injured persons cannot be reached without exposing yourself to injury or the hazardous material, leave the injured personnel where they are.
- \* Report the emergency immediately by phone to 615-898-2424 on campus or 911 at off campus sites. State what happened, the specific location, whether anyone was injured, and your name and phone number.
- \* Proceed with first aid or attempt to control an incident **only if you can do so safely and have been trained** in first aid or the emergency response necessary to control the incident.
- \* Show the ranking emergency-response official where the incident occurred, inform him or her of the hazards associated with the area, provide any other information that will help avoid injuries, and do as he or she requests.

## Reporting Emergencies

### Fire or Fire Alarm:

**You should immediately activate the building alarm system upon detecting a fire or visible smoke.**

- All employees shall **immediately** report **all** fires, regardless of size (even if extinguished); smoke; or fire alarms on campus to the University Police Department at 615-898-2424. If no response then, to the Murfreesboro Fire and Rescue Department (MFRD) by dialing 615-893-1311 or 911 from any campus telephone or by cell phone. Most MTSU buildings have local fire alarm systems that are **remotely monitored**; but not all building or facilities have this capability; therefore, it is imperative that someone notify the University Police Department at 615-898-2424 or MFRD of fire and fire alarms at 615-893-1311 or 911 of from any campus telephone or by cell phone as soon as it is safely possible.
- If time permits also notify the University Police Department at 615-898-2424.
- Off campus or at remote sites the Fire Department is dispatched by dialing 911 anywhere in Rutherford County.

- The University Police Department will immediately notify the MTSU Fire Marshal of any reported fire or fire alarm at any hour.

### **Medical Emergencies:**

- All employees may request an ambulance and medical assistance on campus by contacting the University Police Department at 615-898-242. If no response, then, to the Murfreesboro Fire and Rescue Department at 615-893-1311 or 911 from any campus telephone or by cell phone as soon as it is safely possible.
- If time permits also notify the University Police Department at 615-898-2424.
- Off campus or at remote sites the ambulance service is dispatched by dialing 911 anywhere in Rutherford County.

### **Bomb Threats:**

- All employees should immediately report bomb threats or the discovery of suspicious objects or devices to the University Police Department) on campus by dialing 615-898-2424.
- Off campus or at remote sites bomb threats or the discovery of suspicious objects or devices may be reported by dialing 911 anywhere in Rutherford County.

### **Other Emergencies:** (Stopped elevators, chemical spills, etc.)

- All other emergencies on campus may be reported to the University Police Department by dialing 615-898-2424. If no response the, to the Murfreesboro Fire and Rescue Department by dialing 615-893-1311 or 911 from any campus phone or by cell phone.
- Off campus or at remote sites emergencies may be reported by dialing 911 anywhere in Rutherford County.

### **Building Evacuation During a Fire or Other Emergency**

Department heads or facility managers in each building shall be responsible for instructing the occupants that the entire building is to be 100% evacuated in an emergency or when the fire alarm sounds.

The size and type of construction of many campus buildings may prevent you from detecting an actual fire until you are at extreme risk of injury. OSHA standards require that **ALL** persons immediately evacuate.

Employees **must** follow these procedures upon discovery of a fire, smoke in a building, or activation of a fire-alarm system:

- \* If a fire occurs in a room where you are, **get out, close the door, and stay out**. If they have been appropriately trained and authorized *in writing* by the department head and the MTS, employees or graduate students may attempt to extinguish small fires with available

portable extinguishers to facilitate the evacuation of the space and the building under the following conditions:

- The fire is confined to the area of origin.
  - The appropriate size and type of extinguisher is immediately available.
  - Someone is sounding the alarm and notifying the fire department.
  - The fire does not block one's path of escape.
  - You can use the extinguisher without exposure to smoke or fire gases.
- \* Sound the alarm and report the fire to 615-893-1311 or 911.
  - \* You should leave if you can.
  - \* Feel the door with the BACK of your hand.
  - \* Open it slowly if it is cool and proceed to the nearest exit.
  - \* **CRAWL LOW** under any smoke.
  - \* **DO NOT** open the door if it is **HOT**. Seal all cracks with wet towels, clothing, or other available material. Shut off all fans and air conditioners. Signal at the window and phone for help.
  - \* Assume **ALL** fire alarms are actual fires.
  - \* Do **NOT** investigate; that is the responsibility of the Fire Department.
  - \* Instructors are responsible for instructing all students in the classroom to leave the building using the nearest unobstructed exit.
    - Use the stairs. Elevators will **NOT** be used for building evacuation purposes under any circumstances.
    - Persons evacuating the building will assemble at a safe distance from the building where they will not interfere with or be endangered by the operation of fire, rescue, or other emergency equipment.
  - \* The person reporting the emergency should remain on site, in a safe area, and meet the arriving University Police Office, MTSU Fire Marshal, or the senior officer of the first arriving fire apparatus and inform him or her of the nature of the emergency and the general situation.
  - \* Follow any instructions given by fire or other emergency personnel until the emergency is over and the building is released by the Fire Department.
  - \* In accordance with Tennessee State law, the building may not be re-occupied and the alarm system may not be reset until permission to do so is given by the Fire Department.

### Use of Portable Fire Extinguishers

Before using your fire extinguisher, be sure to read the instructions before it is too late. Although there are many different types of fire extinguishers, all of them operate in a similar manner. Use the PASS acronym as a quick reference:

#### PASS

**Pull the Pin** at the top of the extinguisher.

**Aim at the base of the fire**, not the flames.

**Squeeze the lever slowly** to release the extinguishing agent. If the handle is released, the discharge will stop.

**Sweep from side to side** until the fire is completely out.

Operate the extinguisher from a safe distance, several feet away, and then move towards the fire once it starts to diminish. Be sure to read the instructions on the fire extinguisher; different fire extinguishers recommend operating them from different distances. Remember to aim at the base of the fire and not at the flames. Once the fire is out, do not walk away! Watch the area for a few minutes in case it re-ignites. Recharge the extinguisher immediately after use.

A typical fire extinguisher contains about 10 seconds of extinguishing power and may be less if it has already been partially discharged. Always read the instructions on the fire extinguisher beforehand and become familiar with its parts. It is highly recommended that you get hands-on training before operating a fire extinguisher.

## **Elevator Evacuation**

**General:** Evacuation of passengers in elevators that have malfunctioned or stopped between floors shall be accomplished only by trained personnel with the expertise and resources necessary to cope with the hazards which may arise. These personnel shall be provided training in the proper procedures for evacuating passengers to prepare them for actual situations which may arise in elevator operation in campus buildings. Under no circumstances should anyone other than the designated trained personnel attempt to evacuate passengers from stopped elevators.

### **Evacuation Procedure:**

#### **Communications:**

- Anyone discovering or receiving a call from an elevator stopped between floors should immediately communicate to the occupants that:

They are safe;  
Steps are being taken to evacuate them from the elevator;  
They should stand clear of the doors since they may be opened; and  
They should refrain from smoking.

- Anyone discovering or receiving a call from an elevator stopped between floors should also obtain the following information from the occupants:

The number of persons in the elevator;  
Whether any of the occupants of the elevator are ill or injured;  
Whether the lights are on in that elevator; and  
The location of the elevator car in the shaft, if known.

- The University Police Department shall then be immediately notified at 615-898-2424 of the location of the stopped elevator and advised of the number of persons in the elevator; whether any of the occupants of the elevator are ill or injured; whether the lights are on in that elevator car; and the location of the elevator car in the shaft, if known.
- Upon receiving notification of a stopped or malfunctioning occupied elevator the University Police Dispatcher shall dispatch an officer to the location and immediately request a maintenance worker from Emergency Maintenance.

### **Assessment:**

- Upon arrival at the location of the stopped elevator the responding University Police Officer shall immediately communicate to the occupants that they are safe; steps are being taken to evacuate them from the elevator; they should stand clear of the doors since they may be opened; and they should refrain from smoking.
- The responding University Police Officer shall also verify the number of persons in the elevator; whether any of the occupants of the elevator are ill or injured; whether the lights are on in that elevator; and the location of the elevator in the shaft.
- If the elevator is within three feet above or below the landing and no one on the elevator is ill or injured the officer shall await the arrival of the worker from Emergency Maintenance before proceeding further.
- If there are occupants of the elevator who are ill or injured the University Police Department shall request immediate assistance from the Murfreesboro Fire and Rescue Department and Rutherford County Emergency Medical Services. The fire department Incident Commander shall direct on-scene operations upon arrival.
- If the floor of the elevator is more than three (3) feet above or below the landing the officer shall request additional assistance from the Murfreesboro Fire and Rescue Department.
- Department before proceeding further. The fire department shall be notified to respond non-emergency when no one is ill or injured in the elevator. The fire department Incident Commander shall direct on-scene operations upon arrival.

**Procedure with Elevator at or Near Landing:** When the elevator is at or near a landing, usually within a foot or less above or below, the doors may already be unlocked, and the elevator doors can be opened by hand. The responding police officer and Emergency Maintenance worker can affect evacuation with the following procedure:

- The emergency maintenance worker shall set and lock the elevator mainline disconnect in the **OFF** position before any other actions are attempted.
- The University Police Officer may then open the doors by hand.
- The University Police Officer will then enter the elevator and set the emergency stop switch, if the elevator is equipped with one, to the **STOP** position.
- The officer will then assist the passengers in leaving the elevator one at a time, making sure that the passengers do not trip or fall if the elevator is not level with the landing.

**Procedure with Elevator Within 3 Feet of Landing:** When the elevator shaft doors are not unlocked, and the floor of the elevator is within three (3) feet of the landing the following procedures shall be followed:

- The emergency maintenance worker shall set and lock the elevator mainline disconnect in the **OFF** position before any other actions are attempted.

- The University Police Officer or Emergency Maintenance worker will then unlock the elevator shaft door at the floor nearest to the stopped elevator with the elevator door interlock release key and open the shaft and elevator doors by hand.
- The University Police Officer will then enter the elevator and set the emergency stop switch, if the elevator car is equipped with one, to the **STOP** position.
- The officer will then assist the passengers in leaving the elevator one at a time, making sure that the passengers do not trip or fall if the elevator is not level with the landing. A stepladder or footstool should be obtained either from the nearest custodial closet or the responding Emergency Maintenance vehicle to facilitate the safe evacuation of the elevator occupants.

### **Tornado Emergency Preparation Information for Administration and Management**

The university may potentially face a tornado capable of producing mass casualties, significant property damage, or significantly interrupting normal campus operations. In a typical year over 800 tornadoes are reported nation-wide causing 80 deaths and 1,500 injuries. Extremely violent tornadoes are capable of winds in excess of 250 mph and producing widespread damage paths in excess of a mile wide and 50 miles long. From 1961 through 1990 Tennessee averaged 3 tornado deaths per year, and 2.91 tornadoes reported per 10,000 square miles or 12 tornadoes per year. Each year the tornadic activity differs. In 2020 the United States alone had 1,050 confirmed tornadoes. With those tornadoes, the United States had 78 confirmed deaths.

A consistent factor in post-tornado analyses is that community preparation and planning results in minimized casualties, reduced property damage, and faster economic recovery. The university would benefit from the experience of the faculty, staff, and administration at Austin Peay State University, who conducted some training and other preparation just prior to being struck by a tornado in 1999.

The National Weather Service increasingly relies on strategically located Doppler radars across the country to provide information on developing storms. These radars can detect air movement toward or away from the radar providing early detection of increasing rotation aloft within a thunderstorm and can allow life-saving warnings to be issued before a tornado forms. The National Weather Service uses information from weather radar, spotters, and other sources to issue severe thunderstorm and tornado warnings for areas where severe weather is imminent. Severe thunderstorm and tornado warnings are broadcast over local National Oceanic and Atmospheric Administration (NOAA) Weather Radio stations serving the warned areas. These warnings are also relayed to local emergency management and public safety officials who can activate local warning systems to alert communities. Stay informed about storm and tornado developments by listening to NOAA Weather Radio for the latest tornado watches and warnings. A list is attached that provides a source for several models of weather radios with the automatic emergency activation feature. It is recommended that each department obtain a weather radio with the capability to operate off either battery or AC current. The University has a campus-wide outdoor emergency warning system. However, NOAA weather radio is the best means to receive warnings from the National Weather Service. Remember that tornadoes occasionally develop so rapidly that advance warning is limited or not possible.

The following tornado instructions have been distributed to all University employees and students. These general instructions should provide the basis for departmental planning. Departmental planning should include:

- a person designated to monitor weather information from NOAA Weather Radio or local radio/television;
- emergency escape procedures and routes. Faculty and staff should be prepared to direct students to move quickly into interior rooms or hallways on the lowest floor when notified of a tornado warning;
- posting of the preferred emergency telephone number, 615-898-2424, by phones;
- procedures to account for employees following an emergency; and
- acquisition and storage of disaster supplies such as a battery-powered NOAA Weather Radio, a portable AM/FM radio, a flashlight, and extra batteries.

Advice and assistance for preparation and planning is available from Environmental Health and Safety Services. Contact the Environmental Health and Safety Services at 615-898-2879 for further information.

### **Tornado Instructions**

**Tornado:** Tornadoes are most likely to occur in mid-afternoon, generally between 3pm and 7pm although they can occur at any time. Movement is generally from southwest to northeast. The cloud associated with a tornado is a dark, thunderstorm cloud from which a whirling funnel-shaped pendent extends to or near the ground. Rain usually precedes the tornado, frequently with hail, and as a heavy downpour.

**Tornado Watch:** A tornado watch is the first alert message issued by the weather bureau. A tornado watch is issued when the conditions are favorable for the formation of a tornado. The local National Weather Service will issue a watch bulletin to the local authorities, as well as the local media. A "watch" specifies the potentially affected area(s) and timeframe during which tornado formation is highly probable. Watches are not warnings. Until a warning is issued, you should not interrupt your normal routine except to stay tuned to the radio or television and look for threatening weather.

**Tornado Warning:** A tornado warning is issued when a tornado is actually sighted visually in the immediate area or by radar. A warning gives the location of the tornado at the time of detection, the area through which it is expected to move, and the time period during which it will pass the area. When a tornado warning is issued, persons in the path of the storm should take immediate safety precautions. If you actually sight a tornado funnel, move to shelter immediately.

A campus-wide outdoor tornado siren/warning system is installed on campus. It will be tested monthly with a brief voice announcement followed by the warning siren for 15 to 30 seconds to develop recognition with the system. In the event of a tornado warning for anywhere in Rutherford County there will be a brief voice announcement followed by a 3-minute warning siren, repeated once then sounded when any additional warnings are issued. A brief voice announcement and all clear signal will be sounded when all tornado warnings for Rutherford County have expired.

Employees should note that the tornado siren/warning system is an **OUTDOOR** system only. It is not intended to be audible inside of buildings. Since the tornado siren/warning system may not

be audible inside of buildings there should be a weather radio available in the office of every department head and at the front desk of every residence hall.

**Protection:** *(The following information is provided for both on and off campus situations.)*

- If employees are notified of a tornado warning, they should alert the building occupants and move to the safest place in your building and/or complex. **THEY SHOULD NOT ACTIVATE A FIRE ALARM** – no one should leave the safety of the building. Students, faculty, and staff should not leave the building until they are notified that the danger has passed. It is helpful if flashlights are kept handy as a power outage may occur during this type of storm.
- Safe places to seek shelter include basements of modern, steel-reinforced office and classroom buildings, storm shelters, tunnels, sub-basements, basements, and interior corridors. Dangerous places to seek shelter include auditoriums, gymnasiums, aircraft hangars, modular buildings, structures with wide, free span roofs, upper stories of office buildings, glass enclosed areas, and vehicles.
- The basement or ground floor interior corridor usually offers the greatest safety in campus buildings. Seek shelter in the middle of the building. Take cover under heavy furniture or in an interior hallway against a strong, inside wall on the lower floor.
- Motor vehicles do not offer adequate protection from a tornado. Violent winds can roll a vehicle over, crushing it and its occupants. Encourage everyone to remain in the building and not attempt to drive.
- No matter where you are, keep a battery-powered radio with you, if available, and listen to weather information so that you will know when the warning is lifted. Call the weather bureau and emergency response agencies only to report a tornado or request emergency assistance. Radio and television stations will broadcast the latest tornado advisory information.
- If caught in the open, move away from the tornado's path at a right angle. If there is no time to escape, lie flat in the nearest depression such as a ravine or ditch.
- Follow the instructions of emergency response personnel or remain in the hallway until the Campus Police, Safety Officer, Fire Department, Emergency Management, or other emergency response personnel give the all clear.

## **Terrorism**

Terrorism is the use of force or violence against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion, or ransom. Terrorists often use threats to create fear among the public, to try to convince citizens that their government is powerless to prevent terrorism, and to get immediate publicity for their causes. Acts of terrorism range from threats of terrorism, assassinations, kidnappings, hijackings, bomb scares and bombings, cyber attacks (computer-based), to the use of chemical, biological and nuclear weapons. High-risk targets include military and civilian government facilities, international airports, large cities, and high-profile landmarks. Terrorists might also target large public gatherings, water and food supplies, utilities, and corporate centers. Further, they are capable of spreading fear by sending explosives or chemical and biological agents through the mail. In the immediate area of a terrorist event, you would need to rely on police, fire, and other officials for



instructions. However, you can prepare in much the same way you would prepare for other crisis events.

### **Preparing for Terrorism**

1. Wherever you are, be aware of your surroundings. The very nature of terrorism suggests there may be little or no warning.
2. Take precautions when traveling. Be aware of conspicuous or unusual behavior. Do not accept packages from strangers. Do not leave luggage unattended. Unusual behavior, suspicious packages and strange devices should be promptly reported to the police or security personnel.
3. Do not be afraid to move or leave if you feel uncomfortable or if something does not seem right.
4. Learn where emergency exits are located in buildings you frequent. Notice where exits are when you enter unfamiliar buildings. Plan how to get out of a building, subway or congested public area or traffic. Note where staircases are located. Notice heavy or breakable objects that could move, fall, or break in an explosion.
5. Assemble a disaster supply kit at home and learn first aid. Separate the supplies you would take if you had to evacuate quickly, and put them in a backpack or container, ready to go.

### **Protection Against Cyber Attacks**

Cyber attacks target computer or telecommunication networks of critical infrastructures such as power systems, traffic control systems, or financial systems. Cyber-attacks target information technologies (IT) in three different ways. First, is a direct attack against an information system “through the wires” alone (hacking). Second, the attack can be a physical assault against a critical IT element. Third, the attack can be from the inside because of compromising a trusted party with access to the system.

1. Be prepared to do without services you normally depend on that could be disrupted —electricity, telephone, natural gas, gasoline pumps, cash registers, ATM machines, and internet transactions.
2. Be prepared to respond to official instructions if a cyber attack triggers other hazards, for example, general evacuation, evacuation to shelter, or shelter-in-place, because of hazardous materials releases, nuclear power plant incident, dam, or flood control system failures.

### **Preparing For A Building Explosion**

Explosions can collapse buildings and cause fires. People who live or work in a multi-level building can do the following:

1. Review emergency evacuation procedures. Know where emergency exits are located.
2. Keep fire extinguishers in working order. Know where they are located and learn how to use them.
3. Learn first aid. Contact the local chapter of the American Red Cross for information and training.

4. Building owners should keep the following items in a designated place on each floor of the building.

- Portable, battery-operated radio and extra batteries
- Several flashlights and extra batteries
- First aid kit and manual
- Several hard hats
- Fluorescent tape to rope off dangerous areas

### **Suspicious Parcels And Letters**

Be wary of suspicious packages and letters. They can contain explosives, chemical or biological agents. Be particularly cautious at your place of employment. Some typical characteristics postal inspectors have detected over the years, which ought to trigger suspicion, include parcels that—

- Are unexpected or from someone unfamiliar to you.
- Have no return address or have one that cannot be verified as legitimate.
- Are marked with restrictive endorsements, such as “Personal,” “Confidential” or “Do not x-ray.”
- Have protruding wires or aluminum foil, strange odors or stains.
- Show a city or state in the postmark that does not match the return address.
- Are of unusual weight, given their size, or are lopsided or oddly shaped.
- Are marked with any threatening language.
- Have inappropriate or unusual labeling.
- Have excessive postage or excessive packaging material such as masking tape and string.
- Have misspellings of common words.
- Are addressed to someone no longer with your organization or are otherwise outdated.
- Have incorrect titles or title without a name.
- Are not addressed to a specific person.
- Have handwritten or poorly typed addresses.

With suspicious envelopes and packages other than those that might contain explosives, take these additional steps against possible biological and chemical agents.

- Refrain from eating or drinking in a designated mail handling area.
- Place suspicious envelopes or packages in a plastic bag or some other type of container to prevent leakage of contents. Never sniff or smell suspect mail.
- If you do not have a container, then cover the envelope or package with anything available (e.g., clothing, paper, trash can, etc.) and do not remove the cover.
- Leave the room and close the door, or section off the area to prevent others from entering.
- Wash your hands with soap and water to prevent spreading any powder to your face.
- If you are at work, report the incident to your building security official or an available supervisor, who should notify police and other authorities without delay.
- List all people who were in the room or area when this suspicious letter or package was recognized. Give a copy of this list to both the local public health authorities and law enforcement officials for follow-up investigations and advice.
- If you are at home, report the incident to local police.

In the immediate area of a terrorist event, leave quickly and orderly. Listen to police, fire, and other officials for instructions. Leave the building as quickly as possible. Do not stop to retrieve personal possessions or make phone calls. If things are falling around you, get under a sturdy

table or desk until they stop falling. Then leave quickly, watching for weakened floors and stairs and falling debris as you exit.

## **Chemical and Biological Weapons**

In case of a chemical or biological weapon attack near you, authorities will instruct you on the best course of action. This may be to evacuate the area immediately, to seek shelter at a designated location, or to take immediate shelter where you are and seal the premises. The best way to protect yourself is to take emergency preparedness measures ahead of time and to get medical attention as soon as possible, if needed.

### **Chemical**

Chemical warfare agents are poisonous vapors, aerosols, liquids, or solids that have toxic effects on people, animals, or plants. They can be released by bombs, sprayed from aircraft, boats, or vehicles, or used as a liquid to create a hazard to people and the environment. Some chemical agents may be odorless and tasteless. They can have an immediate effect (a few seconds to a few minutes) or a delayed effect (several hours to several days). While potentially lethal, chemical agents are difficult to deliver in lethal concentrations. Outdoors, the agents often dissipate rapidly. Chemical agents are also difficult to produce.

There are six types of agents:

- Lung-damaging (pulmonary) agents such as phosgene,
- Cyanide,
- Vesicants or blister agents such as mustard,
- Nerve agents such as GA (tabun), GB (sarin), GD (soman), GF, and VX,
- Incapacitating agents such as BZ, and
- Riot-control agents (similar to MACE).

### **Biological**

Biological agents are organisms or toxins that can kill or incapacitate people, livestock, and crops. The three basic groups of biological agents which would likely be used as weapons are bacteria, viruses, and toxins.

1. Bacteria. Bacteria are small free-living organisms that reproduce by simple division and are easy to grow. The diseases they produce often respond to treatment with antibiotics.
2. Viruses. Viruses are organisms which require living cells in which to reproduce and are intimately dependent upon the body they infect. Viruses produce diseases which generally do not respond to antibiotics. However, antiviral drugs are sometimes effective.
3. Toxins. Toxins are poisonous substances found in, and extracted from, living plants, animals, or microorganisms; some toxins can be produced or altered by chemical means. Some toxins can be treated with specific antitoxins and selected drugs. Most biological agents are difficult to grow and maintain. Many break down quickly when exposed to sunlight and other environmental factors, while others such as anthrax spores are very long lived. They can be dispersed by spraying them in the air, or infecting animals which carry the disease to humans as well through food and water contamination.

- **Aerosols**—Biological agents are dispersed into the air, forming a fine mist that may drift for miles. Inhaling the agent may cause disease in people or animals.
- **Animals**—Some diseases are spread by insects and animals, such as fleas, mice, flies, and mosquitoes. Deliberately spreading diseases through livestock is also referred to as agroterrorism.
- **Food and water contamination** —Some pathogenic organisms and toxins may persist in food and water supplies. Most microbes can be killed, and toxins deactivated, by cooking food and boiling water. Anthrax spores formulated as a white powder were mailed to individuals in the government and media in the fall of 2001. Postal sorting machines and the opening of letters dispersed the spores as aerosols. Several deaths resulted. The effect was to disrupt mail service and to cause a widespread fear of handling delivered mail among the public. Person-to-person spread of a few infectious agents is also possible. Humans have been the source of infection for smallpox, plague, and the Lassa viruses. Be aware of your surroundings. The very nature of terrorism suggests that there may be little or no warning.

### **What To Do To Prepare For A Chemical Or Biological Attack**

Assemble a disaster supply kit and be sure to include:

- Battery-powered commercial radio with extra batteries.
- Non-perishable food and drinking water.
- Roll of duct tape and scissors.
- Plastic for doors, windows, and vents for the room in which you will shelter in place—this should be an internal room where you can block out air that may contain hazardous chemical or biological agents. To save critical time during an emergency, sheeting should be pre-measured and cut for each opening.
- First aid kit.
- Sanitation supplies including soap, water, and bleach.

### **What To Do During A Chemical Or Biological Attack**

1. Listen to your radio for instructions from authorities such as whether to remain inside or to evacuate.
2. If you are instructed to remain in your home, the building where you are, or other shelter during a chemical or biological attack:
  - Turn off all ventilation, including furnaces, air conditioners, vents, and fans.
  - Seek shelter in an internal room, preferably one without windows. Seal the room with duct tape and plastic sheeting. Ten square feet of floor space per person will provide sufficient air to prevent carbon dioxide build-up for up to five hours.
  - Remain in protected areas where toxic vapors are reduced or eliminated and be sure to take your battery-operated radio with you.
3. If you are caught in an unprotected area, you should:
  - Attempt to get up-wind of the contaminated area.
  - Attempt to find shelter as quickly as possible.
  - Listen to your radio for official instructions.

## What To Do After A Chemical Attack

Immediate symptoms of exposure to chemical agents may include blurred vision, eye irritation, difficulty breathing and nausea. A person affected by a chemical or biological agent requires immediate attention by professional medical personnel. If medical help is not immediately available, decontaminate yourself and assist in decontaminating others. Decontamination is needed within minutes of exposure to minimize health consequences. (However, you should not leave the safety of a shelter to go outdoors to help others until authorities announce it is safe to do so.) The best protection against a chemical or biological attack would come from being prepared and getting quick medical attention.

1. Use extreme caution when helping others who have been exposed to chemical agents:

- Remove all clothing and other items in contact with the body. Contaminated clothing normally removed over the head should be cut off to avoid contact with the eyes, nose, and mouth. Put into a plastic bag if possible. Decontaminate hands using soap and water. Remove eyeglasses or contact lenses. Put glasses in a pan of household bleach to decontaminate.

2. Remove all items in contact with the body.

3. Flush eyes with lots of water.

4. Gently wash face and hair with soap and water; then thoroughly rinse with water.

5. Decontaminate other body areas likely to have been contaminated. Blot (do not swab or scrape) with a cloth soaked in soapy water and rinse with clear water.

6. Change into uncontaminated clothes. Clothing stored in drawers or closets is likely to be uncontaminated.

7. If possible, proceed to a medical facility for screening.

## What To Do After A Biological Attack

In many biological attacks, people will not know they have been exposed to an agent. In such situations, the first evidence of an attack may be when you notice symptoms of the disease caused by an agent exposure, and you should seek immediate medical attention for treatment. In some situations, like the anthrax letters sent in 2001, people may be alerted to a potential exposure. If this is the case, pay close attention to all official warnings and instructions on how to proceed. The delivery of medical services for a biological event may be handled differently to respond to increased demand. Again, it will be important for you to pay attention to official instructions via radio, television, and emergency alert systems. If your skin or clothing comes in contact with a visible, potentially infectious substance, you should remove and bag your clothes and personal items and wash yourself with warm soapy water immediately. Put on clean clothes and seek medical assistance.

For more information, visit the website for the Centers for Disease Control and Prevention, [www.bt.cdc.gov](http://www.bt.cdc.gov).

## Nuclear and Radiological Attack

Nuclear explosions can cause deadly effects—blinding light, intense heat (thermal radiation), initial nuclear radiation, blast, fires started by the heat pulse, and secondary fires caused by the destruction. They also produce radioactive particles called fallout that can be carried by wind for hundreds of miles. Terrorist use of a radiological dispersion device (RDD)—often called “dirty nuke” or “dirty bomb”—is considered far more likely than use of a nuclear device. These radiological weapons are a combination of conventional explosives and radioactive material designed to scatter dangerous and sub-lethal amounts of radioactive material over a general area. Such radiological weapons appeal to terrorists because they require very little technical knowledge to build and deploy compared to that of a nuclear device. Also, these radioactive materials, used widely in medicine, agriculture, industry, and research, are much more readily available and easy to obtain compared to weapons grade uranium or plutonium. Terrorist use of a nuclear device would probably be limited to a single smaller “suitcase” weapon. The strength of such a weapon would be in the range of the bombs used during World War II. The nature of the effects would be the same as a weapon delivered by an intercontinental missile, but the area and severity of the effects would be significantly more limited. There is no way of knowing how much warning time there would be before an attack by a terrorist using a nuclear or radiological weapon.

A surprise attack remains a possibility. The danger of a massive strategic nuclear attack on the United States involving many weapons receded with the end of the Cold War. However, some terrorists have been supported by nations that have nuclear weapons programs. If there were threat of an attack from a hostile nation, people living near potential targets could be advised to evacuate or they could decide on their own to evacuate to an area not considered a likely target. Protection from radioactive fallout would require taking shelter in an underground area, or in the middle of a large building.

In general, potential targets include:

- Strategic missile sites and military bases.
- Centers of government such as Washington, D.C., and state capitals.
- Important transportation and communication centers.
- Manufacturing, industrial, technology and financial centers.
- Petroleum refineries, electrical power plants and chemical plants.
- Major ports and airfields.

Taking shelter during a nuclear attack is absolutely necessary. There are two kinds of shelters—blast and fallout. Blast shelters offer some protection against blast pressure, initial radiation, heat, and fire, but even a blast shelter could not withstand a direct hit from a nuclear detonation. Fallout shelters do not need to be specially constructed for that purpose. They can be any protected space, provided that the walls and roof are thick and dense enough to absorb the radiation given off by fallout particles. The three protective factors of a fallout shelter are shielding, distance, and time.

- Shielding. The more heavy, dense materials—thick walls, concrete, bricks, books, and earth—between you and the fallout particles, the better.
- Distance. The more distance between you and the fallout particles, the better. An underground area, such as a home or office building basement, offers more protection than the first floor of a building. A floor near the middle of a high-rise may be better, depending on what is nearby at that level on which significant fallout particles would collect. Flat roofs collect

fallout particles, so the top floor is not a good choice, nor is a floor adjacent to a neighboring flat roof.

- Time. Fallout radiation loses its intensity fairly rapidly. In time, you will be able to leave the fallout shelter. Radioactive fallout poses the greatest threat to people during the first two weeks, by which time it has declined to about 1% of its initial radiation level.

Remember that any protection, however temporary, is better than none at all, and the more shielding, distance and time you can take advantage of, the better. Most electronic equipment within 1,000 miles of a high-altitude nuclear detonation could be damaged by EMP.

### **Electromagnetic Pulse**

In addition to other effects, a nuclear weapon detonated in or above the earth's atmosphere can create an electromagnetic pulse (EMP), a high-density electrical field. EMP acts like a stroke of lightning but is stronger, faster and briefer. EMP can seriously damage electronic devices connected to power sources or antennas. This includes communication systems, computers, electrical appliances, and automobile or aircraft ignition systems. The damage could range from a minor interruption to actual burnout of components. Most electronic equipment within 1,000 miles of a high-altitude nuclear detonation could be affected. Battery powered radios with short antennas generally would not be affected. Although EMP is unlikely to harm most people, it could harm those with pacemakers or other implanted electronic devices.

### **What To Do Before A Nuclear Or Radiological Attack**

1. Learn the warning signals and all sources of warning used in your community. Make sure you know what the signals are, what they mean, how they will be used, and what you should do if you hear them.
2. Assemble and maintain a disaster supply kit with food, water, medications, fuel, and personal items adequate for up to 2 weeks—the more the better.
3. Find out what public buildings in your community may have been designated as fallout shelters. It may have been years ago, but start there, and learn which buildings are still in use and could be designated as shelters again.
  - Call Environmental Health and Safety Services on campus.
  - Look for yellow and black fallout shelter signs on public buildings. *Note: With the end of the Cold War, many of the signs have been removed from the buildings previously designated.*
  - If no noticeable or official designations have been made, make your own list of potential shelters near your home, workplace, and school: basements, or the windowless center area of middle floors in high-rise buildings, as well as subways and tunnels.
  - Give your employees clear instructions about where fallout shelters are located and what actions to take in case of attack.
4. If you live in an apartment building or high-rise, talk to the manager about the safest place in the building for sheltering, and about providing for building occupants until it is safe to go out.

5. There are few public shelters in many suburban and rural areas. If you are considering building a fallout shelter, keep the following in mind.\

- A basement, or any underground area, is the best place to shelter from fallout. Often, few major changes are needed, especially if the structure has two or more stories and its basement—or one corner of it—is below ground.
- Fallout shelters can be used for storage during non-emergency periods, but only store things there that can be very quickly removed. (When they are removed, dense, heavy items may be used to add to the shielding.)
- See the *Tornado Instructions* section on page 6-6 for information on areas which could be used as shelter in the event of a nuclear detonation or for fallout protection, especially in a building without a basement.
- All the items you will need for your stay need not be stocked inside the shelter itself but can be stored elsewhere, as long as you can move them quickly to the shelter.

6. Learn about the university's evacuation plans. Such plans may include evacuation routes, relocation sites, how the public will be notified and transportation options for people who do not own cars and those who have special needs.

7. Acquire other emergency preparedness booklets that you may need. Contact Environmental Health and Safety Services or visit the web site at [www.fema.gov](http://www.fema.gov) to obtain further information.

### **What To Do During A Nuclear Or Radiological Attack**

1. Do not look at the flash or fireball— it can blind you.
2. If you hear an attack warning:
  - Take cover as quickly as you can, **BELOW GROUND IF POSSIBLE**, and stay there unless instructed to do otherwise.
  - If you are caught outside, unable to get inside immediately, take cover behind anything that might offer protection. Lie flat on the ground and cover your head.
  - If the explosion is some distance away, it could take 30 seconds or more for the blast wave to hit.
3. Protect yourself from radioactive fallout. If you are close enough to see the brilliant flash of a nuclear explosion, the fallout will arrive in about 20 minutes. Take shelter, even if you are many miles from ground zero—radioactive fallout can be carried by the winds for hundreds of miles. Remember the three protective factors: shielding, distance and time.
4. Keep a battery-powered radio with you and listen for official information. Follow the instructions given. Local instructions should always take precedence: officials on the ground know the local situation best.



## **What To Do After A Nuclear Or Radiological Attack In A Public Or Home Shelter:**

1. Do not leave the shelter until officials say it is safe. Follow their instructions when leaving.
2. If in a fallout shelter, stay in your shelter until local authorities tell you it is permissible or advisable to leave. The length of your stay can range from a day or two to four weeks.
  - Contamination from a radiological dispersion device could affect a wide area, depending on the amount of conventional explosives used, the quantity of radioactive material and atmospheric conditions.
  - A “suitcase” terrorist nuclear device detonated at or near ground level would produce heavy fallout from the dirt and debris sucked up into the mushroom cloud.
  - A missile-delivered nuclear weapon from a hostile nation would probably cause an explosion many times more powerful than a suitcase bomb and provide a greater cloud of radioactive fallout.
  - The decay rate of the radioactive fallout would be the same, making it necessary for those in the areas with highest radiation levels to remain in shelter for up to a month.
  - The heaviest fallout would be limited to the area at or downwind from the explosion, and 80% of the fallout would occur during the first 24 hours.
  - Because of these facts and the very limited number of weapons terrorists could detonate, most of the country would not be affected by fallout.
  - People in most of the areas that would be affected could be allowed to come out of shelter and, if necessary, evacuate to unaffected areas within a few days.
3. Although it may be difficult, make every effort to maintain sanitary conditions in your shelter space.
4. Water and food may be scarce. Use them prudently but do not impose severe rationing, especially for children, the ill or elderly.
5. Cooperate with shelter managers. Living with many people in confined space can be difficult and unpleasant.

## **Returning To Your Home Or Office**

1. Keep listening to the radio for news about what to do, where to go, and places to avoid.
2. If your home was within the range of a bomb’s shock wave, or you live in a high-rise or other apartment building that experienced a non-nuclear explosion, check first for any sign of collapse or damage, such as:
  - toppling chimneys, falling bricks, collapsing walls, plaster falling from ceilings.
  - fallen light fixtures, pictures, and mirrors.
  - broken glass from windows.
  - overturned bookcases, wall units or other fixtures.

- fires from broken chimneys.
- ruptured gas and electric lines.

Learn how to build a temporary fallout shelter to protect yourself from radioactive fallout even if you do not live near a potential nuclear target.

3. Immediately clean up spilled medicines, drugs, flammable liquids, and other potentially hazardous materials.

4. Listen to your battery-powered radio for instructions and information about community services.

5. Monitor the radio and your television for information on assistance that may be provided. Local, state, and federal governments and other organizations will help meet emergency needs and help you recover from damage and losses.

6. The danger may be aggravated by broken water mains and fallen power lines.

7. If you turned gas, water, and electricity off at the main valves and switch before you went to shelter:

- Do not turn the gas back on. The gas company will turn it back on for you or you will receive other instructions.
- Turn the water back on at the main valve only after you know the water system is working and water is not contaminated.
- Turn electricity back on at the main switch only after you know the wiring is undamaged and the community electrical system is functioning.
- Check to see that sewage lines are intact before using sanitary facilities.

8. Stay away from damaged areas.

9. Stay away from areas marked “radiation hazard” or “HAZMAT.”

### **Threat Conditions**

There is always a risk of a terrorist threat. Each threat condition assigns a level of alert appropriate to the increasing risk of terrorist attacks:

Low Condition (Green). This condition is declared when there is a low risk of terrorist attacks.

Guarded Condition (Blue). This condition is declared when there is a general risk of terrorist

High Condition (Orange). A High Condition is declared when there is a high risk of terrorist attacks.

Severe Condition (Red). A Severe Condition reflects a severe risk of terrorist attacks. Under most circumstances, the protective measures for a Severe Condition are not intended to be sustained for substantial periods of time.

## Bomb Threat

### Introduction

Bomb threats and actual bombings are presently on the increase in the United States. Whether this trend will continue is a matter for speculation. Organization and planning efforts must be conducted in advance to handle bomb threats, confusion, and panic. Responsibility should not be avoided or further delegated by those in authority.

This section is intended to assist managers and administrators with the formulation and development of bomb threat plans and procedures. The ideas and suggested methods outlined reflect the most current information available on bomb threats. A single bomb threat policy to cover all activities and situations is not practical, but certain basic considerations will apply in most bomb related incidents.

If one concept should be emphasized, it is PREPAREDNESS. When one is equipped with an organized plan, most bomb threat problems can be resolved with a minimum of exposure to personal injury and property damage.

### Bomb Threat Information

**Definition:** A bomb threat is legally defined as the communication through the use of mail, telephone, telegram, or other instrument of commerce; the willful making of any threat; or the malicious conveyance of false information knowing the same to be false which concerns an attempt being made, or to be made; to kill, injure, intimidate any individual; or unlawfully to damage or destroy any building, vehicle, or other real or personal property by means of an explosive.

**General:** There are only three reasonable explanations for receiving a bomb threat.

First, the caller has definite knowledge or believes that an explosive or incendiary device has been or will be placed in an area and wants to minimize personal injury or property damage. The caller may be the person who placed the device or someone else who has become aware of such information.

Second, the caller wants to create an atmosphere of anxiety and panic, which will possibly result in a disruption of the normal activities at the target area. When a threat has been received, there will be a reaction to it. If the call is directed to a target area where a vacuum in leadership exists or where there has been no organized advance planning to handle such a threat, the call may well result in panic.

Finally, the caller wants to bring about or amplify a lack of confidence in existing leadership or programs. By injecting panic into a normal operational situation through fear of the known or unknown, the caller may achieve his or her ultimate goals; i.e., an increased potential for personal injury, property damage, or evacuation or shutdown of essential facilities which result in unacceptable economic loss.

Past experience has revealed that targets for terrorists' bombings or threats have not been selected at random. The target is generally selected because of political, real, or imagined personal gain to the terrorist. Today, more of these threats are materializing. The university's first consideration must be for the safety of its people. It is necessary to determine immediately

whether a bomb threat is real. Plans devised to cope with these threats are formulated with these thoughts in mind.

## **Preparation**

It is essential that issues of communication and planning be made in advance to safely handle bomb threats, therefore, clear-cut levels of authority have been established. It is important that each person handle his or her assignment without delay and without any manifestation of fear.

Only by having an established organization and procedures can these problems be handled with the least risk to all concerned and instill confidence so that there will be no panic.

The University Police Department will initially designate a command post. It should preferably be in a room or other focal point with telephone or radio communications. Management personnel will be assigned to the command post during the period of the threat. Reports on the progress of the search and any evacuation measures should only be made to the command post. Only those persons who have been assigned duties should be permitted in the control center.

## **The Threat**

There is little probability of receiving a warning call where an explosive or incendiary has been placed, however, the University cannot ignore the fact that there have been instances where a threatening call was not a hoax. In a few instances, the person making a warning call has given the recipient enough information to aid in determining the caller's identity. In addition, there have been cases where the caller has described the device, given its location, and stated the time that the device was to be detonated or ignited.

It is for these reasons that personnel normally responsible for answering the telephone in any campus office should be instructed in advance to do the following:

1. When the caller has communicated the threat, stay calm, do not manifest fear. Make a note as to the date and time of day.
2. Keep the caller talking, the more he/ she says the more we can learn.
3. Record every word the caller says if possible.
4. If the caller does not indicate the location of the bomb or the time of detonation, ask the caller what time it is to go off and where it is located. If the caller has answered any of the above questions and is still on the line, ask for his/ her name and try to ascertain where he/ she is calling from. Although the caller may not respond, one will never know unless one asks.
5. It may be advisable to inform the caller that the building is occupied, and the detonation of a bomb could result in death or serious injury to many innocent people.

6. Listen closely to the voice of the caller and note the following:

- A. Sex of Caller
- B. Age of Caller
- C. Race of Caller
- D. Accent (Is voice native to the area)
- E. Speech Impediments or Peculiar Voice Characteristics-Drunk, Etc.
- F. Attitude of Caller-Calm? Excited? Etc.

7. Pay particular attention to any strange or peculiar background noises, such as street noises, motors running, music, television or radio programs, dishes rattling, babies crying, and other background noise which might give even a remote clue as to the origin of the call.

**NOTE: See Bomb Threat Checklist on page 6-31.**

8. Notify only the department head and the University Police Department. Do not discuss the call with anyone unless authorized to do so. Do not leave your post or assignment unless instructed to do so by the person in charge.

Since the University Police Department will be interested in talking firsthand with the person receiving the call, this person should remain available until officers arrive on the scene.

## **Prevention**

To reduce the potential placement of an explosive or incendiary device the university can tighten physical security in some areas. Not only will this reduce the chances of having a bomb brought on to the campus, but search efforts can be maximized by doing the following:

1. During the inspection of the building, particular attention should be given to such areas as elevator shafts, ceiling areas, rest rooms, access doors, crawl spaces and other areas which are used as a means of immediate access; plumbing fixtures, electrical fixtures, utility and closet areas, areas under stairwells, boiler (furnace) rooms, flammable storage areas, electrical switches, gas or fuel valves, indoor trash receptacles, record storage areas, mail rooms, ceiling lights with easily removable panels, and fire hose racks. While this list is not complete, it is sufficient to give an idea of those areas where a time-delay explosive or an incendiary device might be concealed.
2. Establish procedures for the control and inspection of packages and materials going into critical areas.
3. Develop a positive means of identifying and controlling personnel who have authorized access to critical areas and denying access to unauthorized personnel.
4. Instruct all personnel to be alert for suspicious individuals. All personnel should be alert to the presence of foreign or suspicious objects or parcels which do not appear to belong in the area where they are observed.
5. Instruct all personnel throughout the building to be especially aware of all rest rooms, stairwells, and areas under stairwells to ensure that unauthorized personnel are not in hiding or concealment.

6. Ensure that doors and/or access ways to such areas as boiler rooms, mail rooms, computer areas, switchboards, elevator machine rooms and utility closets are securely locked when not in use.

7. Check key control procedures to see that all keys to all locks are accounted for. If keys are in possession of persons no longer in the University's employment or keys cannot be accounted for, then all locks should be changed.

*NOTE: Combination locks should be changed semi-annually.*

8. Check fire exits to make sure they are not obstructed.

9. Check fire hose racks and fire extinguishers regularly to assure they have not been damaged, i.e., hoses cut, exposed to acid, or nozzles damaged. Make periodic checks of fire hydrants. There have been instances where fire hydrants were made inoperable by the insertion of beverage cans into the outlets of the fire hydrant stem. If it appears that the fire hydrant has been disturbed or tampered with, then notify Facilities Services to arrange for the hydrant to be tested.

10. Increase patrols or surveillance of receiving/ shipping areas, garages, and parking areas.

11. Assure adequate protection for classified documents, proprietary information, and other records essential to the daily operation of the university. (A well planted device could, upon detonation, destroy records which are vital for day-to-day operations).

12. Check all exterior and protective lighting for proper operation and adequate illumination.

13. Conduct daily checks for good housekeeping and proper disposal of combustible material.

14. In the event electric power is shut off, have flashlights or battery powered lanterns available.

While all the above measures might not apply to all university departments, some of them will, and the implementation of any of these measures will offer some protection.

## **The Search**

All authorities agree that the most effective and fastest search of a building can be made by the normal occupants of that building. No community can supply the number of police officers or firemen it would take to make a fast thorough search of a facility of any size such as the academic and public assembly facilities on campus. Even if such manpower were available, they would still not be the best qualified to conduct the search.

Since the terrorist does not label the device with the word "bomb", what should you look for? What does a bomb look like? No one knows. It can be packaged in as many ways as the maker's imagination will allow. Some devices may be the size of a cigarette package, while others may be as large as a 2½ ton truck.

Since the object of the search can vary in size and shape, it is a fundamental rule that search must be made by persons who are familiar with the area to notice a strange or foreign object. However, the use of personnel who occupy the premises to conduct the search may present problems with the hysteria that can result from the threat unless there has been careful planning beforehand. In designating or assigning personnel to an area to be searched, there should be no reluctance to assign females, if they are the ones most familiar with the area. Women are as qualified to carry out this function as are men.

If the facility has a public address system, personnel can be alerted to commence the search by use of a code signal, e.g., "Mr. Franklin, Please come to the office".

In devising a search plan, the building, or premises to be searched should be divided into areas and each person assigned a room or area. Personnel so assigned should make a survey of the area and note what objects normally occupy the area. Grill covers over heating and air-conditioning ducts should be inspected so that a subsequent inspection would reveal any entry or tampering.

In some instances, the detonation or ignition of any explosive or incendiary might depend on a change in environment, e.g., temperature variations or the presence of an electric current. Therefore, the personnel assigned to conduct the search should be cautioned not to cause, or at least minimize any change in the environment. Do not go into a dark room and turn on the lights or change the setting of the thermostats in the room.

Other search techniques that can be employed are:

1. A staff member or supervisor should be designated as floor or area warden for each floor of the building, or perhaps several area wardens for single story buildings. Wardens should be responsible for directing the search of their areas, receiving information from search personnel, and relaying it to the command post.
2. Alert the nearest medical facility to standby during the search. This provides immediate medical attention in the event of accidental or premature detonation.
3. Alert the Murfreesboro Fire and Rescue Department to standby in the event a detonation occurs.
4. An effective search technique is as follows:
  - A. Maintenance and custodial personnel search such areas as hallways, rest rooms, stairwells, elevator shafts, utility closets, and areas outside the building.
  - B. Office personnel search their immediate areas.
  - C. As the search of each area is completed and no suspicious objects found, a report is given to the incident commander.

### **Communications During Search**

A rapid two-way communication system is of utmost importance. Normally communication between administrators, officers, search teams and the command post can be accomplished through the existing telephone system, or the building's internal communication system. In many

instances, two-way ( walkie-talkie) radios have been used. **CAUTION:** *The use of radios could be dangerous. The radio beam could cause premature detonation of an electric initiator (blasting cap).*

### **Suspicious Object Located**

**NOTE:** *It is imperative that personnel involved in the search be instructed that their mission is only to search for and report suspicious objects. NOT to move, jar or touch the objects or anything attached thereto. The removal/disarming of a bomb must be left to professional Bomb Technicians.*

1. The location and a description of the object as can best be provided, should be reported to the command post. This information is relayed immediately to the incident commander.
2. To minimize damage sandbags or mattresses, but not metal plates or objects, may be placed around the object. **DO NOT ATTEMPT TO COVER THE OBJECT.**
3. The danger area should be identified, and blocked off with a clear zone of at least 300 feet, including areas below and above the object.
4. Check to see that all doors and windows are open to minimize primary damage from blast and secondary damage from fragmentation.
5. Evacuate the building.
6. Do not permit re-entry into the building until the device has been removed/disarmed, and the building declared safe for re-entry.

### **Problems of Evacuation**

The most common practice is to evacuate the building upon receipt of a bomb threat call. At first thought, this might appear to be the thing to do. After all, there is the possibility that an explosive or incendiary device might be in the building. However, consider the chances of personal injury that could result where a hasty evacuation is attempted, and panic ensues.

Panic is one of the most contagious of all human emotions. Panic is defined as a "sudden, excessive, unreasoning, infectious terror caused by fear of the known or the unknown." Panic can also be defined in the context of a bomb threat call as the ultimate achievement of the caller. Once a state of panic has been reached, potential for personal injury and property damage is dramatically increased. Some authorities feel that hasty evacuation can endanger more lives through panic than an explosive detonating.

In evacuating any building, we are routing personnel through the most public areas of the facility, its corridors, and stairwells. And these are the places that are most likely to contain an explosive or incendiary device. By evacuating immediately, we might be exposing personnel to a greater danger. The movement of any large mass of people under emergency conditions is a hazardous undertaking unless absolute control is maintained.

The decision to evacuate or not to evacuate is an administrative decision and there will be no time to have a committee meeting to make such a decision without first evaluating all the information available at that time.



Some of the factors that should be considered are:

1. The caller- What did he say? Was it a child's voice with other small children snickering in the background or did the caller sound serious in his threats?
2. Has this been a recurring thing?
3. Are employees or students excused from work or class when such threats are experienced?
4. Is it possible that this call was precipitated by news reports of other calls?
5. Will immediate evacuation of the premises expose personnel to greater danger?
6. What is the size of the building and how many people are involved?

Consider priority and routes of evacuation in the event a bomb is found in the building. This will depend on the type of building and location of personnel in relation to the area where the bomb is located. In multistory buildings, personnel on floors above the danger area should be evacuated first. This can be done simultaneously with the evacuation of lower levels.

If evacuation is affected an assembly area must be established for persons evacuated. This area should be at a distance far enough away from the event of an explosion. The minimum distance is 300 feet.

The University Police Department will control entry into a building during a bomb search. This may be accomplished concurrently by building staff and the police.

If the building is evacuated, it is recommended that all gas and fuel lines should be shut off at the main switch or valve. There is some diversity of opinion as to whether electric power should be shut off. To leave it on increases the possibility of electrical fires. To shut it off leaves the building in darkness and may tend to hamper the search team. The decision to shut off utility services to a building during a search when no device has been found will be made by the university administration. If a device or suspicious object has been located this decision will be made by the bomb disposal personnel upon their arrival.

### **Handling of the News Media**

It is of extreme importance that all inquiries by the news media be directed to the person appointed to function as a spokesperson. All other university personnel shall not discuss the situation with any outsiders, especially the news media. The purpose of this provision is to ensure that the news media is furnished with accurate information and that additional bomb threat calls are not precipitated by statements from uninformed sources.

## Contact Numbers

Middle Tennessee State University Police Department  
PO Box 141 MTSU  
Murfreesboro, TN 37132

Telephone:    On Campus:                    615-898-2424  
                  Off Campus or Cellular:        (615) 898-2424

## MTSU Bomb Threat Procedure

### Employee Responsibilities:

Employees receiving a threat over the telephone should note the exact time of the call and the exact words said by the caller.

The employee should listen carefully to the details of the threat and try to keep the caller talking to obtain the answers to the following questions:

1. When will the bomb explode?
2. Where is it located?
3. What does it look like?
4. What kind of bomb is it?
5. What will cause it to explode?
6. Did you place the bomb?
7. Why?
8. Where are you calling from?
9. What is your address?
10. What is your name?

The employee should write down whether the caller is male or female, what age he or she sounds like, any voice characteristics the caller may have (lisp, stuttering, accents, disguised, etc.), and any background noise heard.

If a display telephone is used, the employee should write down what appears on the digital display.

When the caller hangs up, the employee should call the University Police Department at 615-898-2424 and tell the dispatcher that a bomb threat has just been received. The employee should provide all the information received from the caller and the employee's observations. The employee should also give the dispatcher his or her name, office location, and telephone extension number. The employee should stay on the phone with the dispatcher until released from the call by the University Police Department.

After the employee has contacted dispatch, the employee should inform the supervisor about the call and that the police have been called and are en route to the location threatened by the bomb. If in the area threatened, employees should remain calm and stay where they are until police arrive at the scene.

If requested to leave the area or building, employees should look around their work areas as they leave. They should look for any suspicious packages or bags. If they see something that does not belong, **THEY MUST NOT TOUCH THE SUSPICIOUS OBJECT**. They should follow the

department evacuation procedure and inform police officers outside the building about any suspicious article seen and the exact location.

Employees should follow all instructions given by police or fire personnel. They should not re-enter the building or area until told that they may.

### **Department Head, Manager, and Supervisor Responsibilities**

When informed that their department or building has received a bomb threat, department heads, managers, and supervisors should do the following:

1. Make sure that the University Police Department has been notified. If they have not been notified, contact University Police dispatch at 615-898-2424 and provide the following information:

- a. Who received the bomb threat. (Officers will want to talk with the person who received the original call).
- b. The exact time the threat came in.
- c. What department or area was threatened.

2. Have all personnel in their area look around to determine whether they see anything unusual or different such as a box or bag that does not belong in their work area. **THEY SHOULD NOT TOUCH ANY ITEM THAT IS NOT IDENTIFIABLE TO THEIR WORK AREA.** If they find anything, they should contact University Police dispatch at 615-898-2424 immediately and provide the following information:

- a. Name and phone extension
- b. Location
- c. Location of the suspicious item
- d. Description of the item (shape, size, color, etc.)

They should secure the area around the item by asking all persons to leave the area or room. No one should be allowed to re-enter until emergency personnel arrive.

3. Evacuate only if directed by the MTSU President, Provost, Vice President of Student Affairs, Senior Vice President, University Police, MTSU Fire Marshal, or Murfreesboro Fire and Rescue Department. Departmental evacuation procedures should be followed.

4. If directed to evacuate, assist police, or fire personnel to secure facilities to ensure the safety of all staff and students.

5. **Do not activate the fire alarm.** Emergency personnel may activate the fire alarm system to assist in evacuation, but only after they evaluate the circumstances and location of the threat.

6. Provide calm leadership for colleagues. Speak slowly and distinctly when giving instructions. The main consideration is a safe and orderly evacuation of the area or building until it is found to be safe to re-enter.

## **University Police Department Responsibilities**

1. University Police dispatch has the responsibility to obtain all information from the person who received the bomb threat, to maintain the CAD entry/records on the incident, and immediately to dispatch University Police officers and supervisors to the location of the bomb threat.
2. Dispatchers will update officers, supervisors, and MTSU News and Public Affairs with current information and call all persons from the incident call list as required. Dispatch will refer all calls from media to MTSU News and Public Affairs.
3. University Police Officers will be responsible for securing the building or area of the bomb threat. They are responsible for assisting in the search for any explosive devices that may be in the building or area and will keep dispatch and supervisors current on any problems or the status of the situation.
4. The President, any Vice President, Facility Managers, University Police Supervisors, the MTSU Safety Officer, and/or Murfreesboro Fire and Rescue Department officers have the authority to evacuate any area or building if they determine that there is an immediate threat to life and/or property.

### Potential Concealment Areas

The following is a list of possible concealment areas for time delayed or incendiary devices:

<b>Buildings and Structures (General)</b>	<b>Auditoriums and Theaters</b>
<ol style="list-style-type: none"> <li>1. Elevator wells and shafts.               <ol style="list-style-type: none"> <li>A. Nooks</li> <li>B. Closets</li> <li>C. Storage rooms</li> <li>D. False Panels</li> <li>E. Walk areas</li> <li>F. Counterweights</li> <li>G. Motors</li> <li>H. Cables</li> <li>I. Trash in shafts</li> </ol> </li> <li>2. All ceiling areas</li> <li>3. Restrooms</li> <li>4. Access doors</li> <li>5. Crawl space in rest rooms and areas used as access to plumbing fixtures</li> <li>6. Electric fixtures</li> <li>7. Utility and other closet area</li> <li>8. Space under stairwell</li> <li>9. Boiler(furnace) rooms</li> <li>10. Flammable storage areas</li> <li>11. Main switches and valves</li> <li>12. Indoor trash receptacles</li> <li>13. Storage areas, including record-storage areas</li> <li>14. Mail rooms</li> <li>15. Ceiling lights with easily removable panels</li> <li>16. Fire hose racks</li> <li>17. Basements</li> <li>18. Around windows hidden by drapes or shades</li> <li>19. Inside desks</li> <li>20. Inside storage cabinets and containers</li> <li>21. Under tables</li> </ol>	<p>Searches must be conducted under each seat, into cut seat cushions, as well as the following:</p> <ol style="list-style-type: none"> <li>1. Stage area</li> <li>2. Microphones</li> <li>3. Speaker platform</li> <li>4. Crawl ways</li> <li>5. Tunnels</li> <li>6. Trapdoors</li> <li>7. Dressing rooms</li> <li>8. Restrooms</li> <li>9. Storage areas</li> <li>10. Ceilings</li> <li>11. Props</li> <li>12. Hanging decorations</li> <li>13. Lighting fixtures</li> <li>14. Sound system</li> <li>15. Air-conditioning system</li> <li>16. Roof</li> <li>17. Heating system</li> <li>18. Projection booths</li> <li>19. Offices</li> </ol>
<b>Academic Buildings</b>	<b>Outside Areas</b>
<p>Bombings in academic buildings are usually directed against non-student areas.</p> <ol style="list-style-type: none"> <li>1. Lockers</li> <li>2. Mechanical rooms</li> <li>3. Utility closets</li> <li>4. Offices</li> <li>5. Chemistry labs</li> <li>6. Auditoriums</li> <li>7. Cafeterias, lounges, or break areas</li> </ol>	<ol style="list-style-type: none"> <li>1. Street drainage systems</li> <li>2. Manholes in street and sidewalk</li> <li>3. Trash receptacles</li> <li>4. Garbage cans</li> <li>5. Dumpsters</li> <li>6. Mailboxes</li> <li>7. Parked cars, trucks, and carts</li> <li>8. Storage areas</li> </ol>

## BOMB THREAT CHECKLIST

*Reproduce and place this form near your telephone*

### QUESTIONS TO ASK:

1. When is bomb going to explode?
2. Where is it right now?
3. What does it look like?
4. What kind of bomb is it?
5. What will cause it to explode?
6. Did you place the bomb?
7. Why?
8. What is your address?
9. What is your name?

### CALLER'S VOICE:

Calm     Nasal     Angry     Stutter     Excited     Lisp     Slow     Raspy  
 Rapid     Deep     Soft     Ragged     Loud     Clearing Throat     Laughter  
 Deep Breathing     Crying     Cracking voice     Normal     Disguised

### THREAT LANGUAGE:

Distinct     Accent     Well Spoken (educated)     Slurred     Familiar     Incoherent  
 Whispered     Foul     Taped     Message read by threat maker     Irrational

If voice is familiar, who did it sound like? \_\_\_\_\_

Write the Exact Wording of the Threat:

### BACKGROUND SOUNDS

Street noises     Factory machinery     Crockery     Animal noises     Voices     Clear  
 PA System     Static     Music     Local     Long distance     House noises  
 Motor     Office machinery     Other \_\_\_\_\_

### CALLER INFORMATION:

Sex of Caller:\_\_\_\_ Race:\_\_\_\_ Age:\_\_\_\_

**NUMBER AT WHICH CALL IS RECEIVED:** \_\_\_\_\_

Time:\_\_\_\_\_ Date: \_\_/\_\_/\_\_

**REMARKS:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Name:\_\_\_\_\_ Position:\_\_\_\_\_

Phone Number:\_\_\_\_\_

## CHAPTER 7 FIRE SAFETY

### Introduction

This chapter covers the fire safety responsibilities of employees and supervisors and sets forth the fire safety rules and procedures.

### General

Planning for fire safety at Middle Tennessee State University considers the special fire hazards for specific operating areas, the protection of high-value property, and the safety of employees, students, and guests. These ends are met by:

- Non-combustible or fire-rated materials and construction practices suitable to the assigned uses of buildings and facilities.
- Alarm systems and automatic extinguishing systems.
- Access to a professional fire department, always staffed and trained in the control of emergencies that could occur at the University. (The University Police Department makes the initial response to all requests for emergency aid received on the emergency telephone numbers: 911 or 615-898-2424 on campus, 911 off campus. The Murfreesboro Fire and Rescue Department (MFRD) and Rutherford County Emergency Medical Services are automatically notified by the University Police Department as appropriate.)
- MTSU is a NON-SMOKING CAUMPUS

### DEFINITIONS

**Area of Refuge:** A space along an exit route that is protected from the effects of fire by separation from other spaces within the building by a barrier with at least a one-hour fire resistance-rating; or A floor with at least two spaces, separated from each other by smoke-resistant partitions, in a building protected throughout by an automatic sprinkler system that complies with 29 CFR 1910.159.

**Cryogenic Liquid:** A liquid with a normal boiling point below -240 degrees F (-150 degrees C).

**Compressed Gas: Means:**

- A gas or mixture of gases having, in a container, an absolute pressure exceeding 40 psi at 70 degrees F (21 degrees C); or
- A gas or mixture of gases having, in a container, absolute pressure exceeding 104 psi at 130 degrees F (54.4 degrees C) regardless of the pressure at 70 degrees F (21.1 degrees C); or
- A liquid having a vapor pressure exceeding 40 psi at 100 degrees F (37.8 degrees C) as determined by ASTM D-323.72



**Egress:** “means of egress.” A means of egress is a continuous and unobstructed way of exit travel from any point in a building or structure to a public way and consists of three separate and distinct parts:

- the way of exit access,
- the exit, and
- the way of exit discharge.

**Emergency Forces:** The public organizations that respond to and deal with emergencies when they occur, especially the ambulance service, the police, and the fire brigade.

**Flash Point:** Lowest temperature at which a material will emit vapor combustible in air mixture higher than Flame point of same material.

### Reporting Fires or Fire Alarms

- Employee **shall immediately** activate the building Fire Alarm system from the nearest Pull Station upon detecting a fire or seeing visible smoke.
- All employees **shall immediately** report **ALL** fires, regardless of size (even if extinguished), smoke, or fire alarms on campus to the University Police Department by dialing 615-898-2424. If no response, then to Murfreesboro Fire and Rescue Department (MFRD) by dialing 615-893-1311 or 911 from any campus telephone or by cell phone. Most MTSU buildings have installed fire alarm systems that are *remotely monitored*, but not all buildings or facilities have this capability; therefore, it is imperative that someone notify the University Police Department at 615-898-2424 or MFRD of fires and fire alarms at 615-893-1311 or 911 from any campus telephone or by cell phone as soon as it is safely possible.
- Off campus or at remote sites the Fire Department is dispatched by dialing 911 anywhere in Rutherford County.
- The University Police Department will immediately notify the MTSU Fire Marshal of any reported fire or fire alarm at any hour.

### Building Evacuation during a Fire or Other Emergency

Department heads or facility managers in each building shall be responsible for instructing the occupants that the entire building is to be 100% evacuated in an emergency or when the fire alarm sounds.

The size and type of construction of many campus buildings may prevent you from detecting an actual fire until you are at extreme risk of injury. TOSHA standards require that **ALL** persons immediately evacuate.

Employees **must** follow these procedures upon discovery of a fire, smoke in a building, or activation of a fire alarm system:

**R.A.C.E.**

R- Relocate

A – Alarm

C – Confine

E – Extinguish (if trained to do so)

- If a fire occurs in a room where you are, **get out, close the door, and stay out.** If they have been appropriately trained and authorized *in writing* by the department head and the MTSU Fire Marshal, employees or graduate students may attempt to extinguish small fires with available portable extinguishers to facilitate the evacuation of the space and the building under the following conditions:
  - The fire is confined to the area of origin.
  - The appropriate size and type of extinguisher is immediately available.
  - Someone is sounding the alarm and notifying the fire department.
  - The fire does not block one's path of escape.
  - A person can use the extinguisher without exposure to smoke or fire gases.
- Sound the alarm and report the fire to **615-898-2424** or **911**.
- You should leave if you can.
- Feel the door with the BACK of your hand.
- Open it slowly if it is cool and proceed to the nearest exit.
- **CRAWL LOW** under any smoke.
- **DO NOT** open the door if it is **HOT**. Seal all cracks with wet towels, clothing or other available material. Shut off all fans and air conditioners. Signal at the window and phone for help.
- Assume **ALL** fire alarms are actual fires.
- Do **NOT** investigate; that is the responsibility of the Fire Department.
- Instructors are responsible for instructing all students in the classroom to leave the building using the nearest unobstructed exit.
- Use the stairs. Elevators **SHALL NOT** be used for building evacuation purposes under any circumstances.
- Persons evacuating the building will assemble at a safe distance at least 100 feet from the building where they will not interfere with or be endangered by the operation of fire, rescue, or other emergency equipment.
- The person reporting the emergency should remain on site, in a safe area, and meet the arriving University Police officer, MTSU Fire Marshal, or the senior officer of the first arriving fire apparatus and inform him or her of the nature of the emergency and the general situation. **Including Location or Room # of the incident.**
- Follow any instructions given by fire or other emergency personnel until the emergency is over and the building is released by the Fire Department.
- In accordance with Tennessee State law, the building may not be reoccupied, and the alarm system may not be reset until permission to do so is given by the Fire Department.
- Provide the necessary assistance to any disabled occupants in your office or classroom. Wheelchair users should go to the stairwell or designated area Area of Refuge that is furthest from the fire to wait for help. Call University Police Dispatch at 615-898-2424 to

notify them concerning the disabled student's location or have an assistant notify the incident commander on the scene.

### Use of Portable Fire Extinguishers

Before using your fire extinguisher, be sure to read the instructions **before** an incident happens, and it is too late. Although there are many different types of fire extinguishers, all of them operate in a similar manner. Use the PASS acronym as a quick reference:

#### PASS

**Pull the Pin** at the top of the extinguisher.

**Aim at the base of the fire**, not the flames.

**Squeeze the lever slowly** to release the extinguishing agent. If the handle is released, the discharge will stop.

**Sweep from side to side** until the fire is completely out.

Operate the extinguisher from a safe distance, several feet away, and then move towards the fire once it starts to diminish. Be sure to read the instructions on the fire extinguisher; different fire extinguishers recommend operating them from different distances. Remember to aim at the base of the fire and not at the flames. Once the fire is out, do not walk away! Watch the area for a few minutes in case it re-ignites. Recharge the extinguisher immediately after use.

A typical fire extinguisher contains about 10 seconds of extinguishing power and may be less if it has already been partially discharged. Always read the instructions on the fire extinguisher beforehand and become familiar with its parts. It is highly recommended that you get hands-on training before operating a fire extinguisher.

### Emergency Relocation/Fire Exit Drills

**General:** The purpose of conducting Emergency Relocation/Fire Exit Drills is to ensure the safe and efficient evacuation of a building in any emergency situation while maintaining order and control and preventing panic. Speed in emptying a building, while desirable, is not the object of an Emergency Relocation/Fire Exit Drill and should be considered of secondary importance. The facility manager or building director of any facility conducting an Emergency Relocation/Fire Exit Drill shall notify the University Police at 615-898-2424 of the time and location of the drill not less than one hour prior to initiating any Emergency Relocation/Fire Exit Drill. The University Police dispatcher shall notify the Murfreesboro Fire and Rescue Department (MFRD) dispatcher of the time and location of the drill prior to the actual initiation of any fire exit drill.

**Residence Halls:** Each residence hall shall conduct a minimum of two Emergency Relocation/Fire Exit Drills each semester. One shall be announced, and notice given to all building staff and residents. One shall be unannounced without notice to either the building staff or residents. Accidental or non-fire initiation of the fire alarm system will not be counted in the required number of Emergency Relocation/Fire Exit Drills per semester.

**Academic and Other Buildings:** Annual fire exit drills are required in all University buildings. Such fire exit drills should be limited to regular employees and conducted at such times when classes will not be disrupted. All regular employees in every building should know the proper procedures for emergency evacuations and be trained to properly direct students and other occupants in case of a fire or other emergency.

**Emergency Relocation/Fire Exit Drills Procedures:**

1. Upon hearing the fire alarm, remain calm and walk immediately to the nearest exit and leave the building.
2. Classroom faculty and staff should be familiar with the nearest and easiest exit to be used in the fire drill and any alternative exits available. Faculty and staff should close (not lock) doors and windows and take responsibility for checking facilities for complete evacuation.
3. Disabled students should privately inform faculty or staff at the start of the semester of any special requirements with respect to locations and procedures that will best facilitate those students' exiting from the building in an emergency. In general, wheelchair users should go to the stairwell that is furthest from the fire or a designated Area of Refuge and wait for help. Students, faculty, or staff should assist other disable persons. Do not leave a disabled person alone during an Emergency Relocation/Fire Exit Drills. For more information on emergency evacuation procedures for individuals with disabilities, go to: <http://www.mtsu.edu/ada/evac.php>
4. If you are located on a floor other than the main building entry level, use the stairwells to exit. **Do not use the elevators.**
5. After exiting, maintain a distance of at least 200 feet away from the building so that emergency personnel have easy access.
6. Do not go back inside the building until the building fire drill coordinator indicates an all-clear.
7. Fire Drill Report is located in Appendix E of this document.

**Emergency Relocation/Fire Drill Evaluation Reports:**

1. For each building on campus, excluding residence halls, a Fire Drill Coordinator and Drill Building Runners shall be identified. The Fire Drill Coordinator shall be responsible for completing the Fire Drill Evaluation Report found in Appendix F and submitting the completed form to the Environmental Health and Safety Services within 2 weeks of the fire drill.

## False Fire Alarms

Issuing a false fire alarm is a **CRIME under Tennessee Law and is punishable as such.** . Persons issuing false fire alarms may be fined and/or imprisoned. Anyone issuing a false fire alarm in any University facility shall be prosecuted to the fullest extent of the law and may also be subject to University imposed disciplinary measures or other sanctions.

## MTSU Fire Marshal

The Campus Fire and Life Safety Specialist or Manager is designated as the MTSU Fire Marshal for the University. He or she is responsible for the execution of all duties and responsibilities identified in National Fire Code 1 and any other State or Federally adopted Code, Regulation, or Standard.

These duties and responsibilities include:

- \* Administration of the International Fire Code (IFC) and any Federal, State, and locally adopted Codes, ordinances, and standards to achieve compliance, insofar as possible, by all University departments and operations;
- \* Investigation of the cause, origin, and circumstances of any fire or explosion involving a loss of life, injuries to persons, or destruction or damage to property;
- \* Cooperation with the University Police and State and local fire or law enforcement officials in the investigation of any fire or explosion where reasonable cause exists that the fire or explosion may have been of incendiary origin;
- \* Ensure the maintenance of records of all fire prevention inspections, including the date of inspection and a summary of violations found to exist, the date of notification of violations, and the final disposition of all violations;
- \* Performance of any required duties to achieve compliance with all provisions of the International Fire Code (IFC) and any Federal, State, and locally adopted Codes, ordinances and standards to achieve compliance, insofar as possible covering the prevention of fires; the storage and use of combustible, flammable, or explosive materials; the installation and maintenance of automatic and other fire alarm systems and fire extinguishing equipment; the maintenance and regulation of fire escapes; the means and adequacy of exit in case of fire from all university facilities; the investigation of the cause, origin, and circumstances of fires; the maintenance of fire cause and loss records; and
- \* The performance of other such duties as may be required or set forth in applicable laws, regulations, standards, codes, policies, and procedures applicable to the University.
- \* The Safety Officer shall also inspect, or cause to be inspected, all University premises and facilities on a periodic basis and shall make such recommendations as may be necessary to achieve compliance with the laws, standards, codes, regulations, policies, and procedures governing the same and for safeguarding of life and property from fire.

## University Police Department

All employees must **IMMEDIATELY** report **ALL** fires, regardless of size (even if extinguished, smoke, or fire alarms on campus to the University Police Department by dialing 615-898-2424. If no response, then to Murfreesboro Fire and Rescue Department (MFRD) by dialing 615-893-1311 or 911 from any campus telephone or by cell phone. The University Police dispatched all emergency calls on campus.

For off campus or a remote sites, the Fire Department is dispatched by dialing 911 anywhere in Rutherford County.

The University Police Department will immediately notify the MTSU Fire Marshal any fire or fire alarm at any hour.

## Fire Department

All employees must **IMMEDIATELY** report **ALL** fires, regardless of size (even if extinguished, smoke, or fire alarms on campus to University Police Department by dialing 615-898-2424 or 911. The University Police dispatches all emergency calls on campus. Potential fire hazards should be reported to MTSU Environmental Health and Safety Services at 615-898-2879 or by campus email at John.Turner@MTSU.edu.

Off Campus or at remote sites the Murfreesboro Fire and Rescue Department (MFRD) can be dispatched by dialing 911 anywhere within Rutherford County.

The Murfreesboro Fire and Rescue Department (MFRD) is responsible for protecting people and property from fires, explosions, and other hazards through expeditious control of such events.

The MTSU Environmental Health and Safety Services is responsible for assisting departments in achieving University-wide compliance with fire, life safety, and protection requirements and for reviewing all plans and procedures for compliance with these requirements; for conducting fire, life safety and protection inspections; and or providing fire prevention recommendations.

All these Protection and Response functions are performed in compliance with OSHA/TOSHA standards, MTSU Policies, Federal, State, and locally adopted Codes, ordinances and standards for fire and life safety. The MTSU EHS Services-Safety Officer is also designated as the MTSU Fire Marshal.

All employees must conduct their operations in such a way as to minimize the possibility of fire. This means applying rules such as keeping combustibles separated from ignition sources and avoiding needless accumulations of combustible materials.

Supervisors are responsible for keeping their operating areas safe from fire. The Environmental Health and Safety-MTSU Fire Marshal, Murfreesboro Fire and Rescue Department (MFRD), and Tennessee State Fire Marshal Office (TSFMO) may provide guidance and construction criteria with respect to fire and life safety as well as inspections. The provision and maintenance of fire detection systems and both automatic and manual fire extinguishing equipment is the responsibility of Facilities Services with guidance from the Safety Officer. But the supervisor, who best know the day-to-day nature of his/her operations, is responsible for notifying the

Environmental Health and Safety-MTSU Fire Marshal of operations that change the degree of fire risk and will therefore require a change in the planned fire protection provisions.

### **Supervisor Responsibilities**

Supervisors must ensure that their personnel are properly instructed regarding potential fire hazards involved in their work and around their workplaces, the proper precautions to minimize fires, and the procedures in case of fire.

### **Class “A” Combustibles**

Class A combustibles are common materials such as wood, paper, cloth, rubber, plastics, etc. Fires in any of these fuels can be extinguished with water as well as other agents specified for Class A fires. They are the most common fuels to be found in non-specialized operating areas of the workplace such as offices.

Safe handling of Class A combustibles means:

- \* Disposing of waste daily.
- \* Keeping work area clean and free of fuel paths, which can spread a fire, once started.
- \* Keeping combustibles away from accidental ignition sources such as hot plates, soldering irons, space heaters, or other heat or spark-producing devices.
- \* Keeping all rubbish, trash, or other waste in metal or metal-lined receptacles with tight-fitting covers when in or adjacent to buildings. (Exception: wastebaskets of metal or of other material and design approved for such use, which are emptied each day, need not be covered.)
- \* Pre-planning the use of combustible materials to limit the amount stored on site or require disposal.
- \* Storing of paper stock in metal cabinets and rags in metal bins with automatically closing lids.
- \* Making frequent self-inspections and checks for noncompliance with these rules to prevent fires before they can start.

### **Class “B” Combustibles**

Class B combustibles are flammable and combustible liquids (including oils, greases, tars, oil-base paints, lacquers) and flammable gases. Flammable aerosols (spray cans) are also covered in this section. Cryogenic and pressurized flammable gases are treated elsewhere in this handbook.

The use of water to extinguish Class B fires (by other than trained firefighters) can cause the burning liquid to spread carrying the fire with it. Flammable-liquid fires are usually best extinguished by excluding the air around the burning liquid. Generally, this is accomplished by using one of several approved types of fire-extinguishing agents, such as carbon dioxide, ABC multipurpose dry chemical, Halon 1301 (used in built-in, total-flood systems), and Halon 1211 (used in portable extinguishers).

*Halon has been banned by the EPA, although some Halon based systems may still be in use. Halon should be considered as "immediately dangerous to life and health" as an asphyxiant, also its by-products, generated when exposed to fire or heat, are extremely toxic. Halon 1211 portable extinguishers should only be used in WELL ventilated areas.*

Fires involving flammable gases are usually controlled by eliminating the source of fuel, i.e., closing a valve or using Emergency Shut-Offs.

Technically, flammable, and combustible liquids do not burn. However, under appropriate conditions, they generate sufficient quantities of vapors to form ignitable vapor-air mixtures. As a general rule, the lower the flash point of a liquid, the greater the fire and explosion hazard. It should be noted that many flammable and combustible liquids also pose health hazards.

**Note:** *The flash point of a liquid is the minimum temperature at which it gives off sufficient vapor to form an ignitable mixture with the air near the surface of the liquid or within the vessel used.*

It is the responsibility of the user to ensure that all Class B combustibles are properly identified, labeled, handled, and stored. If assistance is required, contact Environmental Health and Safety Services.

Safe handling of Class B combustibles means:

- \* Using only approved containers, tanks, equipment, and apparatus for the storage, handling, and use of Class B combustibles;
- \* Making sure that all containers are conspicuously and accurately labeled as to their contents; dispensing liquids from tanks, drums, barrels, or similar containers only through approved pumps taking suction from the top or through approved self-closing valves or faucets;
- \* Storing, handling, and using Class B combustibles only in approved locations, where vapors cannot reach any source of ignition, including heating equipment, electrical equipment, oven flame, mechanical or electrical sparks, etc.;
- \* Never cleaning with flammable liquids within a building except in a closed machine approved for the purpose; never storing, handling, or using Class B combustibles in or near exists, stairways, or other areas normally used for egress;
- \* Storing flammable liquids in approved storage cabinets or special rooms approved for the purpose;
- \* Never smoking, welding, cutting, grinding, using an open flame or electrical appliances or equipment, or otherwise creating heat that could ignite vapors near any Class B combustibles.

## **Cryogenic and Pressurized Flammable Gases**

### **Cryogenic Liquids and Gases:**

Cryogenic liquids are liquefied gases that are kept in their liquid state at very low temperatures. The word "cryogenic" means "producing, or related to, low temperatures," and all cryogenic liquids are extremely cold. Cryogenic liquids have boiling points below -150°C (-238°F) (Carbon dioxide



and nitrous oxide, which have slightly higher boiling points are sometimes included in this category). All cryogenic liquids are gases at normal temperatures and pressures. Liquefied gases, such as liquid nitrogen and liquid helium, are used in many cryogenic applications. Liquid nitrogen is the most commonly used element in cryogenics. Liquid helium is also commonly used and allows the lowest attainable temperatures to be reached. These gases must be cooled below room temperature before an increase in pressure can liquefy them. Different cryogenics become liquids under different conditions of temperature and pressure, but all have two properties in common: they are extremely cold, and small amounts of liquid can expand into very large volumes of gas.

The vapors and gases released from cryogenic liquids also remain very cold. They often condense the moisture in air, creating a highly visible fog. In poorly insulated containers, some cryogenic liquids actually condense the surrounding air, forming a liquid air mixture. Cryogenic liquids are classified as "compressed gases" according to WHMIS 1988 criteria.

- Everyone who works with cryogenic liquids (also known as cryogenics) must be aware of their hazards and know how to work safely with them.

### **Explosion Due to Rapid Expansion**

Cryogenic liquids cannot be indefinitely maintained in the liquid state. If they are vaporized in sealed container(s) they can produce enormous pressures that could rupture the container, for this reason pressurized cryogenic containers are normally protected with multiple devices for over-pressure prevention.

- Pressure relief devices must protect all selected equipment that may allow for the liquid to become trapped.

### **General Safety Practices:**

Storage and Use:

All cryogenic liquids must be stored and used in a well-ventilated area.

1. Dewars: Non-pressurized, vacuum-walled containers which are equipped either with a loose-fitting cap or open top and are used for storage of small amounts of liquid.
2. Cryogenic Liquid Cylinders: These are sealed, vacuum-walled containers, which do contain pressure up to 350 psig.
3. Cryogenic Storage Tanks: These tanks range in size from 500 to 420,000 gallons and are always pad mounted.

Personal safety:

**Recommended** Personal Protective Equipment (PPE) for handling cryogenics includes:

1. A full-face shield over safety glasses,
  - a. The eyes are the most sensitive body part to the extreme cold of the liquid and vapors.
2. Loose-fitting thermal insulated or leather gloves,

- a. Gloves should be loose fitting to allow quick removal if liquid should be spilled inside.
- b. Gloves are not made to permit the hands to be immersed in a cryogenic liquid.
  - i. They will only provide short-term protection from accidental contact with the liquid
3. Long sleeved shirts and trousers without cuffs.
4. No metal jewelry, rings, watches, etc., should be worn on hands or wrist while transferring cryogenic liquids.

### Safety Practices

1. Cryogenic liquids must be handled, stored, and used only in containers or systems designed in accordance with applicable standards, procedures or proven safe practices.
2. All systems components piping, valves etc., must be of the appropriate materials to withstand the extreme temperatures.
3. Pressure relief valves must be in place in systems and piping to prevent pressure build up.
4. Any system section that could be valved off while containing cryogenic liquid must have a pressure relief valve.
  - a. Pressure relief valve relief ports must be positioned to face toward a safe location.
5. Transfer operations involving open cryogenic containers, such as dewars must be done slowly, while wearing all required PPE.
  - a. Care must be used not to contact non-insulated pipes and system components.
6. Open transfers will be allowed only in well-ventilated areas.
7. Use of a funnel while transferring cryogenic liquids is not permitted on MTSU Campus.
8. Tongs or other similar devices must be used to immerse and remove objects from cryogenic liquids.

### **Flammable Gases:**

The objective of this section is to ensure the safe and proper handling, storage and use of flammable gases at Middle Tennessee State University.

Flammable gases can cause fires, explosions, oxygen deficient atmospheres, toxic gas exposures as well as the innate physical hazard associated with fires, explosions, and

cylinders under high pressure. Special storage, use, handling, and disposal procedures are necessary to ensure the safety of researchers using these chemicals and equipment.

**This policy does not apply to propane used for cooking purposes, for forklift propane tanks or for carbon dioxide used for beverage dispensing.**

### **General Cylinder Safety:**

- The University shall only use cylinders that meet Department of Transportation (DOT) regulations for the transportation and storage of compressed gases.
  - Accept only properly identified cylinders and do not rely on color codes.
- Purchasing and Delivery:
  - At MTSU, all compressed gas cylinders, including lecture bottles, are to be ordered through General Stores unless granted specific exception by the Manager of General Stores in consultation with Central Purchasing. It is General Stores responsibility to deliver cylinders to on-campus facilities at MTSU. Vendors' direct deliveries to various colleges and departments will not be permitted unless granted specific exception.
  - At MTSU locations, in order to receive the University's contract pricing, it is recommended that all gas cylinders be purchased through the University's contracted gas supplier, if located near a campus. If the University contracted gas cylinder supplier is not located near a campus, the campus can purchase their gas cylinders through a local supplier.
- No cylinders shall be recharged by University personnel without special consent from the cylinder owner, and then only in accordance with DOT regulations.
  - This requirement also applies to the transfer of gas from one cylinder to another.
    - This portion of the policy does not apply to scuba tanks or self-contained breathing apparatus (SCBA) tanks.
- Wear safety equipment appropriate for the hazard potential of the gas before beginning work.
- If a cylinder or valve is noticeably corroded, the vendor should be contacted for instructions.
- A leaking cylinder should be removed and isolated in a well-ventilated safe area. It may be necessary to call in trained emergency response personnel.
- If the leak is at the junction of the cylinder valve and cylinder DO NOT try to repair! Instead, contact the supplier.

### **Storage, Use and Handling:**

- All flammable gases shall be used only for their intended purpose.
  - a. No cylinder is to be used if the contents are not known or identified.
- It is recommended that flammable gas users review Safety Data Sheets (SDSs) before using any flammable gases.
- All cylinders shall be stored in accordance with all Federal, State, and local municipal regulations, and in accordance with standards of other authorities having jurisdiction over the University.
- Properly secure cylinders in a well-ventilated and protected area away from heat, flames, and the sun.
  - a. Compressed and flammable gas cylinders shall not be subjected to a temperature above 125° Fahrenheit (52° Celsius). Cylinders should not be subjected to artificially created low temperatures without the approval of the vendor due to possible decreased ductility of the steel at low temperatures
- Segregated cylinders by hazard classes while in storage.
  - a. If gases of different types are being stored at the same location, the cylinders should be grouped by types of gas, and these groups should be arranged to take into account the gases contained.
  - b. All cylinder storage areas shall be so posted with the names of the gases being stored.
- Full and empty cylinders are to be stored separately.
- Due to the possibility of severe corrosion, cylinders shall not be exposed to continued dampness, nor near salt or other corrosives for extended periods.
- Cylinders may be stored in the open as long as proper safeguards have been provided to prevent corrosion and protection from the elements.
- Cylinders shall be stored in a location that minimizes the chance of tampering and vandalism.
  - a. This may involve the construction of barriers.
- Discontinue use of the cylinder when it has at least 25 psi remaining; close valve to prevent air and moisture from entering. MTSU returns unused and empty cylinders to the vendor for reuse or refill.
  - a. It is the ultimate responsibility of the cylinder user, upon returning an empty cylinder, to close valves and make certain that all valve caps are in place. In addition, a tag shall be attached reading "EMPTY."

- Changing of compressed gas cylinders shall be done only by trained personnel.
- All compressed gas cylinders must bear labels that clearly identify the contents.
  - a. No cylinder is to be used if the contents are not known or identified.
  - b. It is illegal to change the stamped marks on any compressed gas cylinder.
  - c. Each cylinder should be provided with the proper DOT label required for the gas contained.
  - d. No one shall deface or remove any markings, labels, decals, tags, or stencil marks that have been applied/attached for the identification of a cylinder. The cost of determining the contents of an unknown cylinder shall be the responsibility of the Department or Unit.
  - e. If a non-DOT approved cylinder is found, the cost to transfer the contents to an approved cylinder and/or the cost of disposal of the non-approved cylinder shall be the responsibility of the Department or Unit where the cylinder was found.
- No cylinders are to be repainted by University personnel unless authorized in writing by the vendor.
- Compressed gas cylinders must be in an upright position and supported at all times, whether full or empty. Acceptable methods of support include:
  - a. wall-mounted or bench-mounted gas cylinder brackets;
  - b. chains or belts anchored to walls or benches; and,
  - c. Freestanding dollies or carts designed for gas cylinders and equipped with safety chains or belts.
- Gas cylinders must have the valve protection cap in place except when in use.
- Pressure regulators and gauges must be compatible with the cylinder valves. MTSU ***does not*** allow use of “cheaters” (adapters) instead of the correct regulator and gauge.
- Do not purchase more or larger cylinders than necessary;
- Do not permit oil or grease to contact cylinders or their valves, especially cylinders containing oxidizing gases.

### **Flammable Gas Restrictions:**

1. No cylinders are to be stored near highly flammable solvents, combustible waste material, unprotected electrical connections, gas flames, or other sources of ignition.
2. No cylinder is to be placed where it might become part of a "live" electrical circuit.

3. Open flame should never be permitted to come into contact with any part of a compressed or flammable gas cylinder. Flames should be kept as far away as possible from compressed and flammable gas cylinders. When in doubt, flames should be kept at least 20 feet from any compressed or flammable gas cylinder.
4. At no time should a flame be used to detect a leak.
5. All connections shall be tested with a soapy water solution ("Snoop") or approved commercial leak detection solution shall be used.
6. The cylinder user shall make certain that all appliance connections are tight to prevent leakage. The system shall be slowly and partially pressurized and leak- tested before fully pressurizing the system.
7. **DO NOT** store flammable gases next to near oxygen cylinders.
8. Inside buildings, stored oxygen shall be separated from flammable gas cylinders by a minimum of 20 feet or separated by a fire resistant partition with a height no less than that of the cylinders.
9. **DO NOT** store flammable gases at, near, or next to an exit.
10. Cylinders are not to be stored near elevators, ramps or paths of normal egress, or in locations where heavy objects may strike or fall on them.
11. At no time shall smoking be permitted in any area where flammable gas cylinders are stored.
12. Refer to University Policy 75 for further information regarding the University's smoking policy.
13. **DO NOT** use copper fittings or tubing on acetylene tanks;
14. **DO NOT** use Teflon tape on cylinder or tube fitting connections, which have metal-to-metal face seals or gasket seals.
15. Protective, removable caps are to be kept in place until the cylinder is to be used.
16. Tampering with the safety relief devices in cylinder valves is not permitted.
17. Approved pressure regulating devices must be used in all cases when gas pressure in a system is to be lower than cylinder pressure.
18. At no time should connections between cylinder and auxiliary equipment be forced. If the threads do not match, return the cylinder to General Stores or the vendor. Teflon tapes should never be used on cylinder or regulator connections.
19. When flammable gas cylinders are connected to a manifold, all related equipment should be of a design, which has been approved by the Department Chair or EHS.

20. Regulators, gauges, hoses, and other appliances used with a particular gas or group of gases must not be used on cylinders containing gases having different chemical properties unless the vendor grants permission in writing.
21. All cylinder valves should be opened slowly to prevent ice formation. Appropriate tools should be used to tighten or loosen tank valves. If the valve will not readily open, return the cylinder to General Stores.
22. Compressed gas shall not be used to remove foreign matter from clothing or any part of the human body.
23. Before a regulator is removed from a cylinder, the cylinder valve shall be closed, and all pressure released from the regulator and system.
24. No University personnel are to attempt to repair or alter cylinders, valves, or other safety relief devices.
25. Cylinders shall never be used as rollers, supports, or for any purpose other than to contain the contents as received.
26. All cylinder valves are to be kept closed at all times, except when the cylinder is in use.
27. General Stores or the vendor should be notified if any condition has occurred which might have permitted any foreign substance to enter a cylinder or valve.

### **Moving Cylinders:**

1. Whenever removable caps are provided for valve protection, they shall be kept in place when the cylinder is not in use.
2. Cylinders shall never be lifted by the cap or valve.
3. Cylinders should never be dropped or permitted to come into violent contact with each other.
4. Magnets, slings, ropes or chains shall not be used to handle any cylinder. A suitable "truck" or cylinder cart shall be used.
  - a. Use appropriate dollies or hand trucks to move cylinders weighing more than 50 pounds
5. Avoid dragging, rolling or sliding cylinders whenever possible.
6. When cylinders are being transported by truck, forklift or cylinder cart, they shall be firmly secured.
7. Transportation of more than 1000 pounds, either separately or combined, of oxygen, non-flammable or flammable compressed gas requires a Commercial Driver's License (CDL).

**Reference:**

*Standard No. 55, Compressed Gases and Cryogenic Fluids Code – National Fire Protection Association.*

**Portable Heaters**

MTSU endeavors to provide all students, faculty, staff and visitors with a temperate environment in which to live and work throughout the colder winter months. Occasionally, that endeavor falls short of maintaining the desired temperature range due to system abnormalities, structural inadequacies, extreme weather conditions or a combination of all three. Should this be the case, we encourage all of the campus community to promptly communicate this with Facilities Maintenance. MTSU seeks to expeditiously remedy heating problems in the quickest, safest, and environmentally friendly way possible. If the situation cannot be remedied in that expeditious fashion, in certain limited situations, the use of portable heating appliances may be allowed.

The use of these appliances, whether privately or university owned, is allowed only where there is no chance of causing injury to personnel or of creating a fire hazard. This provision requires a common-sense approach in safely locating such appliances and ensuring that the appliances do not operate when they are unattended. These appliances **may not** be used where:

- \* Flammable or explosive vapors or dusts may be present;
- \* Eating, or drinking are prohibited because toxic or radioactive materials may be present;
- \* The area has been designated as unsafe for such devices; or
- \* In residence halls or any other Campus-Owned residential occupancies.

The following practices should be carried out when operating portable heating appliances:

- \* Do not place the appliance on unstable or readily combustible materials;
- \* Maintain a clearance of at least 36 inches between the appliance and combustible materials;
- \* Ensure that the appliance is approved by either Underwriters Laboratories, Inc., or Factory Mutual Research Corporation;
- \* Connect the appliance directly to a proper electrical outlet using only the cord with which it was originally equipped;
- \* Do not use extension cords or power strips;
- \* Do not operate appliances during off hours if they are unattended unless they are controlled by a timer installed by a Middle Tennessee State University electrician. The timer will automatically de-energize the appliance during off hours and energize it not more than 30 minutes before the arrival of personnel. If 24-hour operation is desirable, the Campus Fire Marshal must review the proposed operation and arrangement.



*MTSU reserves the right to periodically monitor the use of portable heating appliances to assure that they are being used in a manner compliant with this section. Any unsafe conditions found to exist during these periodic inspections, the University reserves (retains) the right to make changes in the installation/application or rescind the use of the device.*

### **Fire, Heat, and Smoke Detectors**

Several types of automatic fire, heat, and smoke detectors are used throughout Middle Tennessee State University according to particular needs and purposes. All of them will detect fire (by one of several means) and transmit an alarm within the building. All University buildings are equipped with fire alarms. Automatic detectors, where installed, activate those alarms, as do the manual pull boxes. In some cases, automatic detectors activate automatic extinguishing systems. The Fire Department always dispatches firefighters and apparatus to the scene of any fire alarm. Most fire alarms on campus are **LOCAL** alarms only and **DO NOT** automatically notify the Fire Department. Alarms **MUST** be reported to University Police Department by dialing 615-898-2424 or 911 on campus. If not response, then, call Murfreesboro Fire and Rescue Department at 615-893-1311 or 911 by any campus phone or by cell phone.

### **Fire Doors**

Fire doors and dampers are provided at strategic points to block the spread of smoke and fire. Some of these are automatic and close when automatic detectors sense smoke or fire. Fire doors must **never** be blocked open or left in disrepair so that they cannot close, and latch automatically as intended in the event of a fire. They must never be blocked, wedged, or tied open. If such doors must be kept open, they must be equipped with approved automatic smoke-activated release hold-open devices.

### **Fire Exits**

Fire exits must be of sufficient number to allow for rapid evacuation of all personnel. Fire doors must never be locked to prevent someone from opening the door from inside a building.

### **Fire Hydrants**

Fire hydrants are maintained for emergency use by the Fire Department. They must be kept accessible and in good working condition. It is against the law to park at a fire hydrant, even when driving MTSU cars and service vehicles on campus. Fire hydrants are to always remain unobstructed in accordance with National Fire Code 1:3-5.5 which has been adopted as state law under the provisions of Tennessee Code Annotated Title 68. Tennessee Code Annotated 55-8-160(a)(4) further prohibits parking within 15 feet of a fire hydrant. Under Tennessee Code Annotated 6-2135(h), the fire department, when responding to an emergency call, may remove any vehicle blocking access to a hydrant or fire lane by any means necessary without liability. Any damages to the removed vehicle or any fire apparatus are the responsibility of the driver and vehicle owner.

There are no exceptions allowed under the code; MTSU cars and service vehicles may not park at fire hydrants for any reason. These violations were classified as Class C misdemeanors on 1 November 1989 as provided in Acts 1989 Chapter 591 Section 113. Tennessee Code Annotated 40-35-111(e) provides that the penalty imposed for a Class C Misdemeanor shall be a jail term of not more than 30 days, or a fine not to exceed \$50.00, or both.

Fire hydrants are flowed and tested annually by the Murfreesboro Fire and Rescue Department (MFRD).

Certain temporary uses of fire hydrants may be authorized in writing by the Chief or Assistant Chief of the Fire Department. An example of such temporary use may be connection by construction contractors. When temporary connections are authorized, the following practices must be observed:

- Use only valved outlets.
- Use only a hydrant spanner provided by the Fire Department. (Other types of wrenches can damage the wrench flats on the valve stem.)
- Do not leave connections in place unattended, except at construction sites.
- Close a hydrant valve 1/8th turn after fully opening it. (This is done so that a person mistakenly turning the valve the wrong way will not cause damage by forcing it.)
- When replacing the outlet caps after using a hydrant, screw them on only hand tight.

### **Fire Lanes**

Fire lanes are maintained to allow emergency access by the Fire Department. They must be always kept accessible **at all times** and should be enforced by towing 24 hours a day and 7 days a week. It is against the law to park in a fire lane, even when driving MTSU cars and service vehicles on campus. Posted fire lanes are to always remain unobstructed in accordance with National Fire Code 1:3-5.5 which was adopted as state law under the provisions of Tennessee Code Annotated Title 68. Tennessee Code Annotated 6-2135(h) allows the fire department, when responding to an emergency call, to remove any vehicle blocking access to a fire lane, by any means necessary, without liability. Any damages to the removed vehicle or any fire apparatus are the responsibility of the driver and vehicle owner.

There are no exceptions allowed under the code; MTSU cars and service vehicles may not park in fire lanes for any reason. These violations were classified as Class C misdemeanors on 1 November 1989 as provided in Acts 1989 Chapter 591 Section 113. Tennessee Code Annotated 40-35-111(e) provides that the penalty imposed for a Class C Misdemeanor shall be a jail term of not more than 30 days, or a fine not to exceed \$50.00, or both.

### **Exit Ways and Building Corridors**

Exit corridors must not be used for storage. The Life Safety Code, National Fire Protection Association - Code 101, requires that buildings designed for human occupancy must have continuous and unobstructed exits to permit prompt evacuation of the occupants and allow necessary access for responding emergency personnel. The intent of the Code is to keep exits free from obstructions and clear of combustible materials. Attention to housekeeping is very important. "Temporary" storage of furniture, equipment, supplies, or anything else is not permitted in exit ways. Combustibles, including recyclable wastepaper, are not permitted in exit ways.

Metal lockers with ends and tops ferried to the walls and that do not interfere with minimum exit width requirements may be installed in exit corridors when approved by the State Fire Marshal.

The following requirements must be met for storage locker/cabinets:

- \* Cabinets will be permitted on one side of the corridor only.

- \* Cabinets must end at least 6 ft from the corridor exit door.
- \* Cabinet ends must be at least 12 in. from the edge of the doorway on the latch side and from the edge of the door leaf when fully opened into the corridor.
- \* The cabinets must not be more than 20 in. deep by 37 in. wide by 72-3/4 in. high.
- \* All doors must return automatically to the closed position when not held open manually.
- \* A 45 degree-angle fairing must be provided from the wall to the corridor corner of the cabinet. Fairing must be provided at both ends of cabinet or bank of cabinets. \* A 45 degree-angle fairing must be provided at the top of the cabinets from the outside corridor edge of cabinet to the wall.
- \* All cabinets must be anchored to the wall firmly enough to withstand 0.5g of lateral acceleration (or a lateral load equal to 1/2 the total dead weight of the cabinet and its contents) in the event of an earthquake.
- \* Liquids and chemicals are not to be stored in corridor lockers.
- \* All cabinets must be kept locked, using locks provided by the university on the university key system, with one key being retained by the Facilities Services.
- \* All cabinets must be labeled with the contents and the name, address, and telephone number of the assigned user.

### **Automatic Sprinkler Systems**

**General:** Automatic sprinkler systems are intended to minimize the hazards to the occupants in case of fire while they escape from the building.

#### **Impairment of Automatic Sprinkler Systems:**

- \* The Murfreesboro Fire and Rescue Department (MFRD) shall be notified prior to shutting off any section of an automatic sprinkler system. All work should be planned, and materials assembled to complete work and return the automatic sprinkler system to service as quickly as possible.

*(By State law, impediments lasting longer than 10 hours for regular Campus buildings or 4 hours in Childcare or Healthcare spaces will result in requiring a Fire Watch).*

- \* Emergency hose lines, portable fire extinguishers, and extra watch service should be provided in the affected areas until full protection is restored.
- \* Temporary water supply connections should be established to maintain a reasonable level of protection any time the water is shut off from a considerable number of sprinkler heads for more than a few hours. Protection should be restored each night, insofar as possible.

### **Water Supply Valves:**

- \* All water supply gate valves for automatic sprinkler systems should be locked or sealed in the open position to prevent tampering.
- \* Control, drain, and alarm valves shall be identified by standard signage adopted by the sprinkler industry.
- \* Pipes, tubes, fittings, hangers, and other hardware shall have corrosion resistant protective coatings when used in areas subject to corrosive exposure.

**Freezing:** Wet pipe automatic sprinkler systems extending through cold rooms, passageways, or other areas subject to temperatures of less 40° Fahrenheit shall be protected from freezing by insulation, frost proof casings, or other appropriate means.

**Physical Damage:** Sprinkler heads or other system components that may be subject to physical damage shall be protected by guards designed for that purpose.

### **Painted Sprinkler Heads:**

- \* Sprinkler heads shall not be painted for any reason except for factory-applied coatings.
- \* Painted sprinkler heads shall be immediately replaced with new sprinkler heads of the appropriate type.
- \* Sprinkler heads shall be protected during painting of nearby surfaces or piping by covering with a paper bag. The paper bag must be removed immediately upon work completion.

**Sprinkler Head Clearance:** A minimum of 24 inches clearance shall be maintained between the top of any storage and the sprinkler head deflector to eliminate any obstruction to water distribution.

**Inspection and Maintenance:** Inspection and maintenance of automatic sprinkler systems shall be accomplished by licensed contractors supervised by Environmental Health and Safety Services in compliance with the National Fire Codes and the rules of the Tennessee State Fire Marshal.

## **Standpipes**

Standpipe connections shall be equipped with fittings to accept 1.5" or 1.75" fire hose couplings with National Standard Threads or appropriate sized Storz™ connections. Standpipe connections are not provided with hose and are for use by the fire department only.

All standpipe connections shall be fitted with caps to prevent tampering or inadvertent water flow.

Standpipes shall be flowed at least every 5 years, more often, if necessary, to prevent obstruction with sediment.

Inspection and maintenance of standpipes shall be accomplished by qualified persons in compliance with the National Fire Codes and the rules of the Tennessee State Fire Marshal.

## **Fire Alarm Systems**

Fire alarm systems shall be installed in compliance with the International Fire Codes (IFC) and Federal, State, And Locally adopted Codes, Ordinances and Standards to achieve compliance, insofar as possible to applicable occupancy. Contractors installing new systems shall provide a copy of the system certification information as required by NFPA 72 to Environmental Health and Safety Services, Facilities Services, and Campus Planning prior to acceptance of the system

Fire alarm systems shall be used only for fire protective signaling purposes.

Fire alarm pull stations shall be located on each floor of a building in the normal path of exit. The maximum horizontal travel distance to the nearest pull station shall be 200 feet.

Inspection and maintenance of fire alarm systems shall be accomplished by qualified licensed contractors supervised by Facilities Services in compliance with the International Fire Codes and Federal, State, and Locally adopted Codes, Ordinance and Standards, and the rules of the Tennessee State Fire Marshal.

## **Public Assembly Buildings**

### **Non-continuous Activities:**

An inspection of the assembly space (Public Assembly Safety Checklist?) is to be completed by person in charge responsible for ensuring life safety measures are in place prior to each event. The inspection will apply to all places of public assembly with 50 or more people. The person in charge is responsible for completing the inspection at least 90 minutes prior to the start of each event. All aisles, passageways, and stairways must not be obstructed or restricted by tables, showcases, or other objects. All exit doors must remain unlocked during assembly to permit evacuation. If required means of egress are obstructed, the admittance to the assembly is not permitted until necessary corrective actions have been completed. Immediately prior to the start of the program the person in charge of the event, or his or her representative, shall make an oral announcement to notify all attendees of the locations of exits to be used in case of fire or other emergency. The Inspection Report and Record of Announcements are required by the Code and are to be forwarded to and kept on file by Facility Reservationist (the department) for at least two [2] years.

The employees or attendants at places of assembly should be trained in the duties they are to perform in case of fire, panic, or other emergency, to be of greatest service in effecting orderly exit of assemblages.

- Attendants should know the location of fire exits and portable fire extinguishers.
- Attendants should know how to use fire extinguishers. If evacuation is necessary, an announcement should be made over the PA system. The wording of the announcement should be established prior to the event and a specific person should be designated to make the announcement.
- It is preferable that the fire alarms in the assembly area not be suddenly sounded as this may cause panic.

- *NOTE: In some buildings the fire alarms may automatically activate. In this situation, consideration should be given to making an announcement concerning this possibility before the event.*
- Reference Campus Safety Manual, for places of assembly, other than regularly scheduled classrooms, with a capacity of 50 or more people.

### **Decorations and Stage Scenery:**

Combustible materials must be treated with an effective flame-retardant material. Stage settings made of combustible materials must likewise be treated with flame-retardant materials as indicated below:

- Plywood, wood, particle board, mineral and fiber board, hardboard, etc. must be flame treated or otherwise be UL listed with a flame spread of 75 or less (class B).
- Fabrics such as draperies and curtains must be flame treated or non-combustible.
- Plastics must be UL labeled with flame spread of 75 or less and must not exceed 10% of the wall or ceiling area. Pyroxylin plastics are prohibited.
- Cardboard should be flame treated or painted with fire retardant paint and must not exceed 10% of the wall/ceiling area.
- Carpet must meet Federal Flammability Standard FF 1 70.
- Christmas trees and decorations need prior approval from the Fire Marshal. Trees will need to be artificial having the Underwriters Laboratories label ("UL") or live trees composed of a root ball wrapped in burlap. Cut trees must be sprayed with a fire-retardant material.
- Power Cords: The use of extension cords should be limited to the extent possible. If they are to be used the following should be observed:
  - Lightweight (lamp cord) extension cords shall not be used.
  - Do not place cords beneath carpets and rugs or cross doorways or window openings.
  - Must not be wrapped around a nail or subject to other physical damage.
  - Shall not be stapled to any building structure including but not limited to wall, ceiling, floor or baseboard.
  - Discard cords with frayed insulation or damaged plugs such as those with a ground prong missing.
  - Do not overload electrical circuits. The use of octopus connection (also known as multiple connection devices or cube taps) is prohibited.
  - Power strips are acceptable providing they are plugged directly into a wall outlet. Daisy chaining (plugged one into another) power strips one into another is not allowed.

- Carpet must meet Federal Flammability Standard FF 1 70.
- Shall not obstruct exit signs, the clear path to an exit, view of an exit, a fire alarm pull station or fire extinguisher.
- Decorations must allow for at least 24 inches of free space between them and the bottom of a sprinkler head.
- No decorative materials may be attached to, be suspended from or cover any part of the ceiling including light fixtures.
- Must not be attached to any window frames, walls, doors, or doorframes by any method that damages the finish when removed. This would include nails, tacks, brads, staples, screws, and adhesives unless Facilities Services has approved charge work orders to repair any damages when finished. Some finishes cannot be effectively repaired like marble so it may be best to get these installations approved for both safety and building preservation ahead of time.
- Any decoration material which is normally considered flammable, such as batting, cloth, cotton, hay, stalks, straw, vines, leaves, trees, moss, corn stalks, crepe paper and similar materials must be of fire-resistant quality and should bear the seal of approval of the Factory Mutual Company (F. M.) or Underwriter's Laboratory (U. L.).
- The flame propagation criteria of NFPA 701 shall not exceed 10 percent of the specific wall.
  - *Example – posters and other paper materials shall not cover more than 10% of the wall.*
- Plastics, Styrofoam's, and polyurethane foams cannot be used for decorations or furnishings.

### **Seating:**

A non-fixed seating arrangement for gatherings of 50 or more persons requires prior approval by the Environment, Health and Safety Office-Safety Officer. Any increase in the seating capacity of assembly rooms with fixed seats requires approval from the Environment, Health and Safety Office-Safety Officer.

### **Social Activities:**

Open flames shall not be permitted for lighting in places of public assembly. Candles or other open flames may be used briefly for ceremonial purposes where located on non-combustible surfaces with a fire extinguisher readily available for immediate use. Lighting devices such as tiki lamps, oil lamps, torches, etc., are absolutely prohibited in all MTSU facilities. No open flame devices are to be used without prior approval from the Environment, Health and Safety Office. (Exception: portable-cooking equipment, Special Food Service Devices below.)

Portable cooking (Special Food Service Devices) devices not flue connected are to be used only with prior approval from the Environment, Health and Safety Office. Candles may be used on tables for services if securely supported on substantial noncombustible bases located in such a way as to avoid a danger of ignition of combustible materials. Candle flames must be protected.

## **PYRO-TECHNICS ON CAMPUS:**

Any University facility manager desiring to utilize pyrotechnics, including all close proximity use pyrotechnics, either directly or by arrangement with non-University personnel or entities, must demonstrate satisfactory evidence of qualification to use pyrotechnics and demonstrate a satisfactory level of safety of the proposed use of pyrotechnics before approval to use pyrotechnics on the University campus is granted. No pyrotechnic use will occur without a permit issued by the Fire Marshal in accordance with the procedures set forth below.

Submit the following information at least Fifteen (15) working days in advance of the event to the University's Fire Marshal:

- Letter of intent to use pyrotechnics.
- Bonds or certificates of insurance for general liability covering all non-University pyrotechnic companies and pyro technicians in a minimum amount of \$1,000,000 per person/per occurrence.
- Names, dates of birth, qualifications, work experience, and copies of all required licenses for all pyro technicians who will be using pyrotechnics on the University campus. Copies of all Federal and State licenses for the pyrotechnic company.

(Verify if able to perform in TN via TNSFMO-open license Search)

- A proposed traffic and crowd control plan.
- Detailed descriptive list of all pyrotechnics to be used including how discharged, amount utilized from each display site, total amount for the venue, and storage method and location for the single or multiple day event.
- Detailed facility site plan for the event showing the location of the stage, seating, safety buffer zone, portable fire extinguishers, and public egress routes.
- Statement from University Police Chief approving the traffic and crowd control plan and agreeing to provide law enforcement or security services during the display.
- Statement from Murfreesboro Fire Chief agreeing to provide fire personnel for the venue and approving the traffic and crowd control plan. Numbers and placement of fire personnel are at the discretion of the Murfreesboro Fire and Rescue Department (MFRD). The MFRD Chief may designate a MTSU Environment, Health and Safety Office representative to serve as the Fire Official at the display.
- Arrange for testing, utilizing all pyrotechnic discharge sites at the location where the event will be held, with the stage and all related equipment in place. University Environmental Health and Safety Office, MFRD and TNSFMO representatives must be present at the testing. The test shall provide for a representative demonstration of the pyrotechnic devices that are to be used during the performance. If, in the opinion of the fire officials, any device is unsafe for the proposed location and proximity to the audience, it fails the test. Devices, which fail the test, must be excluded from the performance. The permit issued will indicate devices that are to be excluded.
- Provide communications between the pyro technician and standby Fire Official.



- The Fire Officials will determine that the requested display meets all applicable Tennessee Fireworks and National Fire Protection Association Standards #1123 and #1126 Fireworks regulations. Upon demonstration that all requirements have been met, based on the information provided to it, the University's Environmental, Health and Safety Office will recommend to the Murfreesboro Fire and Rescue Department Fire Marshal that the permit be issued.
- Display Fireworks (Class B) must be submitted to TNSFMO for approval and process – once all of these approvals are in place, then Pyrotechnics may be used.

### **Holiday Decorations:**

Christmas trees are permitted in University Buildings for the holidays. While the trees are delightful sights and cheerful reminders of the holidays, they can also be fire hazards. The following precautions are to be observed to minimize hazards.

- Types of trees permitted:
  - Artificial trees having the UL or Underwriters Laboratories Label.
  - Live trees composed of a root ball wrapped in burlap.
  - Cut trees sprayed with a fire-retardant material. The fire-retardant material is packaged in a one-quart spray bottle with instructions for application.
- Trees are not to obstruct means of egress and should not be located near a source of heat.
- Keep tree container filled with water above cut of tree. If the tree becomes dry, remove from building. Please use a stand that will not tip over.
- Lights that are used on the trees should also be UL approved. Always unplug lights at the end of the day. (Use of Timer)
- Christmas trees being considered for Public Assemblies will need prior approval by the Safety Officer/ Fire Marshal (can be reached at 615-898-2879).
- Christmas trees are not to be left in buildings during the holiday season when the building is not occupied. So please put the trees out by the dumpster (Campus Recycling) before the Christmas holiday begins. Grounds Division (Campus Recycling) will pick up the tree if you call them to do so.
- Any outdoor structures, trees, lights, etc. must receive written approval from Facilities Services and EHS.
- Garland, lights, or other decorations shall not be wrapped around or attached to handrails.

## CHAPTER 8 BLOODBORNE PATHOGEN EXPOSURE CONTROL PLAN

### Introduction

The information in this chapter has been provided to minimize or eliminate potential exposures to the Human Immunodeficiency Virus (HIV), Hepatitis-B Virus (HBV), and Hepatitis-C Virus (HCV) in accordance with the requirements specified by OSHA. The HBV virus often leads to life threatening complications that are often fatal. HCV is an infection caused by a virus that attacks the liver and leads to inflammation. The HIV virus is ultimately fatal and there is no known cure.

This chapter applies to all exposure to human blood, body fluids, and other potentially infectious materials regardless of how small or seemingly insignificant. Body fluids include semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, or any body fluid visibly contaminated with blood. All unidentified body fluids should be considered contaminated.

### DEFINITIONS

**Blood** means human blood, human blood components, and products made from human blood.

**Contaminated** means the presence or reasonably anticipated presence of blood or other potentially infectious materials on an item or surface.

**Decontamination** means the use of physical or chemical means to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.

**Employee** means any person employed by the University, full-time, part-time, adjunct, or student workers acting within the scope of their employment.

**Engineering Controls** means controls (e.g., sharps containers) that isolate or remove the bloodborne pathogen hazard.

**Exposure** means reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials.

**Exposure Incident** means a specific eye, mouth, or other mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious materials.

**HBV** means the Hepatitis-B Virus.

**HCV** means the Hepatitis-C Virus

**HIV** means the Human Immunodeficiency Virus.

**Other Potentially Infectious Materials** means:

- (a) The following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, any body fluid that is visibly

contaminated with blood, and all body fluids where it is difficult or impossible to differentiate between body fluids;

(b) Any unfixed tissue or organ (other than intact skin) from a human being (living or dead);

(c) HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals infected with HIV or HBV.

**Parenteral** means piercing mucous membranes or the skin barrier through such events as needlesticks, human bites, cuts, and abrasions.

**Personal Protective Equipment** is specialized clothing or equipment worn for protection against a hazard. General work clothes (e.g., uniforms, pants, shirts, or blouses) not intended to function as protection against a hazard are not considered to be personal protective equipment.

**Regulated Waste** means liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood or other potentially infectious materials and can release these materials during handling; contaminated sharps; and pathological and microbiological wastes containing blood or other potentially infectious materials.

**Sharps** means any object that can penetrate the skin including, but not limited to, needles, scalpels, broken glass, broken capillary tubes, and exposed ends of dental wires.

**Source Individual** means any individual, living or dead, whose blood or other potentially infectious materials may be a source of exposure to any member of the administration, faculty, staff, or student body.

**Sterilize** means the use of a physical or chemical procedure to destroy all microbial life including highly resistant bacterial endospores.

**Universal Precautions** is an approach to infection control. According to the concept of Universal Precautions, all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, HCV and other bloodborne pathogens.

**Work Practice Controls** means controls that reduce the likelihood of exposure by altering the manner in which a task is performed (e.g., prohibiting recapping of needles by a two-handed technique).

## EXPOSURE DETERMINATION

Personnel employed in the following departments and job classifications may be reasonably anticipated to have skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials within the normal scope of their duties:

### **Department of Public Safety:**

- All commissioned police officers.
- All Student Patrol personnel.

**Custodial Services:** All.

**Nursing:** Faculty.

**Health Services:** All personnel involved in patient care.

**Environmental Health & Safety Services:** All.

Some personnel employed in the following departments and job classifications may be reasonably anticipated to have skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials within the normal scope of their duties:

**Athletics:** Coaches; Trainers; Student Trainers.

**Health & Human Performance:** Faculty; Graduate Teaching Assistants.

**Housing & Residential Life:** All Hall and Maintenance Staff.

**Campus Recreation:** All.

**Facilities Services:** Maintenance Mechanics.

**Project HELP:** Director; Coordinators; Specialists; Teachers.

Personnel performing the following tasks may be reasonably anticipated to have skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials:

**Department of Public Safety:**

- Criminal Arrests;
- First Aid (including CPR);
- Personnel and Equipment Decontamination;
- Spill Clean-up.

**Athletics; Campus Recreation; Custodians; Health & Human Performance; Housing & Residential Life; Facilities Services; Project HELP; Environmental Health and Safety Services; Telecommunications:**

- First Aid (including CPR);
- Personnel/Equipment Decontamination;
- Spill Clean-up.

**Health Services; Nursing:**

- Patient Care;
- First Aid (including CPR);
- Personnel/Equipment Decontamination;
- Spill Clean-up.

**Others:** Other job classifications not identified in this chapter may be included based on evaluation of their assigned duties by Environmental Health & Safety Services at the request of their department head.

**SCHEDULE AND METHODS OF IMPLEMENTATION**

**Schedule:**

- The Bloodborne Pathogen Exposure Control Plan shall be completed and distributed to all department heads not later than 5 May 1992.
- Personnel currently assigned to departments identified as having exposure potential shall receive their initial training under the requirements of 29CFR1910.1030 between 5 May and 4 June 1992. All training shall be scheduled by the affected department head.
- Effective 4 June 1992 all personnel newly assigned to a department identified as having exposure potential shall be trained in Bloodborne Pathogen Exposure Control prior to beginning work in that department.
- Effective 4 June 1992 all personnel in affected departments shall receive annual refresher training in Bloodborne Pathogen Exposure Control.
- Effective 6 July 1992 the affected departments shall implement all work practice and engineering controls required by 29CFR1910.1030.
- Effective 6 July 1992 the affected departments shall provide Personal Protective Equipment appropriate to the tasks performed.
- All required signs and warning labels shall be in place not later than 6 July 1992.
- The HBV vaccinations shall be available to all affected employees without cost no later than 6 July 1992.
- HBV post-exposure evaluation and follow-up procedures shall be implemented not later than 6 July 1992.

### **Methods of Implementation:**

- Each department head retains the responsibility to ensure compliance with the provisions of this plan by personnel assigned to his or her department.
- Each affected department head shall schedule training as appropriate for his or her personnel when initially assigned and on an annual basis thereafter.
- Post-Exposure evaluation and follow-up shall be conducted by Health and Human Services and Environmental Health and Safety Services.
- Vaccination for HBV shall be available by Health and Human Services in accordance with the provisions of 29CFR1910.1030.
- Communication of Hazards to employees shall be accomplished through training, color coding, and symbols required by 29CFR1910.1030.
- Required signage shall be provided by Facilities Services;
- Color coded and labeled bags for regulated waste shall be provided by Custodial Services;
- Required labels and tags shall be provided by the departments affected.
- Each affected department shall retain training records for that department for three years as required by 29CFR1910.1030.
- Employee medical records required under 29CFR1910.1030 shall be retained by Human Resource Services. These records shall be maintained for the duration of employment plus thirty years as required by 29CFR1910.20(d).
- Assistance in compliance with this standard, including required training, will be made available by the Environmental Health and Safety Services on request.

### **METHODS OF COMPLIANCE**

**UNIVERSAL PRECAUTIONS:** Blood or other potentially infectious materials shall be assumed to be contaminated with HIV, HBV, or HCV.

### **WORK PRACTICE CONTROLS:**

- All personnel, administration, faculty, staff, and students shall routinely use appropriate barrier precautions to prevent skin and mucous membrane exposure when a potential contact with blood or other potentially infectious materials is anticipated.
- Gloves shall be worn for touching blood, other potentially infectious materials, mucous membranes, or non-intact skin of all persons, and for handling items or surfaces soiled with blood or other potentially infectious materials.
- Gloves shall be changed immediately after each exposure incident and properly disposed of.

- Protective eye wear or face shields shall be worn during those tasks or procedures that are likely to generate droplets of blood or other potentially infectious materials to prevent exposure of mucous membranes of the mouth, nose, and eyes.
- Aprons, gowns, or appropriate coveralls shall be worn during tasks or procedures likely to generate splashes of blood or other potentially infectious materials.
- Hands and other skin surfaces shall be washed immediately and thoroughly following contact with blood or other potentially infectious materials .
- Eyes and mucous membranes shall be flushed with water immediately and thoroughly following contact with blood or other potentially infectious materials.
- Hands shall be washed immediately and thoroughly after gloves are removed.
- When provision of handwashing facilities is not feasible the department shall provide either an appropriate antiseptic hand cleanser in conjunction with clean cloth or paper towels or antiseptic towelettes.
- When antiseptic hand cleansers or towelettes are used, hands shall be washed with soap and running water as soon as feasible.
- All personnel shall take necessary precautions to prevent injuries caused by sharp instruments or devices.
- Mouthpieces, resuscitation bags, or other ventilation devices should be available for use in which the need for resuscitation is predictable to minimize the need for emergency mouth-to-mouth resuscitation, although saliva has not been implicated in HIV transmission.
- Personnel with exudative lesions or weeping dermatitis shall refrain from direct personal contact and handling personal care items and equipment until the condition resolves.
- Pregnant personnel should be especially familiar with and strictly adhere to precautions to minimize or eliminate any potential HIV or HBV exposure to the infant.
- Eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses are prohibited in any work area where there is a potential exposure to blood or other potentially infectious materials .
- Food and drink shall not be kept in refrigerators, freezers, shelves, cabinets, or on countertops or bench tops where blood or other potentially infectious materials are present.
- All procedures involving blood or other potentially infectious materials shall be performed in such a manner as to minimize splashing, spraying, spattering, and generation of droplets of these substances.
- Mouth pipetting/suctioning of blood or other potentially infectious materials is prohibited.

- Specimens of blood or other potentially infectious materials shall be placed in a container which prevents leakage during collection, handling, processing, storage, transport, or shipping.
- The container for storage, transport, or shipping shall be labeled or color coded in accordance with 29CFR1910.1030(g)(1)(i) and closed prior to storage, transport, or shipping.
- If outside contamination of the primary container occurs, the primary container shall be placed within a second container which prevents leakage during storage, transport, or shipping and is labeled or color coded in accordance with 29CFR1910.1030(g)(1)(i).
- If the specimen could puncture the primary container, the primary container shall be placed within a second container which is puncture resistant in addition to the above characteristics.
- Equipment which may become contaminated with blood or other potentially infectious materials shall be examined prior to servicing or shipping and shall be decontaminated as necessary unless decontamination is not feasible.
- A readily observable label in accordance with the provisions of 29CFR1910.1030(g)(1)(i) shall be attached to the equipment stating which portions remain contaminated.
- The department responsible for the equipment shall ensure that this information is conveyed to all affected departmental personnel, servicing representatives, manufacturer, or other receiver as appropriate, prior to handling, servicing, or shipping so that appropriate precautions will be taken.

## **PERSONAL PROTECTIVE EQUIPMENT**

### **General:**

- Each department shall provide, at no cost to employees, appropriate Personal Protective Equipment including, but not limited to, gloves, gowns, masks, face shields, laboratory coats, eye protection, mouthpieces, resuscitation bags, pocket masks, or other ventilation devices. Students, who are not student workers, and visitors shall be required to provide their own Personal Protective Equipment of the appropriate type and specification at their own expense.
- Personal protective equipment will be considered appropriate only if it does not permit blood or other potentially infectious materials to pass through to or reach the person's work clothes, street clothes, undergarments, skin, eyes, mouth, or other mucous membranes under normal conditions of use and for the duration of time which the protective equipment will be used.
- Each department head shall ensure that personnel within that department use appropriate Personal Protective Equipment.
- Any employee failing to use appropriate Personal Protective Equipment after completion of the initial training shall be considered to have committed a willful safety violation as defined by the Occupational Safety and Health Administration and therefore subject to disciplinary action in accordance with MTSU Policy IV:07:10.



- Any person with supervisory authority failing to enforce the use of appropriate Personal Protective Equipment by his or her personnel after completion of the initial training shall be considered to have committed a willful safety violation as defined by the Occupational Safety and Health Administration and therefore subject to disciplinary action in accordance with MTSU Policy IV:07:10.
- Each department head shall ensure that appropriate Personal Protective Equipment in the appropriate sizes is readily accessible at the work location or is issued to employees. Hypoallergenic gloves, glove liners, powderless gloves, or other similar alternatives shall be readily accessible to those employees who are allergic to the gloves normally provided.
- Each department shall be responsible for the cleaning, laundering, or disposal of Personal Protective Equipment in accordance with the appropriate sections of this plan, 29CFR1910.1030(d), and 29CFR1910.1030(e).
- Each department shall repair or replace Personal Protective Equipment as needed to maintain its effectiveness, at no cost to the employee.
- Garments shall be removed immediately or as soon as feasible if penetrated by blood or other potentially infectious materials.
- All Personal Protective Equipment shall be removed prior to leaving the work area.
- When Personal Protective Equipment is removed it shall be placed in an appropriately designated area or container for storage, washing, decontamination, or disposal.

**Gloves:** Gloves shall be worn when it can be reasonably anticipated that the person may have hand contact with blood, other potentially infectious materials, mucous membranes, or non-intact skin; when performing vascular access procedures; and when handling or touching potentially contaminated items or surfaces.

- Disposable (single use) gloves: Disposable (single use) gloves, such as surgical or examination gloves, shall be replaced as soon as practical when contaminated or as soon as feasible if they are torn, punctured, or when their ability to function as a barrier is compromised. Disposable (single use) gloves shall not be washed or decontaminated for re-use.
- Utility gloves: Utility gloves may be decontaminated for re-use if the integrity of the glove is not compromised. However, they must be discarded if they are cracked, peeling, torn, punctured, or exhibit other signs of deterioration, or when their ability to function as a barrier is compromised.

**Masks:** Masks in combination with eye protection devices, such as goggles or glasses with solid side shields, or chin-length face shields, shall be worn whenever splashes, spray, spatter, or droplets of blood or other potentially infectious materials may be generated and eye, nose, or mouth contamination can be reasonably anticipated.

**Other Protective Clothing:** Appropriate protective clothing, including, but not limited to, gowns, aprons, lab coats, clinic jackets, or similar outer garments shall be worn in exposure situations. The type or characteristics will depend upon the task and degree of exposure anticipated.

## HOUSEKEEPING

Department heads shall ensure that their areas of responsibility are maintained in a clean and sanitary condition. The department head, in cooperation with the Superintendent of Custodial Services, shall determine and implement an appropriate written schedule for cleaning and method of decontamination based upon the location within the facility, type of surface to be cleaned, type of soil present, and tasks or procedures performed in this area.

### General Requirements:

- All equipment and environmental and working surfaces shall be cleaned and decontaminated after contact with blood or other potentially infectious materials.
- Contaminated work surfaces shall be decontaminated after completion of procedures; immediately or as soon as feasible when surfaces are overtly contaminated or after any spill of blood or other potentially infectious materials; and at the end of the work shift if the surface may have become contaminated since the last cleaning.
- Protective coverings, such as plastic wrap, aluminum foil, or imperviously backed absorbent paper used to cover equipment and environmental surfaces, shall be removed, and replaced as soon as feasible when they become overtly contaminated or at the end of the workshift if they may have become contaminated during the shift.
- All bins, pails, cans, and similar receptacles intended for reuse which have a reasonable likelihood for becoming contaminated with blood or other potentially infectious materials shall be inspected and decontaminated on a regularly scheduled basis and cleaned and decontaminated immediately or as soon as feasible upon visible contamination.
- Broken glassware which may be contaminated shall not be picked up directly with the hands. It shall be cleaned up using mechanical means, such as a brush and dustpan, tongs, or forceps.
- Reusable sharps that are contaminated with blood or other potentially infectious materials shall not be stored or processed in a manner that requires personnel to reach by hand into the containers where these sharps have been placed.

### Regulated Waste:

#### **Contaminated Sharps Discarding and Containment:**

- Contaminated sharps shall be discarded immediately or as soon as feasible in containers that are closable, puncture resistant, leak proof on sides and bottom, and labeled or color-coded in accordance with the provisions of 29CFR1910.1030(g)(1)(i) and this plan.

- During use, containers for contaminated sharps shall be:
  - (1) Easily accessible to personnel and located as close as is feasible to the immediate area where sharps are used or can be reasonably anticipated to be found;
  - (2) Maintained upright throughout use; and
  - (3) Replaced routinely and not be allowed to overfill.
- When moving containers of contaminated sharps from the area of use, the containers shall be:
  - (1) Closed immediately prior to removal or replacement to prevent spillage or protrusion of contents during handling, storage, transport, or shipping;
  - (2) Placed in a secondary container if leakage is possible. The secondary container shall be closable, constructed to contain all contents and prevent leakage during handling, storage, transport, or shipping, and labeled or color-coded in accordance with the provisions of 29CFR1910.1030(g)(1)(i) and this plan.
- Reusable containers shall not be opened, emptied, or cleaned manually or in any other manner which would expose personnel to the risk of percutaneous injury.

**Other Regulated Waste Containment:**

- Regulated Waste shall be placed in containers that are closable, constructed to contain all contents and prevent leakage of fluids, labeled or color-coded in accordance with the provisions of 29CFR1910.1030(g)(1)(i) and this plan, and closed prior to removal to prevent spillage or protrusion of contents during handling, storage, transport, or shipping.
- If outside contamination of the regulated waste container occurs, it shall be placed in a second container. The second container shall be closable, constructed to contain all contents and prevent leakage of fluids during handling, storage, transport, or shipping, labeled or color-coded in accordance with the provisions of 29CFR1910.1030(g)(1)(i) and this plan, and closed prior to removal to prevent spillage or protrusion of contents during handling, storage, transport, or shipping.
- Disposal of all regulated waste shall be in accordance with applicable regulations of the United States and the State of Tennessee.

**Laundry:**

- Contaminated laundry shall be handled as little as possible with a minimum of agitation.
- Contaminated laundry shall be bagged or containerized at the location where it was used and shall not be sorted or rinsed in the location of use.

- Contaminated laundry shall be placed and transported in bags or containers labeled or color-coded in accordance with the provisions of 29CFR1910.1030(g)(1)(i) and this plan. When Universal Precautions are utilized by a department in the handling of all soiled laundry, alternative labels or color-coding is sufficient if it permits all personnel to recognize the containers as requiring compliance with Universal Precautions.
- When contaminated laundry is wet and presents a reasonable likelihood of soak-through or leakage from the bag or container, the laundry shall be placed and transported in bags or containers which prevent soak-through and/or leakage of fluids to the exterior. The department shall ensure that personnel who have contact with contaminated laundry wear protective gloves and other appropriate Personal Protective Equipment.
- When a department ships contaminated laundry off-campus to a facility that does not use Universal Precautions in the handling of all laundry, the department generating the contaminated laundry must place such laundry in bags or containers which are labeled or color-coded in accordance with the provisions of 29CFR1910.1030(g)(1)(i) and this plan.

### **HEPATITIS B VACCINATION, POST EXPOSURE EVALUATION, and FOLLOW-UP**

#### **General:**

- Each department identified in this plan shall make the Hepatitis B vaccine available, through the Middle Tennessee State University Health and Human Services, to all employees in job classifications listed and any other employee who may have occupational exposure, including student workers, and post exposure evaluation and follow-up to all personnel who have had an exposure incident.
- Middle Tennessee State University Health and Human Services shall ensure that all medical evaluations and procedures including the Hepatitis B vaccine, vaccination series, and post exposure evaluation and follow-up, including prophylaxis, are: made available at no cost to employees, including student workers, made available to all personnel at a reasonable time and place, performed by or under the supervision of a licensed physician or by or under the supervision of another licensed healthcare professional, and provided according to recommendations of the U.S. Public Health Service current at the time these evaluations and procedures take place.
- All vaccinations and post exposure evaluation and follow-up shall be performed by Middle Tennessee State University Health and Human Services, which shall maintain an adequate supply of vaccine for these purposes.
- Middle Tennessee State University Health and Human Services shall ensure that all laboratory tests are conducted by an accredited laboratory at no cost to employees and at minimum cost to MTSU students.
- Nursing faculty and students working in a hospital shall follow the procedures established by that hospital's Infection Control Committee for exposure incidents.
- Post exposure evaluation and follow-up conducted by the hospital need not be repeated by MTSU Health and Human Services where copies of all records pertaining to the exposure

incident, post exposure evaluation, and follow-up are provided to MTSU Health and Human Services by the hospital, after appropriate consent for their release has been obtained.

- The Nursing Chair shall ensure that these incidents are reported in accordance with the requirements of this plan and that all records required to be maintained by MTSU Health and Human Services are provided as they become available.

### **Hepatitis B Vaccination:**

- Hepatitis B vaccination shall be made available after the employee has received the training required by 29CFR1910.1030 (g)(2)(vii)(I) and within 10 working days of initial assignment to all personnel who have exposure unless the person has previously received the complete hepatitis B vaccination series, antibody testing has revealed that the person is immune, or the vaccine is contraindicated for medical reasons.
- Participation in a prescreening program shall not be required for receiving the hepatitis B vaccination.
- If a person initially declines hepatitis B vaccination but later decides to accept the vaccination, Health and Human Services shall make the hepatitis B vaccination available at that time in accordance with 29CFR1910.1030(f)(1) and this plan.
- Middle Tennessee State University Health and Human Services shall assure that all employees who decline to accept the hepatitis B vaccination offered sign the statement in Annex A of this chapter.
- If routine booster doses of hepatitis B vaccine are recommended by the U.S. Public Health Service at a future date, such booster doses shall be made available through the Middle Tennessee State University Health and Human Services in accordance with the provisions of 29CFR1910.1030(f)(1)(ii) and this plan.

### **Post Exposure Evaluation and Follow-up:**

#### **Reporting of Exposure Incidents:**

- All exposure incidents shall be reported to the department head by means of a standard *MTSU Accident Report* at Human Resource Services completed by the exposed person and documenting in his or her own words the route of exposure (body parts exposed and their condition), and the circumstances under which the exposure occurred. The exposed person should identify the source individual in the report, if known.
- The department head shall review the Accident Report in accordance with standard accident reporting procedures and submit the original report to Human Resource Services and a clear photocopy to MTSU Health and Human Services within three calendar days.
- The incidents shall be investigated by the Department Head to verify the reported information and establish identification of the source individual unless identification is not feasible. The results of the Department Head's investigation shall be submitted to MTSU Health and Human Services and attached to the Accident Report filed in Human Resource Services.

**Post Exposure Evaluation:**

- In those cases where the source individual can be identified he or she shall be referred to MTSU Health and Human Services for blood testing as soon as feasible after consent is obtained to determine HIV and HBV infectivity. If consent cannot be obtained Health and Human Services shall establish and document that legally required consent cannot be obtained. The results of any testing shall be documented.
- When the source individual is already known to be infected with HBV or HIV, testing for the source individual's known HBV or HIV status shall not be repeated.
- MTSU Health and Human Services shall make the results of the source individual's testing available to the exposed person and shall inform the exposed person of applicable laws and regulations concerning disclosure of the identity and infectious status of the source individual.

**Collection and Testing of Blood for HIV/HBV:**

- MTSU Health and Human Services shall collect, or cause to be collected, and test, or cause to be tested, the exposed person's blood as soon as feasible after consent has been obtained.
- If the person consents to baseline blood collection but does not give consent at that time for HIV serologic testing, the blood sample shall be preserved for at least 90 days. If, within 90 days of exposure, the person elects to have the baseline sample tested, such testing shall be done as soon as feasible.
- Post-Exposure prophylaxis shall be provided, when medically indicated, as recommended by the U.S. Public Health Service, including, but not limited to, counseling and evaluation of reported illnesses.

**Information Provided to the Healthcare Professional:** MTSU Health and Human Services shall ensure that the healthcare professional evaluating an employee or student after an exposure incident is provided with the following information:

- A copy of 29CFR1910.1030
- A description of the exposed individual's duties as they relate to the exposure incident,
- Documentation of the route(s) of exposure and the circumstances under which exposure occurred,
- Results of the source individual's blood testing, if available, and
- All medical records relevant to the appropriate treatment of the individual, including vaccination status, which are the University's responsibility to maintain.

### **Healthcare Professional's Written Opinion:**

- MTSU Health and Human Services shall obtain and provide the individual with a copy of the evaluating healthcare professional's written opinion within 15 calendar days of the completion of the evaluation.
- The healthcare professional's written opinion for Hepatitis B vaccination shall be limited to whether Hepatitis B vaccination is indicated for that individual, and if the person has received such vaccination.
- The healthcare professional's written opinion for post-exposure evaluation and follow-up shall be limited to the following information: that the employee or student has been informed of the results of the evaluation, and that the individual has been told about any medical conditions resulting from exposure to blood or other potentially infectious materials which require further evaluation or treatment.
- All other findings or diagnoses shall remain confidential and shall not be included in the written report.

**Medical Recordkeeping:** Medical records shall be maintained as required by 29CFR1910.20, 29CFR1910.1030(h)(1), and this plan.

## **COMMUNICATION OF HAZARDS TO EMPLOYEES**

### **Labels:**

- Warning labels shall be affixed to containers of regulated waste, refrigerators and freezers containing blood or other potentially infectious materials; and other containers used to store, transport, or ship blood or other potentially infectious materials except where red bags have been substituted for labels; containers of blood, blood components, or blood products that are labeled as to their contents and have been released for transfusion or other clinical use are exempted from labeling requirements; or individual containers of blood or other potentially infectious materials that are placed in a labeled container during storage, transport, shipment, or disposal are exempted from the labeling requirement.
- Labels shall include the universal biohazard symbol as specified by 29CFR1910.1030(g)(1)(i)(B) and the legend 'BIOHAZARD'.
- These labels shall be fluorescent orange or orange-red, or predominantly so, with lettering or symbols in a contrasting color.
- Required labels shall be affixed as close as feasible to the container by string, wire, adhesive, or other method that prevents their loss or unintentional removal.
- Red bags or red containers may be substituted for labels.
- Containers of blood, blood components, or blood products that are labeled as to their contents and have been released for transfusion or other clinical use are exempted from labeling requirements.

- Individual containers of blood or other potentially infectious materials that are placed in a labeled container during storage, transport, shipment, or disposal are exempted from the labeling requirement.
- Labels required for contaminated equipment shall be in accordance with provisions of 29CFR1910.1030(g) and this plan and shall also state which portions of the equipment remain contaminated.
- Regulated waste that has been decontaminated need not be labeled or color-coded.

### **Information and Training:**

- Department heads shall ensure that all personnel within their departments with potential exposure participate in a training program which must be provided at no cost to the personnel trained and during working hours.
- Training shall be provided: at the time of initial assignment to tasks where exposure may take place, on or before 4 June 1992 in accordance with 29CFR1910.1030(g)(2)(ii)(B), and at least annually thereafter.
- For personnel who have received training on bloodborne pathogens prior to 4 June 1992, only training with respect to the provisions of 29CFR1910.1030 which were not included need be provided.
- Annual training for all exposed personnel shall be provided within one year of their previous training.
- Departments shall provide additional training when changes such as modification of tasks or procedures or institution of new tasks or procedures affect an individual's exposure. The additional training may be limited to addressing the new exposures created.
- Material appropriate in content and vocabulary to educational level, literacy, and language of persons to be trained shall be used.
  - The training program shall contain, at a minimum, the following elements:
    - A copy of the text of 29CFR1910.1030 and an explanation of its contents.
    - A general explanation of the epidemiology and symptoms of bloodborne diseases.
    - An explanation of the modes of transmission of bloodborne pathogens.
    - An explanation of the University's exposure control plan and the means by which a written copy of the plan can be obtained.
    - An explanation of the appropriate methods of recognition of tasks, procedures, and other activities that may involve exposure to blood and other potentially infectious materials.



- An explanation of the use and limitations of methods that will prevent or reduce exposure including appropriate engineering controls, work practices, and personal protective equipment.
  - Information on the types, proper use, location, removal, handling, decontamination, and disposal of personal protective equipment.
  - An explanation of the basis for selection of personal protective equipment.
  - Information on the Hepatitis B vaccine, including information on its efficacy, safety, method of administration, the benefits of being vaccinated, and that the vaccine and vaccination will be offered free of charge to employees, including student workers.
  - Information on the appropriate actions to take and persons to contact in an emergency involving blood or other potentially infectious materials.
  - An explanation of the procedure to follow if an exposure incident occurs, including the method of reporting the incident and the medical follow-up that will be made available.
  - Information on the post-exposure evaluation and follow-up that the University is required to provide for the employee following an exposure incident.
  - An explanation of the signs and labels and/or color-coding required by 29CFR1910.1030(g)(1).
  - An opportunity for interactive questions and answers with the person conducting the training session.
- The person(s) conducting the training shall be knowledgeable in the subject matter covered by the elements contained in the training program as it relates to the departmental area that the training will address.

## RECORDKEEPING

### Medical Records:

- Middle Tennessee State University Health and Human Services shall establish and maintain an accurate record for each employee, including student workers, with occupational exposure, in accordance with the provisions of 29CFR1910.20.
- This record shall, at a minimum, include:
  1. The name and social security number of the employee.
  2. A copy of the employee's hepatitis B vaccination status including the dates of all hepatitis B vaccinations and any medical records relative to the employee's ability to receive vaccination as required by 29CFR1910.1030(f)(2).
  3. A copy of all results of examinations, medical testing, and follow-up procedures as required by 29CFR1910.1030(f)(3).
  4. The University's copy of the healthcare professional's written opinion as required by 29CFR1910.1030(f)(5).
  5. A copy of the information provided to the healthcare professional as required by 29CFR1910.1030(f)(4)(ii)(B), (C), and (D).
  6. Middle Tennessee State University Health and Human Services shall maintain the medical records required by 29CFR1910.1030 and this plan for at least the duration of employment plus thirty years in accordance with the provisions of 29CFR1910.20.

**Confidentiality:** Middle Tennessee State University Health and Human Services shall ensure that all medical records required by 29CFR1910.1030(h)(1) and this plan are: Kept confidential; and are not disclosed or reported without the individual's express written consent to any person within or outside the University except as required by 29CFR1910.1030 or as may be required by law.

### Training Records:

- Training records shall include, at a minimum, the following information: the dates of the training sessions, the contents or a summary of the training sessions, the names and qualifications of persons conducting the training, and the names and job titles of all persons attending the training session.
- Training records shall be maintained by the department for three years from the date on which the training occurred.

**Availability:**

- Human Resource Services, Department of Health Services, and the affected departments shall ensure that all records required to be maintained by 29CFR1910.1030(h) and this plan shall be made available upon request to the Commissioner of Labor, his designated representative, or the University Safety Officer for examination and copying.
- Medical records required under 29CFR1910.1030(h) and this plan shall be made available upon request to the Commissioner of Labor, his designated representative, or the University Safety Officer for examination and copying in accordance with 29CFR1910.20.
- Medical records required under 29CFR1910.1030(h) and this plan shall be made available upon request for examination and copying to the subject individual and to anyone having the express written consent of the subject individual.
- Training records required under 29CFR1910.1030(h) and this plan shall be made available upon request to employees, employee representatives, other persons in accordance with state law or University policy, the Commissioner of Labor, his designated representative, or the University Safety Officer for examination and copying in accordance with 29CFR1910.20.

**Transfer of Records:** Medical records for employees with less than one year of service may be provided to that employee upon termination of employment instead of the thirty-year retention period under the provisions of 29CFR1910.20.

**CHAPTER 8: ANNEX A**

**MIDDLE TENNESSEE STATE UNIVERSITY  
HEPATITIS B VACCINE DECLINATION (MANDATORY)**

I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with hepatitis B vaccine, at no charge to myself. However, I decline hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination series at no charge to me.

_____	_____	_____
EMPLOYEE	SSAN	DATE
_____		_____
UNIVERSITY REPRESENTATIVE	DATE	

## CHAPTER 8: ANNEX B

### MIDDLE TENNESSEE STATE UNIVERSITY BLOOD/BODY FLUID CLEAN-UP INSTRUCTIONS

**PURPOSE:** These procedures are designed to eliminate your potential exposure to HIV and Hepatitis-B viruses. Both of these viruses may ultimately prove **FATAL** and there is no known cure at this time.

**SCOPE:** These procedures are to be followed any time you must clean up after an incident involving any amount of bleeding, loss of tissue or organs, or loss of any other body fluid, no matter how small or seemingly insignificant. Body fluids include semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, or any body fluid visibly contaminated with blood. All unidentified body fluids should be considered contaminated.

#### **CLEAN-UP PROCEDURES:**

1. If you have had direct contact with the blood or body fluid you should **IMMEDIATELY** wash the contacted skin area with warm, soapy water.
2. Put on rubber gloves. If you are working with a partner, then he or she should also wear gloves.
3. Thoroughly clean the spill area using warm, soapy water and using caution not to come into direct contact with the contaminated area.
4. Once the blood/body fluid has been cleaned up pour the warm, soapy water down the drain at the nearest custodial wash basin.
5. Rinse the container and prepare a sodium hypochlorite solution by mixing 1 part sodium hypochlorite (Clorox, Purex, or other chlorine bleach) with 9 parts of warm water, mixing thoroughly.
6. Thoroughly disinfect the spill area using the sodium hypochlorite solution.
8. Upon completion of the disinfection pour the remaining sodium hypochlorite solution down the drain of the nearest custodial wash basin.
9. Remove the gloves and dispose of them properly.
10. Wash hands thoroughly with warm, soapy water.
11. Immediately report the incident to your immediate supervisor. Identify **EVERYONE**, faculty, staff, students, or visitors, who may have had contact with the contaminated surfaces.
12. The supervisor should report, no later than the close of business the next working day, the time, date, location of the incident, and names of persons contacting the contamination to Environmental Health and Safety Services if anyone had direct skin contact with the contaminated surfaces.

## CHAPTER 8: ANNEX C

### 29CFR1910.1030 Bloodborne Pathogens

(a) **Scope and Application.** This section applies to all occupational exposure to blood or other potentially infectious materials as defined by paragraph (b) of this section.

(b) **Definitions.** For purposes of this section, the following shall apply:

*Assistant Secretary* means the Assistant Secretary of Labor for Occupational Safety and Health, or designated representative.

*Blood* means human blood, human blood components, and products made from human blood.

*Bloodborne Pathogens* means pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV).

*Clinical Laboratory* means a workplace where diagnostic or other screening procedures are performed on blood or other potentially infectious materials.

*Contaminated* means the presence of the reasonably anticipated presence of blood or other potentially infectious materials on an item or surface.

*Contaminated Laundry* means laundry which has been soiled with blood or other potentially infectious materials or may contain sharps.

*Contaminated Sharps* means any contaminated object that can penetrate the skin including, but not limited to, needles, scalpels, broken glass, broken capillary tubes, and exposed ends of dental wires.

*Decontamination* means the use of physical or chemical means to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.

*Director* means the Director of the National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designated representative.

*Engineering Controls* means controls (e.g., sharps disposal containers, self-sheathing needles) that isolate or remove the bloodborne pathogens hazard from the workplace.

*Exposure Incident* means a specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious

materials that results from the performance of an employee's duties.

*Handwashing Facilities* means a facility providing an adequate supply of running potable water, soap, and single use towels or hot air drying machines.

*Licensed Healthcare Professional* is a person whose legally permitted scope of practice allows him or her to independently perform the activities requires by paragraph (f) Hepatitis B Vaccination and Post-Exposure Evaluation and Follow-up.

*HBV* means hepatitis B virus.

*HIV* means human immunodeficiency virus.

*Occupational Exposure* means reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.

*Other Potentially Infectious Materials* means

(1) The following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids;

(2) Any unfixed tissue or organ (other than intact skin) from a human (living or dead); and

(3) HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals infected with HIV or HBV.

*Parenteral* means piercing mucous membranes or the skin barrier through such events as needlesticks, human bites, cuts, and abrasions.

*Personal Protective Equipment* is specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes (e.g., uniforms, pants, shirts or blouses) not intended to function as protection against a hazard are not considered to be personal protective equipment.

*Production Facility* means a facility engaged in industrial-scale, large volume or high concentration production of HIV or HBV.

*Regulated Waste* means liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling; contaminated sharps;

and pathological and microbiological wastes containing blood or other potentially infectious materials.

*Research Laboratory* means a laboratory producing or using research-laboratory-scale amounts of HIV or HBV. Research laboratories may produce high concentrations of HIV or HBV but not in the volume found in production facilities.

*Source Individual* means any individual, living or dead, whose blood or other potentially infectious materials may be a source of occupational exposure to the employee. Examples include, but are not limited to, hospital and clinic patients; clients in institutions for the developmentally disabled ;trauma victims; clients of drug and alcohol treatment facilities; residents of hospices and nursing homes; human remains; and individuals who donate or sell blood or blood components.

*Sterilize* means the use of a physical or chemical procedure to destroy all microbial life including highly resistant bacterial endospores.

*Universal Precautions* is an approach to infection control. According to the concept of Universal Precautions, all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

*Work Practice Controls* means controls that reduce the likelihood of exposure by altering the manner in which a task is performed (e.g., prohibiting the recapping of needles by a two-handed technique).

(c) **Exposure Control** -- (1) *Exposure Control Plan.* (i) Each employer having an employee(s) with occupational exposure as defined by paragraph (b) of this section shall establish a written Exposure Control Plan designed to eliminate or minimize employee exposure.

(ii) The Exposure Control Plan shall contain at least the following elements: (A) The exposure determination required by paragraph (c)(2), (B) The schedule and method of implementation for paragraphs(d) Methods of Compliance, (e) HIV and HBV Research Laboratories and Production Facilities, (f) Hepatitis B Vaccination and Post-Exposure Evaluation and Follow-up , (g) Communication of Hazards to Employees, and (h) Record keeping, of this standard, and (C) The procedure for the evaluation of circumstances surrounding exposure incidents as required by paragraph(f)(3)(i) of this standard. (iii) Each employer shall ensure that a copy of the Exposure Control Plan is

accessible to employees in accordance with 29 CFR 1910.20(e).

(iv) The Exposure Control Plan shall be reviewed and updated at least annually and whenever necessary to reflect new or modified task and procedures which affect occupational exposure and to reflect new or revised employee positions with occupational exposure.

(v) The Exposure Control Plan shall be made available to Assistant Secretary and the Director upon request for examination and copying.

(2) *Exposure determination.* (i) Each employer who has an employee(s) with occupational exposure as defined by paragraph (b) of this section shall prepare an exposure determination. This exposure determination shall contain the following:

(A) A list of all job classifications in which all employees in those job classification have occupational exposure;

(B) A list of all job classification in which some employees have occupational exposure, and

(C) A list of all task and procedures or groups of closely related task and procedures in which occupational exposure occurs and that are performed by employees in job classifications listed in accordance with the provisions of paragraph (c)(2)(i)(B) of this standard.

(ii) This exposure determination shall be made without regard to the use of personal protective equipment.

(d) *Methods of compliance*-----(1)

*General*--Universal precautions shall be observed to prevent contact with blood or other potentially infectious materials. Under circumstances in which differentiation between body fluids types is difficult or impossible, all body fluids shall be considered potentially infectious materials.

(2) *Engineering and work practice controls.* (i) Engineering and work practice controls shall be used to eliminate or minimize employee exposure. Where occupational exposure remains after institution of these controls, personal protective equipment shall be used.

(ii) Engineering controls shall be examined and maintained or replaced on a regular schedule to ensure their effectiveness.

(iii) Employers shall provide handwashing facilities which are readily accessible to employees.

(iv) When provision of handwashing facilities is not feasible, the employer shall provide either an appropriate antiseptic hand cleansers in conjunction with clean cloth/paper towelettes or antiseptic towelettes. When antiseptic hand cleansers or towelettes are used, hands shall be washed with soap and running water as soon as feasible.

(v) Employers shall ensure that employees wash their hands immediately or soon as feasible after removal of gloves or other personal protective equipment.

(vi) Employers shall ensure that employees wash hands or any other skin with soap and water, or flush mucous membranes with water immediately or as soon as feasible following contact of such body areas with blood or other potentially infectious materials.

(vii) Contaminated needles and other contaminated sharps shall not be bent, recapped or removed except as noted in paragraphs (d)(2)(vii)(A) and (d)(2)(vii)(B) below. Shearing or breaking of contaminated needles is prohibited.

(A) Contaminated needles and other contaminated sharps shall not be recapped or removed unless the employer can demonstrate that no alternative is feasible or that such action is required by a specific medical procedure.

(B) Such recapping or needle removal must be accomplished through the use of a mechanical device or a one-handed technique.

(viii) Immediately or as soon as possible after use, contaminated reusable sharps shall placed in appropriate containers until properly reprocessed. These containers shall be:

(A) Puncture resistant;

(B) Labeled or color-coded in accordance with this standard;

(C) Leakproof on the sides and bottom; and

(D) In accordance with the requirements set forth in paragraph (d)(4)(ii)(E) for reusable sharps.

(ix) Eating, drinking, smoking applying cosmetics or lip balm, and handing contact lenses are prohibited in work areas where there is a reasonable likelihood of occupational exposure.

(x) Food and drink shall not be kept in refrigerators, freezers, shelves, cabinets or on countertops or bench tops where blood or other potentially infectious materials are present.

(xi) All procedures involving blood or other potentially infectious materials shall be performed in such a manner as to minimize splashing, spraying, spattering, and generation of droplets of these substances.

(xii) Mouth pipetting/ suctioning of blood or other potentially infectious materials is prohibited.

(xiii) Specimens of blood or other potentially infectious materials shall be placed in a container which prevents leakage during collection, handling, processing, storage, transport, or shipping.

(A) The container for storage, transport, or shipping shall be labeled or

color coded according to paragraph (g) (1) (i) and closed prior to being stored, transported, or shipped. When a facility utilizes Universal Precautions in the handling of all specimens, the labeling/ color coding of a specimens is not necessary provided containers are recognizable as containing specimens. This exemption only applies while such specimens/ containers remain within the facility. Labeling or color coding in accordance with paragraph (g) (1) (i) is required when such specimens/ containers leave the facility.

(B) If outside contamination of the primary container occurs, the primary container shall be placed within a second container which prevents leakage during handling, processing, storage, transport, or shipping and is labeled or color coded according to the requirements of this standard.

(C) If the specimen could puncture the primary container, the primary container shall be placed within a secondary container which is puncture resistant in addition to the above characteristics.

(xiv) Equipment which may become contaminated with blood or other potentially infectious materials shall be examined prior to servicing of shipping and shall be decontaminated as necessary, unless the employer can demonstrate that decontamination of such equipment or portions of such equipment is not feasible.

(A) A readily observable label in accordance with paragraph (g)(1)(i)(H) shall be attached to the equipment stating which portions remain contaminated.

(B) The employer shall ensure that this information is conveyed to all affected employees, the servicing representative, and/ or the manufacturer, as appropriate, prior to handling, servicing, or shipping so that appropriate precautions will be taken.

(3) *Personal protective equipment*-(i) *Provision.* When there is occupational exposure, the employer shall provide, at no cost to the employee, appropriate personal protective equipment such as, but not limited to, gloves, gowns, laboratory coats, face shields or masks and eye protection, and mouthpieces, resuscitation bags, pocket masks or other ventilation devices. Personal protective equipment will be considered "appropriate" only if it does not permit blood or other potentially infectious materials to pass through to or reach the employee's work clothes, street clothes, undergarments, skin, eyes, mouth, or other mucous membranes under normal conditions of use and for the duration of time which the protective equipment will be used.

(ii) *Use.* The employer shall ensure that the employee uses appropriate

personal protective equipment unless the employer shows that the employee temporarily and briefly declined to use personal protective equipment when, under rare and extraordinary circumstances, it was the employee's professional judgment that in the specific instance its use would have prevented the delivery of health care or public safety services or would have posed an increased hazard to the safety of the worker or co-worker. When the employee makes this judgment, the circumstances shall be investigated and documented in order to determine whether changes can be instituted to prevent such occurrences in the future.

(iii) Accessibility. The employer shall ensure that appropriate personal protective equipment in the appropriate sizes is readily accessible at the worksite or is issued to employees.

Hypoallergenic gloves, glove liners, powderless gloves, or other similar alternatives shall be readily accessible to those employees who are allergic to the gloves normally provided.

(iv) Cleaning, Laundering, and Disposal. The employer shall clean, launder, and dispose of personal protective equipment required by paragraphs (d) and (e) of this standard, at no cost to the employee.

(v) Repair and Replacement. The employer shall repair or replace personal protective equipment as needed to maintain its effectiveness, at no cost to the employee.

(vi) If a garment(s) is penetrated by blood or other potentially infectious materials, the garment(s) shall be removed immediately or as soon as feasible.

(vii) All personal protective equipment shall be removed prior to leaving the work area.

(viii) When personal protective equipment is removed it shall be placed in an appropriately designated area or container for storage, washing, decontamination or disposal.

(ix) Gloves. Gloves shall be worn when it can be reasonably anticipated that the employee may have hand contact with blood, other potentially infectious materials, mucous membranes, and non-intact skin; when performing vascular access procedures except as specified in paragraph (d) (3) (ix) (D); and when handling or touching contaminated items or surfaces.

(A) Disposable (single use) gloves such as surgical or examination gloves, shall be replaced as soon as practical when contaminated or as soon as feasible if they are torn, punctured, or when their ability to function as a barrier is compromised.

(B) Disposable (single use) gloves shall not be washed or decontaminated for re-use.

(C) Utility gloves may be decontaminated for re-use if the integrity of the glove is not compromised. However, they must be discarded if they are cracked, peeling, torn, punctured, or exhibit other signs of deterioration or when their ability to function as a barrier is compromised.

(D) If an employer in a volunteer blood donation center judges that routine gloving for all phlebotomies is not necessary then the employer shall:

(1) Periodically reevaluate this policy:

(2) Make gloves available to all employees who wish to use them for phlebotomy;

(3) Not discourage the use of gloves for phlebotomy; and

(4) Require that gloves be used for phlebotomy in the following circumstances:

(i) When the employee has cuts, scratches, or other breaks in his or her skin:

(ii) When the employee judges that hand contamination with blood may occur, for example, when performing phlebotomy on an uncooperative source individual; and

(iii) When the employee is receiving training in phlebotomy.

(x) Masks, Eye Protection, and Face Shields. Masks in combination with eye protection devices, such as goggles or glasses with solid side shields, or chin-length face shields, shall be worn whenever splashes, spray, spatter, or droplets of blood or other potentially infectious materials may be generated and eye, nose, or mouth contamination can be reasonably anticipated.

(xi) Gowns, Aprons, and other Protective Body Clothing. Appropriate protective clothing such as, but not limited to, gowns, aprons, lab coats, clinic jackets, or similar outer garments shall be worn in occupational exposure situation. The type and characteristics will depend upon the task and degree of exposure anticipated.

(xii) Surgical caps or hoods and / or shoe covers or boots shall be worn in instances when gross contamination can reasonably be anticipated (e.g., autopsies, or orthopedic surgery).

(4) Housekeeping. (i) General. Employers shall ensure that the worksite is maintained in a clean and sanitary condition. The employer shall determine and implement an appropriate written schedule for the cleaning and method of decontamination based upon the location within the facility, type of surface to be cleaned, type of soil present, and tasks or procedures being performed in the area.

(ii) All equipment and environmental and working surfaces shall be cleaned

and decontaminated after contact with blood or other potentially infectious materials.

(A) Contaminated work surfaces shall be decontaminated with an appropriate disinfectant after completion of procedures; immediately or as soon as feasible when surfaces are overtly contaminated or after any spill of blood or other potentially infectious materials; and at the end of the work shift if the surface may have become contaminated since the last cleaning.

(B) Protective covering, such as plastics wrap, aluminum foil, or imperiously-backed absorbent paper used to cover equipment and environmental surfaces, shall be removed and replaced as soon as feasible when they become overtly contaminated or at the end of the workshift if they may have become contaminated during the shift.

(C) All bins, pails, cans, and similar receptacles intended for reuse which have a reasonable likelihood for becoming contaminated with blood or other potentially infectious materials shall be inspected and decontaminated on a regularly scheduled basis and cleaned and decontaminated immediately or as soon as feasible upon visible contamination.

(D) Broken glassware which may be contaminated shall not be picked up directly with hands. It shall be cleaned up using mechanical means, such as a brush and dust pan, tongs, or forceps.

(E) Reusable sharps that are contaminated with blood or other potentially infectious materials shall not be stored or processed in a manner that requires employee to reach by hand into the containers where these sharps have been placed.

(iii) Regulated Waste.

(A) Contaminated Sharps Discarding and Containment. (1) Contaminated sharps shall be discarded immediately or as soon as feasible in containers that are:

(i) Closable

(ii) Puncture resistant;

(iii) Leakproof on sides and bottom; and

(iv) Labeled or color-coded in accordance with paragraph (g) (1) (i) of this standard.

(2) During use, containers for contaminated sharps shall be:

(i) Easily accessible to personnel and located as close as is feasible to the immediate area where sharps are used or can be reasonably anticipated to be found (e.g., laundries);

(ii) Maintained upright throughout use; and

(iii) Replaced routinely and not be allowed to overflow.



(3) When moving containers of contaminated sharps from the area of use, the containers shall be:

(i) Closed immediately prior to removal or replacement to prevent spillage or protrusion of contents during handling, storage, transport, or shipping;

(ii) Placed in a secondary container if leakage is possible. The second container shall be:

(A) Closable  
(B) Constructed to contain all contents and prevent leakage during handling, storage, transport, or shipping; and

(C) Labeled or color-coded according to paragraph (g) (1) (i) of this standard.

(4) Reusable containers shall not be opened, emptied, or cleaned manually or in any other manner which would expose employees to the risk of percutaneous injury.

(B) Other Regulated Waste Containment. (1) Regulated waste shall be placed in containers which are:

(i) Closable;  
(ii) Constructed to contain all contents and prevent leakage of fluids during handling, storage, transport or shipping;

(iii) Labeled or color-coded in accordance with paragraph (g) (1) (i) this standard; and

(iv) Closed prior to removal to prevent spillage or protrusion of contents during handling, storage, transport, or shipping.

(2) If outside contamination of the regulated waste container occurs, it shall be placed in a second container. The secured container shall be:

(i) Closable  
(ii) Constructed to contain all contents and prevent leakage of fluids during handling, storage, transport, or shipping;

(iii) Labeled or color-coded in accordance with paragraph (g) (1) (i) of this standard; and

(iv) Closed prior to removal to prevent spillage or protrusion of contents during handling, storage, transport, or shipping

(C) Disposal of all regulated waste shall be in accordance with applicable regulations of the United States, States and Territories, and political subdivision of States and Territories.

(iv) Laundry.  
(A) Contaminated laundry shall be handled as little as possible with minimum of agitation. (1) Contaminated laundry shall be bagged or containerized at the location where it was used and shall not be sorted or rinsed in the location of use.

(2) Contaminated laundry shall be placed and transported in bags or containers labeled or color-coded in accordance with paragraph (g) (1) (i) of this standard. When a facility utilizes Universal Precautions in the handling of all soiled laundry, alternative labeling or color-coding is sufficient if it permits all employees to recognize the containers as

requiring compliance with Universal Precautions.

(3) Whenever contaminated laundry is wet and presents a reasonable likelihood of soak-through of or leakage from the bag or container, the laundry shall be placed and transported in bags or containers which prevent soak-through and / or leakage of fluids to the exterior.

(B) The employer shall ensure that employees who have contact with contaminated laundry wear protective gloves and other appropriate personal protective equipment.

(C) When a facility ships contaminated laundry off-site to a second facility which does not utilize Universal Precautions in the handling of all laundry, the facility generating the contaminated laundry must place such laundry in bags or containers which are labeled or color-coded in accordance with paragraph (g) (1) (i).

(e) *HIV and HBV Research Laboratories and Production Facilities.*

(1) This paragraph applies to research laboratories and production facilities engaged in the culture, production, concentration, experimentation, and manipulation of HIV and HBV. It does not apply to clinical or diagnostic laboratories engaged solely in the analysis of blood, tissues, or organs. These requirements apply in addition to the other requirements of the standard.

(2) Research laboratories and production facilities shall meet the following criteria:

(i) Standard microbiological practices. All regulated waste shall either be incinerated or decontaminated by a method such as autoclaving known to effectively destroy bloodborne pathogens.

(ii) Special practices  
(A) Laboratory doors shall be kept closed when work involving HIV or HBV is in progress.

(B) Contaminated materials that are to be decontaminated at a site away from the work area shall be placed in a durable, leak proof, labeled or color-coded container that is closed before being removed from the work area.

(C) Access to the work area shall be limited to authorized persons. Written policies and procedures shall be established whereby only persons who have been advised of the potential biohazard, who meet any specific entry requirements, and who comply with all entry and exit procedures shall be allowed to enter the work areas and animal rooms.

(D) When other potentially infectious materials or infected animals are present in the work area or containment module, a hazard warning sign incorporating the universal biohazard symbol shall be posted on all access doors. The hazard

warning sign shall comply with paragraph (g) (1) (ii) of this standard.

(E) All activities involving other potentially infectious materials shall be conducted in biological safety cabinets or other physical-containment devices within the containment module. No work with these other potentially infectious materials shall be conducted on the open bench.

(F) Laboratory coats, gowns, smocks, uniforms, or other appropriate protective clothing shall be used in the work area and animal rooms. Protective clothing shall not be worn outside of the work area and shall be decontaminated before being laundered.

(G) Special care shall be taken to avoid skin contact with other potentially infectious materials. Gloves shall be worn when handling infectious animals and when making hand contact with other potentially infectious materials is unavoidable.

(H) Before disposal all waste from work area and from animal rooms shall either be incinerated or decontaminated by a method such as autoclaving known to effectively destroy bloodborne pathogens.

(I) Vacuum lines shall be protected with liquid disinfectant traps and high efficiency particulate air (HEPA) filters or filters of equivalent or superior efficiency and which are checked routinely and maintained or replaced as necessary.

(J) Hypodermic needles and syringes shall be used only for parenteral injection and aspiration of fluids from laboratory animals and diaphragm bottles. Only needle-locking syringes or disposable syringes-needle units (i.e. the needle is integral to the syringe) shall be used for the injection or aspiration of other potentially infectious materials. Extreme caution shall be used when handling needles and syringes. A needle shall not be bent, sheared, replaced in the sheath or guard, or removed from the syringe following use. The needle and syringe shall be promptly placed in a puncture-resistant container and autoclaved or decontaminated before reuse or disposal.

(K) All spills shall be immediately contained and cleaned up by appropriate professional staff or others properly trained and equipped to work with potentially concentrated infectious materials.

(L) A spill or accident that results in an exposure incident shall be immediately reported to the laboratory director or other responsible person.

(M) A biosafety manual shall be prepared or adopted and periodically reviewed and updated at least annually or more often if necessary. Personnel shall be advised of potential hazards,

shall be required to read instructions on practices and procedures, and shall be required to follow them.

(iii) Containment equipment. (A) Certified biological safety cabinets (Class I, II, or III) or other appropriate combinations of personal protection or physical containment devices, such as special protective clothing, respirators centrifuge safety cups, sealed centrifuge rotors, and containment caging for animals, shall be used for all activities with other potentially infectious materials that pose a threat of exposure to droplets, splashes, spills, or aerosols.

(B) Biological safety cabinets shall be certified when installed, whenever they are moved and at least annually.

(3) HIV and HBV research laboratories shall meet the following criteria:

(i) Each laboratory shall contain a facility for hand washing and an eye wash facility which is readily available within the work area.

(ii) An autoclave for decontamination of regulated waste shall be available.

(4) HIV and HBV production facilities shall meet the following criteria:

(i) The work areas shall be separated from areas that are open to unrestricted traffic flow within the building. Passage through two sets of doors shall be the basic requirement for entry into the work area from access corridors or other contiguous areas.

Physical separation of the high-containment work area from access corridors or other areas or other activities may also be provided by a double doored clothes change room (showers may be included), airlock, or other access facility that requires passing through two sets of doors before entering the work area.

(ii) The surfaces of doors wall floors and ceilings in the work area shall be water resistant so that they can be easily cleaned. Penetrations in these surfaces shall be sealed or capable of being sealed to facilitate decontamination.

(iii) Each work area shall contain a sink for washing hands and a readily available eye wash facility. The sink shall be foot, elbow, or automatically operated and shall be located near the exit door of the work area.

(iv) Access doors to the work area or containment module shall be self-closing.

(v) An autoclave for decontamination of regulated waste shall be available within or as near as possible to the work area.

(vi) A ducted exhaust-air ventilation system shall be provided. This system shall create directional airflow that draws air into the work area through the entry area. The exhaust air shall not be recirculated to any other area of the building, shall be discharged to the

outside, and shall be dispersed away from occupied areas and air intakes. The proper direction of the airflow shall be verified (i.e., into the work area).

(5) *Training Requirements.* Additional training requirements for employees in HIV and HBV research laboratories and HIV and HBV production facilities are specified in paragraph (g)(2)(ix)

(f) *Hepatitis B vaccination and post-exposure evaluation and follow-up-(1) General.* (i) The employer shall make available the hepatitis B vaccine and vaccination series to all employees who have occupational exposure, and post-exposure evaluation and follow-up to all employees who have had an exposure incident.

(ii) The employer shall ensure that all medical evaluations and procedures including the hepatitis B vaccine and vaccination series and post-exposure evaluation and follow-up, including prophylaxis, are:

(A) Made available at no cost to the employee;

(B) Made available to the employee at a reasonable time and place;

(C) Performed by or under the supervision of a licensed physician or by or under the supervision of another licensed healthcare professional; and

(D) Provided according to recommendations of the U.S. Public Health Service current at the time these evaluation and procedures take place, except as specified by this paragraph (f).

(iii) The employer shall ensure that all laboratory tests are conducted by an accredited laboratory at no cost to the employee.

(2) *Hepatitis B Vaccination.* (i) Hepatitis B vaccination shall be made available after the employee has received the training required in paragraph (g) (2) (vii) (f) and within 10 working days of initial assignment to all employees who have occupational exposure unless the employee has previously received the complete hepatitis B vaccination series, antibody testing has revealed that the employee is immune, or the vaccine is contraindicated for medical reasons.

(ii) The employer shall not make participation in a prescreening program a prerequisite for receiving hepatitis B vaccination.

(iii) If the employer initially declines hepatitis B vaccination but at a later date while still covered under the standard decides to accept the vaccination, the employer shall make available hepatitis B vaccination at that time.

(iv) The employer shall assure that employees who decline to accept hepatitis B vaccination offered by the employer sign the statement in appendix A.

(v) If a routine booster dose(s) of hepatitis B vaccine is recommended by the U.S. Public Health Service at a future date, such booster dose(s) shall be made available in accordance with section (f) (1) (ii).

(3) *Post-exposure Evaluation and Follow-up.* Following a report of an exposure incident, the employer shall make immediately available to the exposed employee a confidential medical evaluation and follow-up, including at least the following elements:

(i) Documentation of the route(s) of exposure, and the circumstances under which the exposure incident occurred;

(ii) Identification and documentation of the source individual, unless the employer can establish that identification is infeasible or prohibited by state or local law:

(A) The source individual's blood shall be tested as soon as feasible and after consent is obtained in order to determine HBV and HIV infectivity. If consent is not obtained, the employer shall establish that legally required consent cannot be obtained. When the source individual's consent is not required by law, the source individual's blood, if available, shall be tested and the results documented.

(B) When the source individual is already known to be infected with HBV or HIV, testing for the source individual's known HBV or HIV status need not be repeated.

(C) Results of the source individual's testing shall be made available to the exposed employee, and the employee shall be informed of applicable laws and regulations concerning disclosure of the identity and infectious status of the source individual.

(iii) Collection and testing of blood for HBV and HIV serological status:

(A) The exposed employee's blood shall be collected as soon as feasible and tested after consent is obtained.

(B) If the employee consents to baseline blood collection, but does not give consent at that time for HIV serologic testing, the sample shall be preserved for at least 90 days. If, within 90 days of the exposure incident, the employee elects to have the baseline sample tested, such testing shall be done as soon as feasible.

(iv) Post-exposure prophylaxis, when medically indicated, as recommended by the U.S. Public Health Service;

(v) Counseling, and

(vi) Evaluation of reported illnesses.

(4) *Information Provided to the Healthcare Professional.* (i) The employer shall ensure that the healthcare professional responsible for the employee's Hepatitis B vaccination is provided a copy of this regulation.

(ii) The employer shall ensure that the healthcare professional evaluating an employee after an exposure incident is provided the following information:

- (A) A copy of this regulation;
- (B) A description of the exposed employee's duties as they relate to the exposure incident;
- (C) Documentation of the route(s) of exposure and circumstances under which exposure occurred;
- (D) Results of the source individual's blood testing, if available; and
- (E) All medical records relevant to the appropriate treatment of the employee including vaccination status which are the employer's responsibility to maintain.

(5) *Healthcare Professional's Written Opinion.* The employer shall obtain and provide the employee with a copy of the evaluating healthcare professional's written opinion within 15 days of the completion of the evaluation.

(i) The healthcare professional's written opinion for Hepatitis B vaccination shall be limited to whether Hepatitis B vaccination is indicated for an employee, and if the employee has received such vaccination.

(ii) The healthcare professional's written opinion for post-exposure evaluation and follow-up shall be limited to the following information:

(A) That the employee has been informed of the results of the evaluation; and

(B) That the employee has been told about any medical conditions resulting from exposure to blood or other potentially infectious materials which require further evaluation or treatment.

(iii) All other findings or diagnoses shall remain confidential and shall not be included in the written report.

(6) *Medical record keeping.* Medical records required by this standard shall be maintained in accordance with paragraph (h)(1) of this section.

(g) *Communication of hazards to employees - (1) Labels and signs.*

(i) Labels. (A) Warning labels shall be affixed to containers of regulated waste, refrigerators and freezers containing blood or other potentially infectious material; and other containers used to store, transport or ship blood or other potentially infectious materials, except as provided in paragraph (g)(1)(i)(E),(F) and (G).

(B) Labels required by this section shall include the following legend:



**BIOHAZARD**

(C) These labels shall be fluorescent orange or orange-red or predominantly so, with lettering or symbols in a contrasting color.

(D) Labels required by affixed as close as feasible to the container by string, wire, adhesive, or other method that prevents their loss or unintentional removal.

(E) Red bags or red containers may be substituted for labels.

(F) Containers of blood, blood components, or blood products that are labeled as to their contents and have been released for transfusion or other clinical use are exempted from the labeling requirements of paragraph (g).

(G) Individual containers of blood or other potentially infectious materials that are placed in a labeled container during storage, transport, shipment or disposal are exempted from the labeling requirement.

(H) Labels required for contaminated equipment shall be in accordance with this paragraph and shall also state which portions of the equipment remain contaminated.

(I) Regulated waste that has been decontaminated need not be labeled or color-coded.

(ii) Signs. (A) The employer shall post signs at the entrance to work areas specified in paragraph (e) HIV and HBV Research Laboratory and Production Facilities, which shall bear the following legend:



**BIOHAZARD**

( Name of the Infectious Agent )  
( Special requirements for entering the area )

( Name, telephone number of the laboratory director or other responsible person. )

(B) These signs shall be fluorescent orange-red or predominantly so, with lettering or symbols in a contrasting color.

(2) *Information and Training.* (i) Employers shall ensure that all employees with occupational exposure participate in a training program which must be provided at no cost to the employee and during working hours.

(ii) Training shall be provided as follows:

(A) At the time of initial assignment to task where occupational exposure may take place;

(B) Within 90 days after the effective date of the standard; and

(C) At least annually thereafter.

(iii) For employees who have received training on bloodborne pathogens in the year preceding the effective date of the standard, only training with respect to the provisions of the standard which were not included need be provided.

(iv) Annual training for all employees shall be provided within one year of their previous training.

(v) Employers shall provide additional training when changes such as modification of tasks or procedures or institution of new tasks or procedures affect the employee's occupational exposure. The additional training may be limited to addressing the new exposures created.

(vi) Material appropriate in content and vocabulary to educational level, literacy, and language of employees shall be used.

(vii) The training program shall contain at a minimum the following elements:

(A) An accessible copy of the regulatory text of this standard and an explanation of its contents:

(B) A general explanation of the epidemiology and symptoms of bloodborne diseases:

(C) An explanation of the modes of transmission of bloodborne pathogens;

(D) An explanation of the employer's exposure control plan and the means by which the employee can obtain a copy of the written plan:

(E) An explanation of the appropriate methods for recognizing tasks and other activities that may involve exposure to blood and other potentially infectious materials:

(F) An explanation of the use and limitations of methods that will prevent or reduce exposure including appropriate engineering controls, work practices, and personal protective equipment;

(G) Information on the types, proper use, location, removal, handling,

decontamination and disposal of personal protective equipment;

(H) An explanation of the basis for selection of personal protective equipment;

(I) Information on the hepatitis B vaccine including information on its efficacy safety, method of administration, the benefits of being vaccinated, and that the vaccine and vaccination will be offered free of charge;

(J) Information on the appropriate actions to take and persons to contact in an emergency involving blood or other potentially infectious materials;

(K) An explanation of the procedure to follow if an exposure incident occurs, including the method of reporting the incident and the medical follow up that will be made available;

(L) Information on the post exposure evaluation and follow up that the employer is required to provide for the employee following an exposure incident;

(M) An explanation of the signs and labels and/or color coding required by paragraph (g) (1); and

(N) An opportunity for interactive questions and answers with the person conducting the training session.

(viii) The person conducting the training shall be knowledgeable in the subject matter covered by the elements contained in the training program as it relates to the work place that the training will address.

(ix) Additional Initial Training for Employees in HIV and HBV Laboratories and Production Facilities. Employees in HIV and HBV research laboratories and HIV and HBV production facilities shall receive the following initial training in addition to the above training requirements.

(A) The employer shall assure that employees demonstrate proficiency in standard microbiological practices and techniques and the practices and operations specific to the facility before being allowed to work with HIV or HBV.

(B) The employer shall assure that employees have prior experience in the handling of human pathogens or tissue cultures before working with HIV or HBV.

(C) The employer shall provide a training program to employees who have no prior experience in handling human pathogens. Initial work activities shall not include the handling of infectious agents. A progression of work activities shall be assigned as techniques are learned and proficiency is developed. The employer shall assure that employees participate in work activities involving infectious agents only after proficiency has been demonstrated.

(h) *Record keeping--(1) Medical Records.* (i) The employer shall establish and maintain an accurate record for each employee with occupational exposure, in accordance with 29 CFR 1910.20.

(ii) This record shall include:

(A) the name and social security number of the employee;

(B) A copy of the employee's hepatitis B vaccination status including the dates of all the hepatitis B vaccinations and any medical records relative to the employee's ability to receive vaccination as required by paragraph (f) (2);

(C) A copy of all results of examinations, medical testing and follow-up procedures as required by paragraph (f) (3);

(D) The employer's copy of the healthcare professional's written opinion as required by paragraph (f) (5) and

(E) A copy of the information provided to the healthcare professional as required by paragraph (f)(4)(ii)(B)(C) and (D).

(iii) Confidentiality. The employer shall ensure that employee medical records required by paragraph (h)(1) are:

(A) Kept confidential; and

(B) Are not disclosed or reported without the employee's express written consent to any person within or outside the work place except as required by this section or as may be required by law.

(iv) The employer shall maintain the records required by paragraph (h) for at least the duration of employment plus 30 years in accordance with 29 CFR 1910.20.

(2) *Training Records.* (i) *Training records shall include the following information:*

(A) The dates of training sessions;

(b) The contents or a summary of the training sessions;

(C) The names and qualifications of persons conducting the training and

(D) The names and job titles of all persons attending the training sessions.

(ii) Training records shall be maintained for 3 years from the date on which the training occurred.

(3) *Availability.* (i) The employer shall ensure that all records required to be maintained by this section shall be made available upon request to the Assistant Secretary and the Director for examination and copying.

(ii) Employee training records required by this paragraph shall be provided upon request for examination and copying to employees, to employee representatives, to the Director, and to the Assistant Secretary in accordance with 29 CFR 1910.20

(iii) Employee medical records required by this paragraph shall be provided upon request for examination and copying to the subject employee, to the Director,

and to the Assistant Secretary in accordance with 29 CFR 1910.20

(4) *Transfer of Records.* (i) The employer shall comply with the requirements involving transfer of records set forth in 29 CFR 1910.20(h)

(ii) If the employer ceases to do business and there is no successor employer to receive and retain the records for the prescribed period, the employer shall notify the Director, at least three months prior to their disposal and transmit them to the Director, if required by the Director to do so, within that three month period.

(i) *Dates--(1) Effective Date.* The standard shall become effective on March 6, 1992.

(2) The Exposure Control Plan required by paragraph (c) (2) of this section shall be completed on or before May 5, 1992.

## **CHAPTER 9 MATERIALS HANDLING**

### **Introduction**

Middle Tennessee State University requires that safety planning and practices for commonplace tasks be as thorough as for operations with unusual hazards. Commonplace tasks make up the greater part of the daily activities of most employees and, not unexpectedly, offer more potential sources of accidents with injuries and property damage. Every operation or work assignment begins and ends with handling of materials. Whether the material is a sheet of paper (paper cuts are painful) or a cylinder of toxic gas, accident risks can be reduced with thorough planning. Identifying obvious and hidden hazards should be the first step in planning work methods and job practices. Thorough planning should include all the steps associated with good management from job conception through crew and equipment decommissioning.

Most of the material presented in this chapter is related to the commonplace and obvious. Nevertheless, a majority of the incidents leading to injury, occupational illness, and property damage stem from failure to observe the principles associated with safe materials handling and storage. A less obvious hazard is potential failure of used motorized handling or lifting equipment.

### **Lifting and Moving**

Lifting and moving of objects must be done by mechanical devices rather than by manual effort whenever this is practical. The equipment used must be appropriate for the lifting or moving task. Lifting and moving devices must be operated only by personnel trained and authorized to operate them. Employees must not be required to lift heavy or bulky objects that overtax their physical condition or capability.

### **Rigging**

Planning for safe rigging and lifting must begin at the design stage and lifting procedures must be developed for assembly and installation. The lifting procedure should be developed and discussed with the rigging crew supervisor.

Responsibility for all rigging jobs is assigned to the supervisor. The department requesting the lifting job is responsible for defining and requesting the move or providing technical information on relevant characteristics of the apparatus, including special lifting fixtures when required, for providing suggestions on rigging and moving, and for assigning someone to represent them both in planning and while the job is being carried out. The riggers are responsible for final rigging and for carrying out whatever moves have been designated. Before any movement takes place, however, each representative must approve the rigging and other procedures associated with the intended move. Each must respect the responsibility and authority of the other to prevent or terminate any action he or she judges to be unsafe or otherwise improper.

The supervisor must make certain that personnel know how to move objects safely by hand or with mechanical devices in the operations normal to the area and must permit only those employees who are formally qualified by training and certification to operate a fork truck, crane, or hoist. The supervisor must enforce the use of safe lifting techniques and maintain lifting equipment in good mechanical condition.

Employees are required to observe all established safety regulations relating to safe lifting techniques. Environmental Health and Safety Services provides training programs on request followed by certification for employees who have demonstrated the ability to operate fork trucks of up to 4-ton capacity and for incidental crane operations that require no special rigging.

### **Dock Boards (Bridge plates)**

Portable and powered dock boards shall be strong enough to carry the load imposed on them.

Portable dock boards shall be secured in position, either by being anchored or equipped with devices which will prevent their slipping.

Powered dock boards shall be designed and constructed in accordance with **Commercial Standard CS202-56 (1961) Industrial Lifts and Hinged Loading Ramps** published by the U.S. Department of Commerce.

Handholds, or other effective means, shall be provided on portable dock boards to permit safe handling.

Positive protection shall be provided to prevent trucks or trailers from being moved while dock boards or bridge plates are in position.

### **Trucks**

The brakes of highway trucks shall be set, and wheel chocks placed under the rear wheels to prevent the trucks from rolling while they are boarded with powered industrial trucks.

Fixed jacks may be necessary to support a semi-trailer and prevent upending during the loading or unloading when the trailer is not coupled to a tractor.

### **Powered Industrial Truck Operator Training**

#### **Safe Operation:**

Every MTSU employee operating powered industrial trucks must be competent to operate the equipment safely, as demonstrated by the successful completion of the training and evaluation specified in this chapter.

Prior to permitting anyone to operate a university owned, leased, or rented powered industrial truck (except for training purposes), the supervisor shall ensure that each operator has successfully completed the training required by this chapter.

#### **Training Program Implementation:**

Trainees may operate a powered industrial truck only:

- \* Under the direct supervision of persons who have the knowledge, training, and experience to train operators and evaluate their competence; and
- \* Where such operation does not endanger the trainee, students, visitors, or other employees.

Training shall consist of a combination of formal instruction (e.g., lecture, discussion, interactive computer learning, video tape, written material), practical training (demonstrations performed by the trainer and practical exercises performed by the trainee), and evaluation of the operator's performance in the workplace.

All operator training and evaluation shall be conducted by persons who have the knowledge, training, and experience to train powered industrial truck operators and evaluate their competence.

**Training program content:**

Powered industrial truck operators shall receive initial training in the following topics:

\* Truck-related topics:

Operating instructions, warnings, and precautions for the types of truck the operator will be authorized to operate

Differences between the truck and the automobile

Truck controls and instrumentation: where they are located, what they do, and how they work

Engine or motor operation

Steering and maneuvering

Visibility (including restrictions due to loading)

Fork and attachment adaptation, operation, and use limitations

Vehicle capacity

Vehicle stability

Any vehicle inspection and maintenance that the operator will be required to perform

Refueling and/or charging and recharging of batteries

Operating limitations

Any other operating instructions, warnings, or precautions listed in the operator's manual for the types of vehicle that the employee is being trained to operate

\* Workplace-related topics:

Surface conditions where the vehicle will be operated

Composition of loads to be carried and load stability

Load manipulation, stacking, and unstacking

Pedestrian traffic in areas where the vehicle will be operated

Narrow aisles and other restricted places where the vehicle will be operated

Hazardous (classified) locations where the vehicle will be operated

Ramps and other sloped surfaces that could affect the vehicle's stability

Closed environments and other areas where insufficient ventilation or poor vehicle maintenance could cause a buildup of carbon monoxide or diesel exhaust

Other unique or potentially hazardous environmental conditions in the workplace that could affect safe operation

- \* The requirements of OSHA Standards.

### **Refresher Training and Evaluation:**

Refresher training, including an evaluation of the effectiveness of that training, shall be conducted to ensure that the operator has the knowledge and skills needed to operate the powered industrial truck safely.

Refresher training in relevant topics shall be provided to the operator when:

- \* The operator has been observed to operate the vehicle in an unsafe manner
- \* The operator has been involved in an accident or near-miss incident
- \* The operator has received an evaluation that reveals that the operator is not operating the truck safely
- \* The operator is assigned to drive a different type of truck or
- \* A condition in the workplace changes in a manner that could affect safe operation of the truck

An evaluation of each powered industrial truck operator's performance shall be conducted at least once every three years.

**Avoidance of Duplicative Training:** If an operator has previously received training in a topic specified in this chapter, and such training is appropriate to the truck and working conditions encountered, additional training in that topic is not required if the operator has been evaluated and found competent to operate the truck safely.

**Certification:** The supervisor or department head shall certify that each operator has been trained and evaluated as required by this chapter. The certification shall include the name of the operator, the date of the training, the date of the evaluation, and the identity of the person(s) performing the training or evaluation.



**Dates:** The employer shall ensure that operators of powered industrial trucks are trained, as appropriate, by the dates shown in the following table:

<b>If the employee was hired:</b>	<b>The initial training and evaluation of that employee must be completed:</b>
Before December 1, 1999	By December 1, 1999.
After December 1, 1999	Before the employee is assigned to operate a powered industrial truck.

### Powered Industrial Truck Operations

#### General:

- Trucks shall not be driven up to anyone standing in front of a bench or other fixed object.
- No person shall be allowed to stand or pass under the elevated portion of any truck, whether loaded or empty.
- Personnel other than the operator shall not be permitted to ride on powered industrial trucks.
- Arms or legs are prohibited from being placed between the uprights of the mast or outside the running lines of the truck.
- When a powered industrial truck is left unattended, load engaging means shall be fully lowered, controls shall be neutralized, power shall be shut off, and brakes set. Wheels shall be blocked if the truck is parked on an incline. A powered industrial truck is unattended when the operator is 25 ft. or more away from the vehicle which remains in his view, or whenever the operator leaves the vehicle and it is not in his view.
- When the operator of an industrial truck is dismounted and within 25 ft. of the truck still in his view, the load engaging means shall be fully lowered, controls neutralized, and the brakes set to prevent movement.
- A safe distance shall be maintained from the edge of ramps or platforms while on any elevated dock or platform. Trucks shall not be used for opening or closing freight doors.
- Brakes shall be set, and wheel blocks shall be in place to prevent movement of trucks or trailers while loading or unloading. Fixed jacks may be necessary to support a semi-trailer during loading or unloading when the trailer is not coupled to a tractor. The flooring of trucks and trailers shall be checked for breaks and weakness before they are driven onto.
- There shall be sufficient headroom under overhead installations such as lights, pipes, sprinkler heads, etc.
- An overhead guard shall be used as protection against falling objects. It should be noted that an overhead guard is intended to offer protection from the impact of small packages, boxes, bagged material, etc., representative of the job application, but not to withstand the impact of a falling capacity load.

- A load backrest extension shall be used whenever necessary to minimize the possibility of the load or part of it from falling rearward.
- Only appropriately equipped industrial trucks shall be used in hazardous locations. While there are no hazardous locations, as defined by OSHA Standards, currently on campus, all operators should be aware that areas with high levels of flammable vapors or gases present require special equipment to prevent sparks and potential ignition of those vapors or gases.
- Whenever a truck is equipped with vertical only, or vertical and horizontal controls elevatable with the lifting carriage or forks for lifting personnel, the following additional precautions shall be taken for the protection of personnel being elevated:
  - Use of a safety platform firmly secured to the lifting carriage and/or forks.
  - Means shall be provided whereby personnel on the platform can shut off power to the truck.
  - Such protection from falling objects as indicated necessary by the operating conditions shall be provided.
- Fire aisles, access to stairways, and fire equipment shall be kept clear.

### **Traveling:**

- All traffic regulations shall be observed, including speed limits. A safe distance shall be maintained approximately three truck lengths from the truck ahead, and the truck shall be always kept under control.
- The right of way shall be yielded to ambulances, fire trucks, or other vehicles in emergency situations.
- Other trucks traveling in the same direction at intersections, blind spots, or other dangerous locations shall not be passed.
- The operator shall be required to slow down and sound the horn at cross aisles and other locations where vision is obstructed. If the load being carried obstructs forward view, the operator shall be required to travel with the load trailing.
- The operator shall be required to look in the direction of and keep a clear view of the path of travel.
- Grades shall be ascended or descended slowly.
  - When ascending or descending grades in excess of 10 percent, loaded trucks shall be driven with the load upgrade.
  - On all grades the load and load engaging means shall be tilted back if applicable and raised only as far as necessary to clear the road surface.

- Under all travel conditions the truck shall be operated at a speed that will permit it to be brought to a stop in a safe manner.
- Stunt driving and horseplay are not permitted.
- The operator is required to slow down for wet and slippery floors.
- Dock board or bridge plates shall be properly secured before they are driven over. Dock board or bridge plates shall be driven over carefully and slowly, and their rated capacity never exceeded.
- Motorized hand trucks must enter elevator or other confined areas with load end forward.
- Running over loose objects on the roadway surface shall be avoided.
- While negotiating turns, speed shall be reduced to a safe level by means of turning the hand steering wheel in a smooth, sweeping motion. Except when maneuvering at a very low speed, the hand steering wheel shall be turned at a moderate, even rate.

#### **Loading:**

- Only stable or safely arranged loads shall be handled. Caution shall be exercised when handling off-center loads which cannot be centered.
- Only loads within the rated capacity of the truck shall be handled.
- Long or high (including multiple-tiered) loads which may affect capacity shall be adjusted.
- Trucks equipped with attachments shall be operated as partially loaded trucks when not handling a load.
- A load engaging means shall be placed under the load as far as possible; the mast shall be carefully tilted backward to stabilize the load.
- Extreme care shall be used when tilting the load forward or backward, particularly when high tiering. Tilting forward with load engaging means elevated shall be prohibited except to pick up a load. An elevated load shall not be tilted forward except when the load is in a deposit position over a rack or stack. When stacking or tiering, only enough backward tilt to stabilize the load shall be used.

#### **Operation of the Powered Industrial Truck:**

- If at any time a powered industrial truck is found to be in need of repair, defective, or in any way unsafe, the truck shall be taken out of service until it has been restored to safe operating condition.
- Fuel tanks shall not be filled while the engine is running. Spillage shall be avoided.
- Spillage of oil or fuel shall be carefully washed away or completely evaporated and the fuel tank cap replaced before restarting engine.

- No truck shall be operated with a leak in the fuel system until the leak has been corrected.
- Open flames shall not be used for checking electrolyte level in storage batteries or gasoline level in fuel tanks.

#### **Maintenance of Powered Industrial Trucks:**

- Any power-operated industrial truck not in safe operating condition shall be removed from service. All repairs shall be made by competent personnel.
- Those repairs to the fuel and ignition systems of industrial trucks which involve fire hazards shall be conducted only in locations designated for such repairs.
- Trucks in need of repairs to the electrical system shall have the battery disconnected prior to such repairs.
- All parts of any such industrial truck requiring replacement shall be replaced only by parts equivalent as to safety with those used in the original design.
- Industrial trucks shall not be altered so that the relative positions of the various parts are different from what they were when originally received from the manufacturer, nor shall they be altered either by the addition of extra parts not provided by the manufacturer or by the elimination of any parts. Additional counterweighting of fork trucks shall not be done unless approved by the truck manufacturer.
- Industrial trucks shall be examined before being placed in service and shall not be placed in service if the examination shows any condition adversely affecting the safety of the vehicle. Such examination shall be made at least daily. Where industrial trucks are used on a round-the-clock basis, they shall be examined after each shift. Defects when found shall be immediately reported and corrected.
- Water mufflers shall be filled daily or as frequently as is necessary to prevent depletion of the supply of water below 75 percent of the filled capacity. Vehicles with mufflers having screens or other parts that may become clogged shall not be operated while such screens or parts are clogged. Any vehicle that emits hazardous sparks or flames from the exhaust system shall immediately be removed from service, and not returned to service until the cause for the emission of such sparks and flames has been eliminated.
- When the temperature of any part of any truck is found to be in excess of its normal operating temperature, thus creating a hazardous condition, the vehicle shall be removed from service and not returned to service until the cause for such overheating has been eliminated.
- Industrial trucks shall be kept in a clean condition, free of lint, excess oil, and grease. Noncombustible agents should be used for cleaning trucks. Low flash point (below 100° F.) solvents, such as gasoline, shall not be used. High flash point (at or above 100° F.) solvents may be used. Precautions regarding toxicity, ventilation, and fire hazard shall be appropriate for the agent or solvent used.

- Industrial trucks originally approved for the use of gasoline for fuel may be converted to liquefied petroleum gas fuel provided the complete conversion results in a truck which embodies the features specified for LP or LPS designated trucks. Such conversion equipment shall meet the appropriate OSHA and industry standards for the specific application.

### **Manual Lifting Rules**

Manual lifting and handling of material must be done by methods that ensure the safety of both the employee and the material. It is Middle Tennessee State University policy that employees whose work assignments require heavy lifting be properly trained and physically qualified, by medical examination if necessary. The following are rules for manual lifting:

- \* Inspect the load to be lifted for sharp edges, splinters, and wet or greasy spots.
- \* Wear gloves when lifting or handling objects with sharp or splintered edges. These gloves must be free of oil, grease, or other agents that may cause a poor grip.
- \* Inspect the route over which the load is to be carried. It should be in plain view and free of obstructions or spillage that could cause tripping or slipping.
- \* Consider the distance the load is to be carried. Recognize the fact your gripping power may weaken over long distances.
- \* Size up the load and make a preliminary "heft" to be sure the load is easily within your lifting capacity. If it is not, get help.
- \* If team lifting is required, personnel should be similar in size and physique. One person should act as leader and give the commands to lift, lower, etc.
- \* Two persons carrying a long piece of pipe or lumber should carry it on the same shoulder and walk in step. Shoulder pads should be used to prevent cutting shoulders and help reduce fatigue.

To lift an object off the ground, the following are manual lifting steps:

- \* Make sure of good footing and set your feet about 10 to 15 inches apart. It may help to set one foot forward of the other.
- \* Assume a knee-bend or squatting position, keeping your back straight and upright. Get a firm grip and lift the object by straightening your knees - not your back.
- \* Carry the load close to your body (not on extended arms). To turn or change your position, shift your feet - do not twist your back.
- \* The steps for setting an object on the ground are the same as above, but in reverse.

## Load Path Safety

Loads moved with any material handling equipment must not pass over any personnel. The load path must be selected and controlled to eliminate the possibility of injury to employees should the material handling equipment fail. Equipment worked on while supported by material handling equipment must have a redundant supporting system capable of supporting all loads that could be imposed by failure of the mechanical handling equipment. A suspended load must never be left unattended but must be lowered to the working surface and the material handling equipment secured before leaving the load unattended.

## Off Site Shipping

Material being shipped off site must be packed or crated by competent shipping personnel. Boxes, wooden crates, and other packing materials must be safely consigned to waste or salvage as soon as practicable following unpacking. Hazardous materials shall be labeled in accordance with DOT regulations.

## Work Areas

All areas controlled by Middle Tennessee State University must be kept in orderly and clean condition and used only for activities or operations authorized. The following specific rules must also be followed:

- \* Keep stairs, corridors, and aisles clear. Traffic lanes and loading areas must be kept clear and marked appropriately
- \* **Do not** use hallways, fan lofts, data communications closets, or boiler and equipment rooms as storage areas. Store materials in work rooms or designated storage areas only.
- \* **Do not** allow exits, passageways, or access to equipment to become obstructed by furniture, stored materials, or materials and equipment that are being used.
- \* Arrange stored materials safely to prevent tipping, falling, collapsing, rolling, or spreading or any other undesired and unsafe motion.
- \* Place materials such as cartons, boxes, drums, lumber, pipe, and bar stock in racks or in stable piles as appropriate for the type of material.
- \* Stacked materials shall have a minimum clearance of 36 inches between the top of the stack and light fixtures, joists, rafters, sprinkler heads, and roof trusses.
- \* A minimum clearance of 36 inches shall be maintained around electrical power panels, valves, fire fighting equipment, or heat producing equipment.
- \* Store materials that are radioactive, fissile, flammable, explosive, oxidizing, corrosive, or pyrophoric only in accordance with OSHA standards and fire codes.
- \* Segregate and store incompatible materials in separate locations.
- \* Remove items that will not be required for extended periods from work areas and put them in warehouse storage. Call for assistance.

- \* Temporary equipment required for special projects or support activities must be installed so that it will not constitute a hazard.
- \* Wiring and cables must be installed in a safe and orderly manner, preferably in cable trays.
- \* Machinery and possible contact points with electrical power must have appropriate guarding.
- \* The controls for temporary equipment must be located to prevent inadvertent actuation or awkward manipulation.
- \* When heat-producing equipment must be installed, avoid accidental ignition of combustible materials or touching of surfaces above 60 degrees C (140 F).
- \* Every work location must be provided with illumination that meets OSHA requirements. Evaluation of illumination quality and requirements can be made by the Office of Campus Planning or Environmental Health and Safety Services, but the supervisor of an area is responsible for obtaining and maintaining suitable illumination.
- \* Areas without natural lighting and areas where hazardous operations are conducted must be provided with enough automatically activated emergency lighting to permit exit or entry of personnel if the primary lighting fails.

## CHAPTER 10 LADDERS AND SCAFFOLDS

### Ladders

This chapter pertains to all faculty, staff and students who use or anticipate using a ladder be able to recognize and avoid any ladder hazards that may exist during the use, storing, moving, and working with the ladder.

#### Definitions and Abbreviations

##### Definitions:

Extension Ladder (Portable Ladder) – a non-self-supporting ladder that adjusts in length. It consists of two or more sections in guides or brackets that permit length adjustment. The length is designated by the sum of the lengths (sections) measured along the side rails of the ladder.

Step Ladder (Folding Ladder) – a self-supporting portable ladder, non-adjusting, portable ladder has flat steps and a hinged back. Length is measured along the front edge of the side rail. In the table below are the types of folding ladders available with Load recommendations for person plus equipment.

Type	Duty Rating	Load (Person and Equip)
IAA	Special Heavy Duty	375
IA	Extra Heavy Duty	300
I	Heavy Duty	250
II	Medium Duty	225
III	Light Duty	200

##### Abbreviations:

CFR – Code of Federal Regulations

OSHA – Occupational Safety and Health Administration

Ladders must be in good condition, made of suitable material, of proper length, and of the correct type for the use intended. All ladders should be inspected prior to use and after any incident where damage may have occurred. Damaged ladders must never be used; they should be repaired or destroyed. Ladders used near electrical equipment must be made of a non-conducting material. Stored ladders must be easily accessible for inspection and service, kept out of the weather and away from excessive heat, and well supported when stored horizontally. The height of a stepladder should be sufficient to reach the workstation without using the top or next to the top steps. Bracing on the back legs of stepladders must not be used for climbing. Ladders should not be used in or around slippery surfaces. Ladders should not be moved, shifted, or extended while in use.

Portable ladder (extension ladder) use should follow all the regulations state in the previous paragraph and all the following guidelines in this paragraph and next. A portable ladder must not be used in a horizontal position as a platform or runway or by more than one person at a time. A portable ladder must not be placed in front of doors that open toward the ladder or on boxes, barrels, or other unstable bases. Ladders must not be used as guys, braces, or skids. Do not stand on the top three rungs/step of a portable (extension) ladder.



The proper angle (75-1/2 degrees) for a portable straight ladder can be obtained by placing the base of the ladder a distance from the vertical wall equal to one quarter of the vertical distance from base to top of ladder's resting point. Ladders must be ascended or descended facing the ladder with both hands free to grasp the ladder. Tools must be carried in a tool belt or raised with a hand line attached to the top of the ladder. Extension or straight ladders should be tied in place to prevent side slip. At least three (3) rungs of the ladder should extend beyond the ladder's resting point. All this information can be found in OSHA Regulations 29 CFR1010.23.

### **Scaffolds**

All scaffolds, whether fabricated on site, purchased, or rented must conform to the specifications found in ANSI A10.8, Safety Requirements for Scaffolding. Rolling scaffolds must maintain a 3:1 height to base ratio (use smaller dimension of base).

The footing or anchorage for a scaffold must be sound, rigid, and capable of carrying the maximum intended load without settling or displacement. Unstable objects such as barrels, boxes, loose brick, or concrete blocks must not be used to support scaffolds or planks. No scaffold may be erected, moved, dismantled, or altered unless supervised by competent persons. Scaffolds and their components must be capable of supporting at least four times the maximum intended load without failure.

Guard rails and toe boards must be installed on all open sides and ends of scaffolds and platforms more than 10 ft above the ground or floor. Scaffolds 4 feet to 10 feet in height having a minimum horizontal dimension in either direction of less than 45 inches must have standard rails installed on all open sides and ends of the platform.

Wire, synthetic, or fiber rope used for suspended scaffolds must be capable of supporting at least 6 times the rated load. No riveting, welding, burning, or open flame work may be performed on any staging suspended by means of fiber or synthetic rope. Treated fiber or approved synthetic ropes must be used for or near any work involving the use of corrosive substances. All scaffolds, bosun's chairs, and other work access platforms must conform with the requirements set forth in the Federal Occupational Safety and Health Regulations for Construction, 29 CFR 1926.451.

## **CHAPTER 11 REPORTING SAFETY CONCERNS AND FILING SAFETY COMPLAINTS**

### **General**

The discussion of complaints in this chapter is confined to when a complaint is received and processed by MTSU Environmental Health and Safety Services before it is referred to TOSHA. MTSU Environmental Health and Safety Services is in the Haynes Turner Building, the campus mail address is Box 0157. The telephone number is 615-898-2879. The U.S. Postal Service mailing address is:

MTSU Environmental Health and Safety Services  
MTSU PO Box 0157  
Murfreesboro, Tennessee 37132

### **Employee Rights**

The Williams-Steiger Occupational Safety and Health Act of 1970 and the Tennessee Occupational Safety and Health Act of 1972 both give employees the right to request an OSHA inspection if they believe that a violation of a safety or health standard exists that threatens physical harm or imminent danger. All such requests must be in writing, must give the specifics of the violation that is believed to exist, and must be signed by the employee. The name or names of the persons making the request will NOT be revealed if so requested. Employees making requests for inspections will be notified in writing of the results of any inspections conducted.

When an oral notice is received from an employee or employee representative, that person shall be informed of the right to file a formal complaint in writing and of the right, as a matter of law and MTSU policy, to have the complainant's identity held confidential, if requested, regardless of the formality of the complaint.

Employees that do not wish to file safety or health concerns with MTSU Environmental Health and Safety Services also have the right to file safety or health complaints directly with the Tennessee Occupational Safety and Health Administration. For information concerning the appropriate procedures you may contact:

State of Tennessee  
Department of Labor  
Tennessee Occupational Safety and Health Administration  
Attention: Public Sector  
710 James Robertson Parkway, 3rd Floor  
Nashville, Tennessee 37243-0659  
Voice: (615) 741-2793  
Fax: 741-3325

## MTSU Environmental Health and Safety Services Response

MTSU Environmental Health and Safety Services' response to a complaint will take a variety of forms, ranging from an inspection to a response by letter, depending upon the formality of the complaint, the nature of the hazard and the abatement response of the department.

### Complainant Identity

The identity of complainants who wish to remain anonymous will be kept confidential, pursuant to the **Tennessee Board of Regents Occupational Safety and Health Plan**, the **MTSU Occupational Safety and Health Plan**, the **Williams-Steiger Occupational Safety and Health Act of 1970**, and the **Tennessee Occupational Safety and Health Act of 1972**.

### Definitions

**Complaint:** A complaint is a notice of a hazard or a violation of any safety or health standard believed to exist in a workplace given by an employee. To constitute a complaint the notice must allege that a hazard exists in the workplace or that a standard or regulation is violated. If the notice is so vague and unsubstantiated that MTSU Environmental Health and Safety Services is unable to make a reasonable judgment as to the existence of the alleged workplace hazard, there is no valid complaint. In such a case, however, every reasonable attempt shall be made to contact the person giving the notice to obtain more specific information. If, because of a recent inspection or based on other objective evidence, MTSU Environmental Health and Safety Services determines that the hazard which is the subject of the notice is not present, e.g., it has already been corrected, such a notice is not a valid complaint.

**Employee:** For purposes of submitting a complaint, an employee is either of the following: a present employee of the University about whose workplace the complaint is being made, or a present employee of another employer if that employee is working at the University and is exposed to hazards of that workplace.

**NOTE:** *Former employees are not considered employees for purposes of submitting a complaint.*

**Representative of Employees:** For purposes of submitting a complaint, a representative of employees is any of the following: An authorized representative of the employee bargaining unit, such as a certified or recognized labor organization; An attorney acting for an employee; Any other person acting in a bona fide representative capacity, e.g., a member of the employee's family or an elected official. In this situation, a complainant purporting to act as a representative of an employee shall be presumed to be so acting unless the University obtains information that the complaint was not submitted with the knowledge of or on behalf of the employee.

**Formal Complaint:** To meet the formality requirements, a complaint must:

- \* Be reduced to writing either on an MTSU Notice of Safety or Health Concerns or in a letter
- \* Allege that an imminent danger or a violation threatening physical harm (i.e., a hazard covered by a standard or by the general duty clause) exists in the workplace
- \* Set forth with reasonable particularity the grounds upon which it is based. This does not mean that the complaint must specify a particular standard; it need only specify a condition or practice that is hazardous and, if uncommon, why it is hazardous and
- \* Be signed by at least one employee or employee representative

The following are examples of deficiencies which would result in the failure of an apparent formal complaint to meet the requirements of the definition:

- \* A thorough evaluation of the complaint does not establish reasonable grounds to believe that the alleged violation can be classified as an imminent danger or that the alleged hazard is covered by a standard or, in the case of an alleged serious condition, by the general duty clause.
- \* The complaint concerns a workplace condition which has no direct relationship to safety or health and does not threaten physical harm, e.g., a violation of a recordkeeping or other regulation or a violation of a standard that is classified as de minimis.
- \* The complaint alleges a hazard which violates a standard but describes no actual workplace conditions and gives no particulars which would allow a proper evaluation of the hazard. In such a case MTSU Environmental Health and Safety Services shall make a reasonable attempt to obtain such information.

**Non-formal Complaint:** Any complaint, such as the examples given above, which does not meet any or all the formality requirements is a non-formal complaint. *Examples: oral complaints filed by employees, unsigned written complaints filed by employees, written and oral complaints filed by non-employees (persons or groups other than current employees or their representatives), complaints of hazards not covered by a standard or by the general duty clause, complaints of violations of standards that are classified as de minimis.*

### **Workplace Inspections**

The person giving notice shall be informed that formal complaints generally lead to workplace inspections while non-formal complaints usually result in letters requesting departments to undertake corrective action.

### Formalizing Oral Complaints

If the person is filing a notice orally and makes a request to formalize the complaint, the Fire and Life Safety Specialist (MTSU Fire Marshal), after confirming that the complainant is an employee or employee representative, shall complete the MTSU Notice of Safety or Health Concerns form to the extent possible prior to mailing for the complainant's signature.

If the signed complaint form is not returned within 10 working days, it shall be treated as a non-formal complaint; and a letter shall be sent to the department. If, nevertheless, a signed complaint is received after 10 working days but before a letter has been sent to the department, the complaint is to be considered formal and evaluated as such.

If a complainant filing orally declines to formalize his complaint, the Safety Officer shall nevertheless attempt to obtain the complainant's name, address, and telephone number.

### Discrimination Complaint

The complainant shall be advised of the protection against discrimination afforded by the Occupational Safety and Health Act and shall be informed of the procedure for filing a discrimination complaint.

Safety and/or health complaints filed by former employees who allege that they were fired for exercising their rights under the Occupational Safety and Health Act are non-formal complaints and will not be scheduled for investigation. Such complaints shall be recorded on an MTSU Notice of Safety or Health Concerns Form. They shall be transmitted to the MTSU Office of the Legal Assistant for investigation of the alleged discrimination complaint. In those instances where the Legal Assistant determines that the existence or nature of the alleged hazard is likely to be relevant to the resolution of the discrimination complaint, the complaint shall be sent back to the Safety Officer for an inspection to be conducted.

When, as in most cases, the decision is that no inspection is necessary, the Safety Officer shall ensure that the complaint has been recorded on an MTSU Notice of Safety or Health Concerns Form and proceed to send a letter to the department, as necessary.

### Evaluating Complaints

**Classification:** Immediately upon receipt of a notice reporting a hazard or an alleged violation, Environmental Health and Safety Services shall decide if the notice meets the definition of a complaint. If so, the complaint shall be classified as formal or non-formal.

**Documentation:** Environmental Health and Safety Services shall evaluate all formal complaints as soon as they have been so classified, with all evaluation decisions fully documented in a case file including all relevant information obtained. Complaints shall be classified as to their gravity.

**Response to Person Reporting:** Whenever Environmental Health and Safety Services decides that a notice which fails to meet the definition of a complaint will not be responded to, or that a complaint submitted by an employee or representative of employees which fails to meet all the formality requirements will not be inspected, a letter shall be sent to the person submitting the notice (certified with return receipt) communicating that decision and the reasons for it.

The person shall be informed that he or she has a right to request further clarification of the decision from Environmental Health and Safety Services and, if still dissatisfied, the person may request that the Office of the Legal Assistant investigate and determine if the Environmental Health and Safety Services' decision was made in accordance with current policy.

**Information Needed for Complaint Evaluation:** Environmental Health and Safety Services' personnel shall evaluate complaints. The MTSU Notice of Safety or Health Concerns Form shall normally be used to record both formal and non-formal complaints. Most complaints will be relatively unsophisticated and lacking in details. Thus, the complainant will normally have to be contacted, when possible, either for additional facts or to verify facts supplied. The evaluator must exercise professional judgment based on the information available to decide whether or not there are reasonable grounds to believe that a violation exists and, if so, how it should be classified.

### Taking Complaints

When Environmental Health and Safety Services receives a complaint, by letter, in person, or over the telephone, the MTSU Notice of Safety or Health Concerns Form shall be completed. If the complainant wishes to submit a formal complaint, the person taking the complaint shall ask if the complainant is presently an employee or employee representative. If the complaint has been received in writing and has been signed, the complainant shall be contacted, if necessary, for response to questions on the MTSU Notice of Safety or Health Concerns although the form need not be sent for signature.

### MTSU Notice of Safety or Health Concerns Form

Additional information is usually needed to improve the quality of the complaints and to aid in determining their priority. Therefore, in completing item 8 on the MTSU Notice of Safety or Health Concerns Form, an attempt shall be made to obtain detailed answers to the following questions:

**For All Complaints:** Describe the unsafe or unhealthful conditions; identify the location. What is the nature of the exposure? What is the work being performed in the unsafe/unhealthful area? Identify, as well as possible, the type and condition of equipment in use, the materials or chemicals being used, the process/operation involved, and the kinds of work being done near the hazardous area. How often is work done at the task which leads to the exposure? For how long at one time? How long has the condition existed as far as can be determined? Has it been brought to the supervisor's attention? Have any attempts been made to correct the condition? How many shifts are there? What time do they start? On which shift does the hazardous condition exist? What personal protective equipment is required? Is it used by employees? Include all PPE and describe it as specifically as possible. Include the manufacturer's name and any identifying numbers. How many people work in the area? How many are exposed to the hazardous conditions? What is their proximity? Identify the standard(s) apparently violated by the conditions described by the complainant.

**For Health Hazards:** Have any tests been administered to determine employee exposure levels to the hazardous conditions or substance? Describe these tests. What have been the results? What engineering controls are in place in the area(s) in which the exposed employees work? For instance, are there any fans or acoustical insulation in the area which may reduce exposure to the hazard? What administrative or work practice controls are in effect? Do any employees have any symptoms which may have been caused by exposure to hazardous substances? Have any

employees ever been treated by a doctor for a work-related disease or condition? What was it? Have there been any "near-miss" incidents?

**For Safety Hazards:** Under what adverse or hazardous conditions are employees required to work? (This should include conditions contributing to stress and "other" probability factors.) Have any employees been injured because of this hazardous condition? Have there been any "near-miss" incidents?

### **Responding to Complaints Alleging Imminent Danger Conditions**

Any complaint which, in the professional opinion of the Safety Officer or supervisor, constitutes an imminent danger shall be inspected irrespective of whether or not it meets the formality requirements. It shall be inspected the same day received, where possible, but not later than the next working day after receipt of the complaint.

### **Responding to Formal Complaints**

All formal complaints meeting the requirements of this chapter shall be scheduled for workplace inspections.

**Determination:** Upon determination by Environmental Health and Safety Services that a complaint is formal, an inspection shall be scheduled in accordance with established priorities.

**Priorities for Responding by Inspections to Formal Complaints:** Inspections resulting from formal complaints shall be conducted according to a priority system. Formal complaints, other than imminent danger, shall be given a priority based upon the classification and the gravity of the alleged hazards. Formal serious complaints shall be investigated on a priority basis within 30 working days and formal other-than-serious complaints within 120 days. If resources do not permit investigations within the time frames listed, a letter to the complainant shall explain the delay and shall indicate when an investigation may occur. The complainant shall be asked to confirm the continuation of the alleged hazardous conditions. If a late complaint inspection is to be conducted, Environmental Health and Safety Services may contact the complainant to ensure that the alleged hazards still exist.

### **Responding to Non-Formal Complaints**

All non-formal complaints shall receive a response. The procedures described below include responses to non-formal complaints designed to ensure correction of hazards identified in the complaint:

**Responding by Letter to Non-Formal Complaints:** Upon receipt and evaluation of a non-formal complaint, Environmental Health and Safety Services, as soon as possible, shall prepare a letter to the department head advising him of the complaint, informing him of the standards allegedly violated (including copies of such standards) and outlining the means to assess the hazard and/or the corrective action required. The department head shall be asked to investigate the alleged conditions and respond to Environmental Health and Safety Services within a specified time.

**Posting:** The department shall be requested to post copies of Environmental Health and Safety Services' letter of notification referred to above together with all subsequent correspondence dealing with the complaint items including the department's response until such time as the case

is closed. The department shall be informed that a copy of the letter and subsequent correspondence will be sent to the complainant.

**Letter to Complainant:** Concurrent with the letter to the department, a letter to the complainant shall be prepared explaining that the department has been informed of the complaint. It shall request the complainant to notify Environmental Health and Safety Services if no corrective action has been taken or at least initiated within 30 calendar days (or less if so, indicated in the letter to the department) or if any adverse or discriminatory action or threats are made against the complainant. A copy of the letter to the department shall be included with the letter to the complainant. Copies of all subsequent correspondence shall also be sent to the complainant.

**Department Response:** If a response is received from the department and it appears that appropriate corrective action has been taken or that no hazard is present, the case file shall be closed. The complainant shall be informed of all responses received from the department.

**Responding by Inspection to Non-Formal Complaints:** Where the department fails to respond or submits an inadequate response within the period specified in the letter or where the complainant informs Environmental Health and Safety Services that no corrective action has been taken or the action taken is inadequate, Environmental Health and Safety Services shall contact the department to determine what further action the department plans to take. If no action has been taken and none is planned, the non-formal complaint shall be activated for inspection.

**Status of Corrective Action:** Where an ambiguity exists or where the department has a correction plan which it has not yet had time to implement fully, Environmental Health and Safety Services shall communicate further, as appropriate, with the department head and/or the complainant to determine what interim protective steps have been taken until the corrective action has been completed and, later, whether the hazard has been adequately corrected. Based on information available, Environmental Health and Safety Services shall decide whether an inspection is warranted.

### **Scope of Inspection**

Complaint inspections shall include a complete investigation of the circumstances of the complaint. These investigations may be expanded at the discretion of Environmental Health and Safety Services.

### **Procedures**

In general, the normal inspection procedures shall be followed in conducting complaint inspections. Particular attention, however, is directed to the following special requirements for complaint investigations:

**Copy of the Complaint:** A copy of the complaint shall be given to the department head at an opening conference.

**Identity of Complainant:** If the complainant so requests, names shall be deleted from the department's copy of the complaint. If handwritten, the complaint shall be typed, and reworded if necessary, so that the identity of the complainant cannot be discerned by the employer. Environmental Health and Safety Services may decide, as a matter of general policy, that names shall be deleted from all complaints unless the complainant explicitly requests that his or her name be revealed.



**Walk Around Rights:** In a complaint inspection the walk around rights of the employer and an employee representative shall be applicable. The employee representative will be chosen according to inspection procedures and, thus, the complainant will not necessarily be the employee representative for walk around purposes.

**Results of Inspection to Complainant:** After the completion of an inspection based on a formal or a non-formal complaint, the complainant shall be informed of the results. Each complaint item shall be addressed with a reference to a standard and/or with a sufficiently detailed description of the findings and why they were or were not in compliance.

**Communication to Complainant:** Written communications to a complainant shall be sent to the employee's home address unless specific instructions have been given that such mail be sent via campus mail.

## CHAPTER 12 SAFETY TRAINING

### Responsibilities

All university departments are responsible for providing adequate safety training for all employees under their supervision, including student workers. Employees, including student workers, are responsible for attending scheduled training sessions and notifying supervisors of any safety training needs or deficiencies.

### Training Needs Inventory

The table below lists safety and health training topics required by OSHA. This inventory should be used as a general training planning guide only and should not be regarded as definitive. This inventory also may not be all inclusive, but it does address the most important concerns for MTSU.

Subject	Recommended Departments
<b>Employee Emergency Plans</b>	All
<b>Fire Prevention Plan</b>	All
<b>Powered Platforms, Manlifts, and Vehicle Mounted Platforms</b>	Buildings, Custodial Services, Energy Services, Grounds, Housing Maintenance
<b>Occupational Noise Exposure</b>	Energy Services, Grounds
<b>Ionizing Radiation</b>	Biology, Chemistry, Industrial Studies, Health Services
<b>Hazardous Waste Handling</b>	Biology, Chemistry, Housing Maintenance, Industrial Studies, Facilities Services
<b>Hazardous Waste Hazards</b>	Biology, Chemistry, Housing Maintenance, Industrial Studies, Facilities Services, Environmental Health and Safety Services, Department of Public Safety
<b>Hazardous Waste Emergency Operations</b>	Environmental Health and Safety Services, Department of Public Safety
<b>Respirator Use and Limitations</b>	Buildings, Biology, Chemistry, Custodial Services, Energy Services, Grounds, Housing Maintenance, Environmental Health and Safety Services, Agribusiness/ Agriscience, Telecommunications
<b>Respirator Selection, Use, and Maintenance</b>	Buildings, Custodial Services, Energy Services, Grounds, Housing Maintenance, Environmental Health and Safety Services, Agribusiness/ Agriscience, Telecommunications
<b>Specifications for Accident Prevention Signs and Tags</b>	All
<b>Confined Space Entry</b>	Buildings, Energy Services, Grounds, Housing Maintenance, Environmental Health and Safety Services, Agribusiness/ Agriscience, Telecommunications
<b>Control of Hazardous Energy (Lockout/Tagout)</b>	Buildings, Energy Services, Grounds, Housing Maintenance, Agribusiness/ Agriscience, Telecommunications, Industrial Studies

Subject	Recommended Departments
First Aid	Personnel required to work outside normal business hours
Portable Fire Extinguisher Operation	All
Fire Extinguishing Systems, General	Information Technology
Fire Detection Systems	Buildings
Powered Industrial Trucks	Buildings, Grounds, Housing Maintenance
Mechanical Power Presses	Buildings, Industrial Studies
Oxygen-Fuel Gas Welding and Cutting	Metal Shop
Arc Welding and Cutting	Metal Shop
Resistance Welding	Metal Shop
Telecommunications	Telecommunications
Electrical Safety Work Practices	Buildings, Energy Services, Housing Maintenance, Agribusiness/ Agriscience, Telecommunications, Theatre
Electrical Lockout-Tagout	Buildings, Energy Services, Housing Maintenance, Agribusiness/ Agriscience, Telecommunications, Theatre
Asbestos Exposure <sup>1</sup>	Buildings, Energy Services, Housing Maintenance, Environmental Health and Safety Services, Telecommunications, Theatre
4-Nitrobiphenyl <sup>1</sup>	Chemistry, Biology
alpha-Naphthylamine <sup>1</sup>	Chemistry, Biology
4,4'-Methylene bis (2-chloroaniline) <sup>1</sup>	Chemistry, Biology
Methyl chloromethyl ether <sup>1</sup>	Chemistry, Biology
3,3'-Dichlorobenzidine (and its salts) <sup>1</sup>	Chemistry, Biology
bis Chloromethyl Ether <sup>1</sup>	Chemistry, Biology
beta-Naphthylamine <sup>1</sup>	Chemistry, Biology
Benzidine <sup>1</sup>	Chemistry, Biology
4-Aminodiphenyl <sup>1</sup>	Chemistry, Biology
Ethyleneimine <sup>1</sup>	Chemistry, Biology
beta-Propiolactone <sup>1</sup>	Chemistry, Biology
2-Acetylaminofluorene <sup>1</sup>	Chemistry, Biology
4-Dimethylamino-azobenzene <sup>1</sup>	Chemistry, Biology
N-Nitrosodimethylamine <sup>1</sup>	Chemistry, Biology
Vinyl Chloride <sup>1</sup>	Chemistry, Biology
Bloodborne Pathogen Exposure Control	Department of Public Safety, Environmental Health and Safety Services, Custodial Services, Buildings, Nursing, Health Services, Athletics, HPERS, Housing, Campus Recreation, Telecommunications, Project HELP

<b>Subject</b>	<b>Recommended Departments</b>
<b>Hazard Communications (Hazardous Chemical Right-to-Know)</b>	Aerospace, Art, Buildings, Grounds, Custodial Services, Housing Maintenance, Agribusiness/ Agriscience, Industrial Studies, Telecommunications, Energy Services, Environmental Health and Safety Services, Printing Services, Theatre
<b>Exposure to Hazardous Chemicals in Laboratories</b>	Biology, Chemistry, Physics, Geology
<b>Personal Protective Equipment</b>	Buildings, Biology, Chemistry, Custodial Services, Energy Services, Grounds, Housing Maintenance, Environmental Health and Safety Services, Agribusiness/ Agriscience, Telecommunications, Theatre
<b>Emergency Response Procedures: Fire, Spill, etc.</b>	All
<b>Accident Reporting Procedures</b>	All
<b>Accident Investigation</b>	All Supervisors
<b>Machine Guarding</b>	Buildings, Biology, Chemistry, Custodial Services, Energy Services, Grounds, Housing Maintenance, Environmental Health and Safety Services, Agribusiness/ Agriscience, Telecommunications, Theatre
<b>Electrical Safety Awareness</b>	Buildings, Biology, Chemistry, Custodial Services, Energy Services, Grounds, Housing Maintenance, Environmental Health and Safety Services, Agribusiness/ Agriscience, Telecommunications, Theatre
<b>Ladder Use and Storage</b>	Buildings, Custodial Services, Energy Services, Grounds, Housing Maintenance, Environmental Health and Safety Services, Agribusiness/ Agriscience, Telecommunications, Theatre
<b>Medical Facility Support</b>	All
<b>Hand Tool Safety</b>	Buildings, Custodial Services, Energy Services, Grounds, Housing Maintenance, Environmental Health and Safety Services, Agribusiness/ Agriscience, Telecommunications, Theatre
<b>Ergonomic Principles</b>	Buildings, Custodial Services, Energy Services, Grounds, Housing Maintenance, Environmental Health and Safety Services, Agribusiness/ Agriscience, Telecommunications

<b>Subject</b>	<b>Recommended Departments</b>
<b>Eye Wash and Shower Locations</b>	Buildings, Biology, Chemistry, Custodial Services, Energy Services, Grounds, Housing Maintenance, Environmental Health and Safety Services, Agribusiness/ Agriscience, Telecommunications, Theatre
<b>Access to Exposure and Medical Records</b>	Buildings, Biology, Chemistry, Custodial Services, Energy Services, Grounds, Housing Maintenance, Environmental Health and Safety Services, Agribusiness/ Agriscience, Telecommunications

## CHAPTER 13 TOOLS

**University Provided Tools:** Middle Tennessee State University provides hand and powered portable tools that meet accepted safety standards. A damaged or malfunctioning tool must not be used; it must be turned in for servicing and a tool in good condition obtained to complete the job. Employees must use the correct tool for the work to be performed; if they are unfamiliar with the operation of the tool, they must request instruction from their supervisor before starting the job. Supervisors are responsible for ensuring that their subordinates are properly trained in the operation of any tool that they are expected to operate. An employee is not permitted to use a powder-actuated tool unless instructed and licensed by the manufacturer.

### **Grounding:**

- Tools that are not double-insulated must be effectively grounded and tested. Testing must be accomplished before initial issue, after repairs, and after any incident that could cause damage, such as dropping or exposure to a wet environment.
- Grounded tools must always be used with an effectively grounded circuit. Any extension cord used with a grounded tool must be a three-wire, grounded type.
- Electric-powered hand tools used on construction sites, on temporary wired circuits, or in wet environments will be used in conjunction with an approved ground fault circuit interrupter (GFCI).
- The responsibility for implementing and maintaining this program rests with the individual supervisors involved.
- Tool testing equipment will be maintained by the Supervisor.
- Documentation of tool testing will be maintained by the department owning powered hand tools. Tools maintained in a tool crib and tested prior to issue are exempted from this requirement.
- Repairs of defective tools will only be made by qualified personnel.

**Shop Rules:** Any Middle Tennessee State University facility housing shop tools is defined by OSHA as a shop. It is the responsibility of the person in charge of each shop to ensure compliance with the following practices:

- \* Shop machines and tools are to be used only by qualified personnel. It is the responsibility of the person in charge of the shop to render a judgment as to who is qualified.
- \* The person in charge will take whatever action is necessary to prevent a personal injury or damage to equipment.
- \* Equipment guards and protective devices must be used and must not be compromised.
- \* Appropriate eye protection (visitor's glasses) must be worn by anyone entering and/or passing through shop areas.

- \* Approved industrial safety eye protection must be worn by anyone working in a shop area.
- \* Shoes or boots covering the whole foot must be worn in shop areas.
- \* Persons using machine tools must not wear clothing, jewelry, or long hair in such a way as to represent a safety hazard.

## CHAPTER 14 TRAFFIC AND TRANSPORTATION

**Safety Belts:** Employees operating or riding in university furnished vehicles, movable equipment, personal vehicles on official University business, or aircraft, are required to always wear safety belts. The driver, operator, or pilot is responsible for ensuring that all passengers fasten their safety belts and should require passengers to do same before operating vehicles or aircraft.

### **Accidents:**

- Any accident involving university vehicles, movable equipment, or aircraft (including private, rented, or leased vehicles, movable equipment, or aircraft used on official University business) must be reported to the operator's supervisor. If the operator is unable to make a report, another employee who knows the details of the accident must make the report.
- It is Middle Tennessee State University's policy that employees should not admit to responsibility for vehicle accidents occurring while on official business. It is important that such admissions, when appropriate, be reserved for the University and its legal counsel. The law requires that each driver involved in a vehicle accident must show his/her license on request by the other party. Be sure to obtain adequate information on the drivers involved as well as on the owner of the vehicles. Names, addresses, drivers' license numbers, vehicle descriptions, and registration information are essential. In addition, a description of damages is needed for completion of accident reports. If the accident is investigated by off-site police agencies, request that a copy of the police report be sent to Middle Tennessee State University Motor Pool or obtain the name and department of the investigating officer. A Motor Vehicle Accident Report Form is kept in each official vehicle to assist in collecting required information.
- In case of collision with an unattended vehicle (or other property), the driver of the moving vehicle is required by law to notify the other party and to exchange information pertaining to the collision. If unable to locate the other party, leave a note in, or attached to, the vehicle (or other property) giving the driver's name, address, and vehicle license number.
- The driver of any Middle Tennessee State University vehicle involved in an accident must also complete a university Motor Vehicle Accident Report and submit it to his/her supervisor within one workday of the accident.
- The supervisor should interview the driver and complete the supervisor's portion of the report. Within two workdays of the accident, the completed form and vehicle must be taken to the Motor Pool so that damages may be estimated, and repairs scheduled.



## CHAPTER 15 HAZARD WARNINGS

### Introduction

Every reasonable method to warn employees of hazards and dangers and to inform them of the actions required must be utilized. Signs, characteristic lights, and audible alarms as additional safeguards for built-in mechanical and physical protection must be used. To ensure uniform response by personnel, the warning signs and devices must be of the same type for similar hazards. Obtaining and installing the warning systems is the responsibility of the department needing them.

### Contents and Configuration

**General:** Signs must conform to the colors, symbols, lettering size, and proportions as specified by OSHA standards.

Every warning sign must include the following components:

- \* A standard heading that indicates the relative hazard
- \* A statement of the type of hazard
- \* A statement of what to do or not to do in the area

**Danger Signs:** Danger signs are to be used only where there is an immediate hazard. These signs have red as the predominant color for the upper panel with "DANGER" in white letters; white for the lower panel with additional information in black letters; and a black outline.

**Caution Signs:** Caution signs are for use to warn of potential hazards or unsafe practices. Yellow is the predominant color. The upper panel shall be black with "CAUTION" in yellow letters and the lower panel shall be yellow with additional wording in black letters.

**Traffic Signs:** All traffic control signs shall conform to the standards established in the current edition of the *Manual for Uniform Traffic Control Devices*.

**Exit Signs:** All exit signs shall conform to the standards established in the current edition of the National Fire Code and the Life Safety Code.

**Color Code:** Color coding of physical hazards should conform to ANSI Standard Z.53.1. The following table indicates colors and usages:

<b>COLOR</b>	<b>DESIGNATION</b>
Red	Fire apparatus; fire fighting equipment; stop; or danger.
Orange	Dangerous part of machine or energized equipment.
Yellow	Marks physical hazards and denotes caution; designates fire lanes and tow zones.
Green	Safety equipment or notices such as breathing apparatus, first aid kits, eye washes, safety showers, or safety bulletin boards.
Blue	Disabled parking; Denotes out of service equipment, warning against starting, using, or moving equipment.
Purple	Ionizing radiation presence: Alpha, Beta, Gamma, or X-Rays
Yellow and White Stripes	Service areas.
Black, white, or combinations of black and white	Traffic and housekeeping markings.

## CHAPTER 16 REPORTING INJURIES AND ILLNESSES

### Filing Requirements

Any person who suffers an injury or illness as a direct result of any condition existing on campus should file a report of injury or illness. The report should be filed even though the injury or illness seems to be minor in nature and does not require first aid or medical attention. This includes faculty, administration, support staff, student workers, students, and guests.

It is important that the reports be timely, complete, and accurate. Information in these reports is used for OSHA required record keeping, compilation of injury and illness data bases, and statistical analysis, as well as benefit claims. Incomplete reports may be returned for additional information before processing. Late, inaccurate, or incomplete reports could result in delayed benefit or compensation payments or even denial of benefits.

### Employees

Any employee, including student workers, who suffers an injury or illness within the scope of his or her employment shall immediately report the injury or illness to his or her supervisor and department head. Environmental Health and Safety Services shall also be notified within 24 hours of the event to ensure proper investigation and follow up activities can be conducted.

Visit the EH&S website at: <http://www.mtsu.edu/ehs/index.php>

Or call: 615-898-2879

All MTSU employees are covered under worker's compensation. The State of Tennessee is self-insured and CorVel administers the state worker's compensation program.

### Procedures for Reporting An Injury

**These procedures are to emphasize the importance of all employees notifying his/her supervisor immediately of any incident, injury or illness that occurs while on duty.**

*Even if you did not receive medical treatment, reporting the incident protects you if any physical ailments or illnesses become issues in the future.* For the purposes of workers' compensation, an incident is any event that is or should be reported to the supervisor/manager, any event that the manager witnesses or any event in which there is a possible need for medical treatment.

The following guidelines will help minimize the potential denial of a workers' compensation claim. Not following these procedures will increase chances of sustained injuries not being recognized as qualifying for workers' compensation. Therefore, the claim potentially may be denied. The statute of limitations for filing a claim is one year from the date of the accident.

- 1) Notify your supervisor **immediately**
  - a) Tell your supervisor exactly what happened, how it happened, witnesses to the incident, and whether you were injured because of the incident.
  - b) If you are a witness to a work-related incident where a fellow employee is injured and the involved employee cannot notify his or her supervisor, you should attempt to notify the supervisor.

- c) You should call 911 for all emergencies that result in serious bodily injury and/or seek treatment at the nearest emergency room.
- 2) You **and** your supervisor call the Workplace Injury & First Notice of Loss Call Center at 1-866-245-8588, Option #1, immediately after the occurrence of an incident.
    - a) By calling and selecting Option #1, you (the injured employee) will speak with a 24/7 registered nurse to evaluate the nature of your injury and determine immediate care or treatment options. Your supervisor will only verify that you are reporting a work-related injury to the registered nurse.
      - i) The nurse will ask for the following information:
        - (1) Employee First and Last Name
        - (2) Last 4 digits of the Social Security Number
        - (3) Date of Birth
        - (4) Date of Injury
        - (5) Employer Location and Department
        - (6) Supervisor Name and Contact Number (comes from supervisor)
        - (7) Employee Contact Number
        - (8) Nature of Injury
        - (9) Supervisor emails [Karen.milstead@mtsu.edu](mailto:Karen.milstead@mtsu.edu) and reports the injury, employee name and Banner ID.
    - b) If no medical treatment is recommended, the registered nurse will document the call for you and your supervisor and enter an incident report into the CareMC reporting system. No other action will be needed from you or your supervisor.
    - c) If the registered nurse recommends for you to seek immediate medical treatment, the nurse will direct you to the nearest State-approved medical provider. Your supervisor will be responsible for completing the reporting process of the claim with CorVel.
  - 3) Supervisor calls the First Notice of Loss hotline at 1-866-245-8588, and selects Option #2 and answers the following:
    - a) Full Social Security Number
    - b) Employee Address
    - c) Date of Hire
    - d) Date the employer was notified of the injury
    - e) Accident Description
    - f) Where did the injury occur
    - g) Was the injury in the course and scope of employment
    - h) Do you question the validity of the claim
    - i) Supervisor emails [Karen.milstead@mtsu.edu](mailto:Karen.milstead@mtsu.edu) and report the injury, employee name, and Banner ID.
  - 4) Upon arrival to the medical facility, you and/or your supervisor should notify the doctor's office that you were injured while performing your job duties.
  - 5) A list of the approved panel of physicians will be verbally provided to you by the 24/7 registered nurse
  - 6) For prescribed pharmacy, please visit the State web page at <http://www.treasury.state.tn.us/wc/index.html>.

- 7) Employees must keep the supervisor and Human Resources informed of status regarding worker's compensation
- 8) You should give copies of all the paperwork issued by the treating physician to the supervisor and/or human resources department stating when you can return to work, or if follow-up visits are ordered, or when physical therapy is needed.
- 9) All written medical documentation must be forwarded to Human Resources. Due to HIPPA compliance, ONLY Human Resources will store all medical records related to an employee's on the job injury.

### **Students**

Any student who suffers an injury or illness because of any condition existing on campus shall immediately report the injury or illness to the department head responsible for the area where the condition is located. Students shall also contact Environmental Health and Safety Services to ensure proper investigation and follow up activities can be conducted.

Visit the EH&S website at: <http://www.mtsu.edu/ehs/index.php>  
Or call: 615-898-2879

### **Guests**

Any guest who suffers an injury or illness because of any condition existing on campus shall immediately report the injury or illness to Environmental Health and Safety Services to ensure proper investigation and follow up activities can be conducted.

Visit the EH&S website at: <http://www.mtsu.edu/ehs/index.php>  
Or call: 615-898-2879

## CHAPTER 17 AERIAL LIFT SAFETY

**Introduction:** Various aerial lifts are used on the Middle Tennessee State University campus, such as self-propelled elevating work platforms (e.g., scissor lifts), manually propelled elevating aerial lifts (e.g., uprights), extensible and articulating boom-supported elevating work platforms (e.g., aerial man-lifts), and vehicle-mounted elevating and rotating aerial devices and work platforms (e.g., bucket trucks). Numerous codes and standards govern the use of this equipment to ensure the safety of operators and other workers. These safety requirements are based on codes and standards adopted by the Tennessee Occupational Safety and Health Administration for aerial lifts, along with manufacturers' recommendations and other applicable standards that apply to MTSU. This document contains requirements for aerial lifts that lift workers and tools to elevated work sites. It does not contain requirements for the use of personal platforms attached to a crane boom or suspended by hooks. All MTSU personnel using this equipment, including staff, faculty, and students, must comply with these requirements.

{See Annex A for definitions of terms used in this chapter.}

**Hazards:** The following conditions occurring during aerial lift operations can result in property damage, personal injury, or death:

- A fall from an elevated level.
- Falling objects or items falling out of lifts.
- Exceeding the load capacity of the lift which may result in tip-over or structural failure.
- Electrical hazards (e.g., overhead power lines, extension cords, bridge crane bus bars).
- Entanglement hazards (situations that may cause the lift to be caught on or snagged against other objects).
- Contact with stationary objects (e.g., walls, buildings, other vehicles, ceilings, floors, piping) that may result in an entrapment or crushing hazard.
- Uneven terrain that may cause the vehicle to tip, topple over, or eject the operator. Some examples may include slopes, holes, drop-offs, bumps, debris, and utility vault covers.
- High winds or inclement weather such as rain, hail, snow, or lightning.
- Operation of an internal combustion engine vehicle indoors, which can cause asphyxiation or toxic exhaust-gas exposure.
- Unapproved use of equipment in unusual environments or the use of inadequate controls for operations or maintenance activities, which can cause a fire or explosion.

### General:

- The following sections provide the general requirements and best practices for the various types of aerial lifts used at MTSU. Always refer to the manufacturer's instructions for the

particular make and model of the lift for detailed guidance prior to operation. The information in this chapter must be supplemented by good judgment, safety control, and caution in evaluating each situation.

- Compliance with aerial lift safety standards is the responsibility of the operator since the operator is in direct control of the aerial lift. The operator shall make decisions on the use and operation of the aerial lift with due consideration for the fact that his or her own safety as well as the safety of others is dependent on those decisions. All operators shall be trained before operating aerial lifts.
- Operators are qualified to use lifts to the rated capacity of the equipment for which they are trained and evaluated. All operations shall be done safely and in accordance with accepted work practices. Departments may impose additional restrictions on their operations, as necessary.

#### **Maintenance:**

- Periodic maintenance inspections shall be performed on a timely basis by qualified mechanics. Lifts shall not be operated if they are out of compliance. Inspection items listed in the maintenance manuals shall be tested, evaluated and, if applicable, corrected by qualified personnel before the unit is returned to service.
- Replacement parts shall be identical or equivalent to the original parts or provide a greater level of safety. Markings on the aerial lift shall not be removed, defaced, or altered. Missing or illegible markings shall be replaced promptly. Altering or disabling of safety devices, such as warning beepers, guards or interlocks is prohibited, and modifications shall be done only with the permission of the manufacturer.

#### **Operator Qualifications and Training:**

- Only those personnel who have received instructions regarding the inspection, application, and operation of an aerial lift, including recognition and avoidance of hazards, shall operate that aerial lift.
- Each using department shall verify that the operator is trained to use the lift.
- The operator shall be retrained if management notes any performance deficiencies, or annually for aerial man-lifts, scissor lifts, or bucket trucks, whichever comes first.
- Operators must be trained before using any aerial lift. The required training consists of three parts, Fall Protection, Aerial Lift Safety, and familiarization with the specific lift or group of lifts to be used. The Fall Protection and Aerial Lift Safety training is conducted online through SafeColleges.Com and operators must pass a written exam on each topic. The final component of the aerial lift operator training is familiarization with the specific lift or group of lifts by the operator's supervisor or department head regarding the location of the manufacturers' manuals, the purpose and function of all controls, and the safety devices and operating characteristics specific to that aerial lift or group of aerial lifts prior to operating. When an operator is directed to operate an unfamiliar aerial lift, the operator must receive instruction regarding the location of the manufacturers' manuals, the purpose and function of all controls, and the safety devices and operating characteristics specific

to that group of aerial lifts prior to operating. Operators shall also be afforded the opportunity to familiarize themselves with the operation of the lifts.

- Records of operators' training shall be kept by the using department and in the College of Continuing Studies and Distance Learning.

**Before Operation:** Before operation, the operator shall:

- Perform a Work Location Inspection
- Perform a Pre-start Inspection.
- Practice with the aerial lift (if unfamiliar with the lift) until comfortable/proficient with its operation.
- Read and understand the manufacturers' manuals.
- Understand all labels, warnings, and instructions on the lift.
- Ensure that all occupants of the platform wear appropriate personal safety equipment for the conditions under which the platform will be operated (e.g., fall protection, hard hats).
- Have been instructed by a qualified person in the intended purpose and function of each of the controls.
- Notify and communicate with MTSU and/or contract personnel at the site where the lift will be used.
- The operator's supervisor or department head shall review and approve all indoor work that involves lifts with internal combustion engines.

**Work Location Inspection:** Operators will inspect the work location to mitigate hazards before and during aerial lift use. Areas will be inspected for hazards such as:

- Drop-offs, holes, or untamped earthfills.
- Slope(s), ditches, bumps, and floor obstructions.
- Debris.
- Overhead obstructions and high voltage hazards.
- Other hazardous locations and atmospheres.
- Inadequate support (The working surface that the lift is sitting on cannot support the weight of the machine, men, etc. for the operation).
- Wind and weather conditions.
- Presence of unauthorized persons or other hazardous conditions.



- The operator's supervisor shall determine if there are any unusual hazards in areas where lifts will be used.

**Pre-start Inspection:** The aerial lift shall be inspected for defects prior to each shift's operation. The Pre-start Inspection shall be performed and documented by the operator on each shift and will include items in accordance with manufacturer's recommendations for each specific aerial lift, such as:

- Operating and emergency controls.
- Safety devices.
- Personal protective devices.
- Hydraulic, air, pneumatic, fuel and electrical systems for wear, leakage, excessive dirt, moisture, or any other condition which may impair the use of these systems.
- Fiberglass and other insulating components for visible damage or contamination.
- Missing or illegible placards, warnings, operational, instructional, and control markings.
- Visual inspection of all mechanical fastenings.
- Cables and wiring harnesses.
- Loose or missing parts.
- Wheels and tires.
- Operating manual(s), and their placement in weatherproof containers on the lift, or in the cab of the truck.
- Outriggers, stabilizers, and other structures.
- Guardrail systems.
- Other items specified by the manufacturer.

The aerial lift shall not be operated if the Pre-start Inspection indicates that repair is necessary.

{See Annexes B, C, D, and E of this chapter for sample inspection sheets.}

**Operation:**

- The operator shall perform all Pre-start, Work Location, and Operational Inspections prior to lift operation. When operating the lift, the operator shall follow the Operator Warnings and Instructions as specified in Annex F.

- The lower controls of aerial lifts shall not be used for continuous operation with personnel in the platform.
- Aerial lifts are not normally insulated for use near electrically energized circuits such as power lines or exposed bus bars.
- In general, scissors lifts are not electrically insulated and will not provide protection from contact with or proximity to electrical current.
- Any aerial lift intended for use around electrically energized circuits shall meet the electrical requirements of American National Safety Institute/Scaffold Industry Association (ANSI/SIA) A92.2-2001, "Vehicle-Mounted Elevating and Rotating Aerial Devices." Refer to the manufacturer's owner's manual and identification plate affixed to the machine for the category of insulating aerial device (if applicable).
- Operators shall maintain safe distances from electrical power lines and apparatus in accordance with government regulations and the Minimum Safe Approach Distance (MSAD) Chart provided in Annex G of this chapter.
- Aerial lifts are not normally designed for use in hazardous locations. Do not operate an aerial lift in hazardous locations or areas where potentially flammable or explosive gases or particles may be present. Refer to the manufacturer's owner's manual and identification plate affixed to the machine to determine whether it is permissible to operate the machine in hazardous locations (if applicable).

#### **Documentation:**

- Maintenance records shall be retained for five years (or longer if specified elsewhere) by the owning department, such as Facilities Services, and include written records of frequent, annual, and periodic inspections and repairs performed, including deficiencies found, corrective actions taken, and the person(s) performing the inspections/repairs.
- Inspection sheets shall be kept for two years. If an inspection shows the need for maintenance or repair, the documentation shall be kept for at least five years.

#### **Responsibilities**

**Operator:** Before operation, the operator shall:

- Ensure that their training is current.
- Read and understand the manufacturers' manuals.
- Understand all labels, warnings, and instructions on the lift.
- Perform pre-start activities prior to performing work.
- Ensure all occupants of the platform wear appropriate personal safety equipment for the conditions under which the platform will be operated (e.g., fall protection, hard hats).

- Have been instructed by a qualified person in the intended purpose and function of each of the controls.
- Notify and communicate with the FPOC at the site where the lift will be used.
- Ensure that manufacturers' machine manuals, such as operations manuals, the maintenance manuals for each make and model of lift owned, and the manual of responsibilities (if it is a scissor lift) are in the weatherproof containers located on the lifts or in the mobile unit.
- Be retrained, if necessary, based on the owner's or user's observation and evaluation of the operator or annually for aerial man-lifts, scissor lifts, or bucket trucks, whichever comes first.
- Perform written Pre-start Inspections before use of the lift each day or shift and perform a visual and functional test. See Annexes B, C, D, or E of this chapter for sample inspection sheets.
- Conduct Work Location Inspections before and during aerial lift use.
- Observe operator warnings and instructions to be used before and during each movement of the platform. See Annex F for a list of these warnings and instructions.
- Shut down lift operations in case of any suspected malfunction, or if a hazard or potentially unsafe condition exists. Notify the work unit supervisor about any problems or malfunctions that affect the safety of operations. These problems or malfunctions shall be repaired prior to the use of the lift.

**Owning or Using Department Head:** The Owning or Using Department Head shall ensure that:

- Aerial lift safety programs are developed, documented, and utilized as required.
- Manufacturers' manuals, such as the manual of responsibilities, operations, and maintenance manuals, are available and stored in the weatherproof containers on the lifts or in the mobile units.
- Frequent, annual and/or periodic maintenance inspections shall be performed on a timely basis (considering the severity of use and environment) by qualified mechanics trained for this purpose.
- Inspection items listed in the maintenance manuals shall be tested, evaluated and, if applicable, corrected by qualified personnel before the unit is returned to service.
- There is distribution of and compliance with all safety bulletins received from manufacturers.
- Assistance shall be rendered to operators who have questions concerning lifts.

- Modifications of the aerial lift equipment shall be made only by the manufacturer or with their prior written permission.
- If the location of the intended operation has any of the hazards identified in the Work Location Inspection, the Work Unit Supervisor shall be consulted and any safety measures shall be discussed with, selected, and passed on to the operator before use of the lift.
- That operators comply with all requirements as specified in this chapter.

**Work Unit Supervisors:** Work Unit Supervisors shall:

- Ensure that the aerial lift is used only for intended applications as defined in the operating manual and that recognized safety practices are followed.
- Select operators based on their training, experience, and physical qualifications.
- Ensure that operators' training is current.
- Monitor the performance of lift operators to ensure that they comply with safety rules.
- Ensure that unauthorized persons do not operate the lifts.
- Monitor daily written Pre-start Inspections.
- Ensure that lifts are equipped with required safety equipment (e.g., overrides, backup beepers, anchorage points for personal fall arrest systems).
- Ensure that lifts are maintained and that qualified personnel perform frequent, annual, and periodic inspections as specified by the manufacturer.
- Ensure that lifts are not operated if they are out of compliance with their applicable maintenance schedules.

**Environmental Health and Safety Services:** Environmental Health and Safety Services shall:

- Serve as a consultant to Work Unit Supervisors to determine safety measures to be taken if the lift will be used in a location that has unusual hazards.
- Review, on request, indoor work that involves lifts with internal combustion engines.
- Make recommendations for alternatively powered lifts.
- Stay current with regulations governing the operation of lifts and transmit changes to the appropriate parties.

## **Safety Standards**

- 29 CFR 1910, Subpart F, “Powered Platforms, Manlifts, and Vehicle-Mounted Work Platforms”
- 29 CFR 1926, Subpart L, “Scaffolds”; Standard 1926.453 addresses aerial lifts.
- ANSI/SIA A92.2-2001, for Vehicle-Mounted Elevating and Rotating Aerial Devices (Bucket Trucks).
- NSI/SIA A92.3-1990, for Manually Propelled Elevating Aerial Platforms.
- ANSI/SIA A92.5-1992, for Boom-Supported Elevating Work Platforms (Aerial Platform Manlifts).
- ANSI/SIA A92.6-1999, for Self-Propelled Elevating Work Platforms (Scissor lifts), plus Manual of Responsibilities.

## Annex A: Definitions

**Aerial lifts:** Devices/equipment designed to lift workers and tools to an elevated worksite. Includes scissors lifts, aerial man-lifts, and bucket trucks.

**Bare-handwork:** A technique of performing live-line maintenance on energized conductors and equipment whereby one or more authorized persons work directly on an energized part after having been raised and bonded to the energized conductors or equipment.

**Category A Aerial Device:** An aerial lift (usually a bucket truck) that has dielectric properties in order to resist electrical hazards. The dielectric components shall be certified annually to assure dielectric value.

**Lower controls:** Controls situated at ground level that can control the lift platform.

**MSAD:** Minimum Safe Approach Distance (to 'live' electrical lines, equipment, and components.). See Annex G. See the manufacturer's manuals for more information.

**Operators:** Qualified persons who directly control the movement of the aerial lift. These persons are authorized, trained, and engaged in the lift operation. This could include any employee or subcontractor using a lift owned, rented, or leased by MTSU.

**Owners/ Owing Departments:** MTSU departments or entities who have possession of an aerial lift. MTSU departments, such as Facilities Services, that own, lease, or rent the equipment are considered owners.

**Upper controls:** Controls situated in the platform, man-lift or bucket part of the aerial lift that also controls the movement of the lift.

**Users:** Persons, departments, or work units who have care, control, and custody of the aerial lift.

### Annex B: Platform Lift Equipment Inspection Checklist

To be completed by operator when checking out and checking in equipment.

- Inspect equipment periodically.
- Use only equipment which is in safe working condition.
- DO NOT operate equipment if any items inspected need repair.
- Notify the motor pool of any needed repairs.

<b>Equipment Number/Type of Vehicle</b>	
<b>Location of Use</b>	
<b>Operators Name (Please Print)</b>	<b>Phone#</b>
<b>Dept/Shop #</b>	<b>Cell/Pager #</b>
<b>Inspection Date/Out</b>	<b>Inspection Date/In</b>
<b>Hour Meter/Out</b>	<b>Hour Meter/In</b>

<b>Check (Add if necessary)</b>	<b>OUT O.K.</b>	<b>Repair Needed</b>	<b>IN O.K.</b>
Oil Level			
Fuel Level			
Coolant Level (DO NOT CHECK IF HOT)			
Tire Pressure/ Condition			
Hydraulic Level			
Leaks			
<b>CHECK OPERATION:</b>			
Horn			
Gauges			
Brakes			
Lights			
Steering			
Attachments			
Accessories			
Backup Alarm			
Warning Lights			
Warning Buzzer			

RECORD MALFUNCTIONS, DAMAGE, OR PROBLEMS:

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### Platform Lift Equipment Inspection

AREA	OUT O.K.	Repair Needed	IN O.K.
<b>PLATFORM</b>			
1. Controller			
2. Switches			
3. Placards and Decals			
4. Control Tags			
5. Handrails and Chains			
<b>CHASSIS</b>			
1. Batteries			
2. Battery Charger			
3. Hydraulic Pump/Motor			
4. Valves			
5. Hydraulic Hoses & Tubing			
6. Hydraulic Oil Tank			
7. Lift Cylinder			
8. Limit Switch			
9. Placards and Decals			
10. Wheel and Tire Assemblies			
11. Steer Cylinder			
12. Steer Components			
13. Scissor Arms			
14. Safety Prop			
15. Pivot Pins/Bolts			
16. Switches, Ground Control			
17. Control Tags			
18. Hose and Cable			
19. Tire Pressure/Condition (if applicable)			

RECORD MALFUNCTIONS, DAMAGES, OR PROBLEMS:

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### Annex C: Aerial Lift Daily Safety Inspection Checklist

To be completed prior to each use

Make: \_\_\_\_\_ ID Number: \_\_\_\_\_

Week Ending: \_\_\_\_\_

Inspector Initial/Time							
ITEM	SUN.	MON.	TUES.	WED.	THURS.	FRI.	SAT.
1. Check Load Charts							
2. Capacity							
3. Appearance							
4. Hazard Warning Signal							
5. Brakes							
6. Safety Chains							
7. Tire Condition							
8. Electrical							
9. Baskets							
10. Steering							
11. Safety Override							
12. Control Operation							

Comments: \_\_\_\_\_

Supervisor : \_\_\_\_\_

Please Print

Signature

Date/Time: \_\_\_\_\_

### Annex D: Aerial Lift Equipment Inspection Checklist

To be completed by operator when checking out and checking in equipment.

- Inspect equipment periodically.
- Use only equipment which is in safe working condition.
- DO NOT operate equipment if any items inspected need repair.
- Notify the motor pool of any needed repairs.

Equipment Number/Type of Vehicle	
Location of Use	
Operators Name (Please Print)	Phone#
Dept/Shop #	Cell/Pager #
Inspection Date/Out	Inspection Date/In
Hour Meter/Out	Hour Meter/In

Check (Add if necessary)	OUT O.K.	Repair Needed	IN O.K.
Oil Level			
Fuel Level			
Coolant Level (DO NOT CHECK IF HOT)			
Tire Pressure/ Condition			
Hydraulic Level			
Leaks			
<b>CHECK OPERATION:</b>			
Horn			
Gauges			
Brakes			
Lights			
Steering			
Attachments			
Accessories			
Backup Alarm			
Warning Lights			
Warning Buzzer			

**RECORD MALFUNCTIONS, DAMAGE, OR PROBLEMS:**

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### Annex E: Up-Right Man Lift Inspection Checklist

- Transportation of Lift: The lift's gross weight is 1,033 lbs; requires trailer capacity of 1,500 lbs.
- Lift to be in lowered stowed position and secured in trailer.
- Barricading work areas.
- Review procedures for raising lift from lowered stowed position to upright position.
- Installing outriggers and leveling procedures.
- Test all four outrigger sensors.
- Test emergency descent valve.
- Check hydraulic fluid level. Must show on dip-stick.
- Check battery compartment for leaks.
- Operator's manual on lift.
- Lift gate latches.
- Condition assessment of lift.
- Test controls including emergency descent valve.
- Hazard assessment of work area.
- Controls in place for identified hazards.
- Ground man for emergency descent available and knowledgeable of descent valve.
- Complete job task.
- Lower lift to stowed position.
- Transport lift back to storage.
- Return key and daily lift inspection sheet to supervisor.
- Report any problems with lift.

List any problems

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Signature of employee completing inspection

Time of inspection \_\_\_\_\_ Date of inspection \_\_\_\_\_

## **Annex F: Operator Warnings and Instructions**

The aerial lift is used only for intended applications as defined in the equipment's operating manual. The following recognized safety practices shall be used:

1. Operators shall not use the lift in an unauthorized manner.
2. All platform occupants shall use fall protection (e.g., full body harness, shock-absorbing lanyard) connected to the anchorage point(s) provided at the platform position.
3. A hard hat shall be always worn when operating aerial lifts.
4. Other personal protective equipment, (e.g., eye, foot, hand, clothing) shall be worn as required.
5. The slope and grade for which the platform is rated shall not be exceeded. Aerial lifts may be equipped with tilt or other motion/capacity warning alarms. These alarms shall be operational. The limit switch shall not be altered or disabled. Operators shall not depend upon the tilt alarm as a level indicator.
6. The deployment of stability-enhancing means, such as outriggers, outrigger pads, stabilizers, or extendible axles, shall be utilized.
7. The guardrail system shall be used per manufacturer's specifications. Entry gates or chains shall be closed before operating the lift.
8. Operators shall not overload an aerial lift. Occupants and equipment shall not exceed the maximum platform capacity (or the maximum capacity of the platform extension when so equipped).
9. Safe distances, including overhead clearance, shall be maintained between the operator, the machine, and other objects. Electrocution hazards shall be avoided. Operators shall maintain safe distances from electrical power lines, conductors, or bus bars. They shall allow for boom or platform movement or electrical line sway or sag. Operators shall follow minimum safe approach distances (MSAD); see Annex G.
10. Operators shall not drive the mobile chassis close to an obstruction. The operator shall place his/her machine, then use the raise, swing, and boom functions to get in close. Operators shall use the slowest speed for such movements to avoid "bounce" of the platform.
11. Only Category "A" aerial lifts shall be used for bare-hand electrical work. Check manufacturer's instructions for testing, locking, tagging, and grounding.
12. Workers on the ground associated with the aerial lift operation shall wear appropriate head protection.
13. Operators shall not sit, stand, or climb on the platform guardrails or edge of the bucket. They shall always maintain a firm footing on the platform floor.
14. The use of railings, planks, ladders, scaffolds, or any other device in or on the work platform for achieving additional working height or reach are prohibited.

15. Areas around aerial-lift operations shall be barricaded to prevent injury to pedestrians and other workers. When other moving equipment is present, precautions, such as warnings, barriers, or flashing lights shall be used as appropriate.

16. Observations shall be conducted on an ongoing basis to detect any deficiencies in equipment or method of use. Operator shall cease operation of the lift if any suspected malfunction occurs. Problems or malfunctions shall be reported to the supervisor as soon as possible. Any problems or malfunctions shall be repaired before using the platform.

17. Potentially hazardous locations shall be reported to the supervisor as soon as possible.

18. Aerial lifts with internal combustion engines operating inside a building, or other unusual operating support conditions, are prohibited unless specifically evaluated and permitted by the supervisor.

19. Care shall be taken to avoid entanglement.

20. Work area shall be kept clear of workers, equipment, and other obstructions before lowering the platform.

21. The engine shall be shut down and equipment refueled in a well-ventilated area.

22. Battery charging shall be conducted in a well-ventilated area.

23. Operators shall not use batteries that weigh less than the original equipment. Operators shall always wear protective clothing and eyewear when working with batteries.

24. The platform shall not be steadied by positioning it against another object.

25. Operators shall not attempt to increase the stability of a lift by attaching it to an adjacent structure. Operators shall not tie or attach lifts to any adjacent structures.

26. Operators shall not modify or alter an aerial lift. Mounting attachments for holding tools or other materials onto the bucket, platform, toe boards, or guardrail system can increase the weight in the bucket or platform.

27. Operators shall not place or attach fixed or overhanging loads to any part of the machine.

28. Operators shall not place loads outside the platform perimeter.

29. The platform shall not be used as a crane or jack, unless the manufacturer has approved these operations.

30. Operators shall not use the machine to push or pull another object.

31. Operators shall never use the boom to push the aerial lift along the ground or attempt to free a machine by lifting the wheels off the ground with the boom.

32. Operator shall limit travel speed according to conditions.



33. Traveling 50 feet or more with an aerial lift shall be done with the platform in the lowered or stowed position. Extensible or articulating booms shall be retracted or folded.
34. Elevated driving requirements and repositioning of the aerial lift while elevated shall include maintaining a clear view of the support surface and route of travel, ensuring the safety of workers in the area, and maintaining safe distances from hazards and overhead obstacles that could present crushing hazards. Operators shall not drive over 0.5 mph with the platform elevated.
35. Stunt driving is prohibited.
36. When the aerial platform is unattended, it shall be secured to protect against unauthorized use.
37. The altering of safety devices is prohibited.
38. Personnel shall leave the lift before attempting to free a snagged platform.
39. Entering or exiting the elevated platform shall be done per the manufacturer's instructions.
40. Operators shall use the three (3) point contact method (3 out of 4 arms and legs in contact with the machine) when mounting and dismounting the platform or bucket. Never attempt to mount or dismount a moving machine or climb down the frame or boom from the platform or bucket when raised.
41. When required to exit or climb out of an elevated aerial lift to a location not otherwise protected by guardrails, floors, or other continuous means of fall protection, operators shall use a second shock-absorbing lanyard to connect to the new location before disconnecting from the aerial lift. When entering an aerial lift from an unprotected location, operators shall connect a shock-absorbing lanyard to the anchorage point in the aerial lift before entering.
42. Modifications will only be approved with or by the prior written permission of the manufacturer.
43. Materials shall be carried on the platform as specified in the manufacturers' recommendations for load capacity.
44. The rated horizontal force on the platform shall not be exceeded.
45. Operators shall not exceed the manufacturers' limits when pushing on or pulling toward any object outside of the lift or platform.
46. Steps shall be taken to avoid collision of the platform with any crane or overhead equipment, moving or not.
47. Support requirements for the platform shall be adequate before work begins.
48. The aerial platform shall be leveled using the manufacturers' outriggers and leveling devices and the brakes set.
49. Operators shall not use lifts as a ground for welding.

50. Operators shall not increase the surface area of a platform or the load. By increasing the area exposed to the wind, the stability of the machine is decreased.

51. Only one designated person should operate the controls. Operators shall never allow anyone to tamper with, service, or operate a machine from the lower control station while workers are in the bucket or platform except in an emergency.

52. Operators shall not operate lifts during inclement weather, unless approved by the manufacturer for this purpose (i.e., bucket/line trucks).

## Annex G

### Minimum Safe Approach Distance to Energized (Exposed or Insulated) Power Lines

Voltage Range (Phase to Phase)	Minimum Safe Approach Distance
0 to 300V	AVOID CONTACT
Over 300 to 50KV	10 Feet (3.05 Meters)
Over 50KV to 200KV	15 Feet (4.6 Meters)
Over 200KV to 350KV	20 Feet (6.1 Meters)
Over 350KV to 500KV	25 Feet (7.62 Meters)
Over 500KV to 750KV	35 Feet (10.67 Meters)
Over 750KV to 1000KV	45 Feet (13.72 Meters)

## CHAPTER 18 MINORS IN LABORATORIES AND SHOPS

### Introduction:

The purpose of this chapter is to identify under what circumstances and/or conditions minors will be allowed to visit, work, or conduct research in MTSU laboratories or shops where hazardous materials are used or hazardous procedures are conducted.

### Definitions:

- “Minor” – refers to any person who has not yet attained the age of 18 years.
- “Laboratories” – refers to any room or part of a building used by the University for scientific or technical activities in which hazardous materials are used or hazardous activities/procedures are conducted.
- “Shop” – refers to any room or part of a building in which machinery or tools are used. “Shops” include, but are not limited to, engineering shops, art workshops, theater shops, etc.
- “Principal Faculty/Sponsor” – refers to the person who is responsible for the research project or activity as well as the oversight of the participants in the research or activity, including minors.
- “Supervision” – refers to management by overseeing the performance or operation of the person or group in the laboratory at all times.
- “Personal Protective Equipment” (PPE) – refers to equipment to be worn to minimize the exposure to a variety of hazards. Examples of PPE include such items as lab coats, gloves, foot protection, safety goggles, protective hearing devices, hard hats, respirators, etc.

### General:

1. No individual between the ages of 16 and 18 may enter a laboratory or other work area with potentially hazardous materials or conditions unless the minor is part of a group or individual educational program reviewed in advance by the Department Chair.
2. No individual under the age of 16 may enter a laboratory, unless they are part of a one-time tour that was approved by the individual faculty member and the Department Chair. Tours may only be conducted at times when all hazardous materials are properly stored and not currently in use for experiments. The faculty member will be responsible for providing proper supervision and any required personal protective equipment.
3. Children under the age of 12 are prohibited from entering laboratory areas under all circumstances.
4. Proposed activities that will be conducted by minors in University laboratories or shops must adhere to all applicable requirements or restrictions imposed by the Department

Chair, Environmental Health and Safety Services, University Police, General Counsel, Human Resources, or other University safety committee. In addition, all required training must be completed before the minor engages in any lab or shop activities. Minors must attend required training during times when these programs are offered. The lab or shop activities must be conducted under an appropriate supervisory plan developed by the Principal Faculty/Sponsor.

5. Prior to the minor engaging in laboratory or shop activities, the Principal Faculty or Sponsor must complete the Classroom/Laboratory Safety Analysis Form and submit to the Department Chair and Environmental Health and Safety Services to be kept on file. A Volunteer Participation Waiver of Liability form and Principal Faculty/Sponsor Responsibilities Acknowledgment form shall also be signed and submitted for complete record keeping. All forms may be found in Appendix E of the MTSU Campus Safety Handbook.
6. The Principal Faculty or Sponsor shall provide general and laboratory/shop specific training to all minors including the following:
  - a. Explain hazards specific to the lab or shop, equipment, and the materials minors may handle
  - b. Show the minor how to access and understand Safety Data Sheets (SDS) for the chemicals with which they will be working.
  - c. Explain possible routes of exposure, as appropriate (e.g., skin absorption, ingestion, inhalation) and precautionary measures to be taken to limit exposures
  - d. Provide appropriate PPE and engineering controls and train the minor in their proper use.
7. Minors under the age of 18 are prohibited from handling any of the following hazardous materials in University laboratories:
  - a. Biological
    - i. Recombinant or synthetic nucleic acids requiring biosafety level 2 or higher containment
    - ii. Biological agents classified as Risk Group 2 or higher
    - iii. Human-derived materials covered under the OSHA Bloodborne Pathogens Standard
    - iv. HHS/USDA select agents
    - v. Biological toxins
    - vi. Animals representing special hazards
  - b. Chemical
    - i. Highly carcinogenic substances
    - ii. Known human reproductive toxins
    - iii. Highly acute toxic substances
    - iv. Explosive or highly reactive chemicals
    - v. Cryogenic substances
    - vi. DEA Controlled substances
  - c. Radiological/Physical
    - i. Ionizing radiation-generating equipment (XRD, X-ray, fluoroscopy, accelerator, cyclotron, etc.)
    - ii. Radioactive materials

- iii. Unshielded lasers greater than or equal to class 3B
  - iv. High magnetic field equipment (greater than 5G)
- d. Other Equipment or Machinery
- i. High voltage equipment
  - ii. Extreme temperatures
  - iii. Pressurized systems and procedures
  - iv. Hazardous machinery (e.g., shot equipment that cuts, crushes, or has exposed moving parts)

## CHAPTER 19 ILLICIT STORMWATER DISCHARGE

### Scope

This section shall apply to all water generated on developed or undeveloped land entering MTSU's separate storm sewer system on MTSU campus.

### Prohibition of Illicit Discharges

No person whoever shall introduce or cause to be introduced into the Municipal Separate Storm Sewer System any discharge that is not composed entirely of stormwater. The commencement, conduct or continuance of any non-stormwater discharge to the Municipal Separate Storm Sewer System is prohibited except as described as follows:

- (1) Uncontaminated discharges from the following sources:
  - (a) Water line flushing or other potable water sources;
  - (b) Landscape irrigation or lawn watering with potable water or repurified water;
  - (c) Diverted stream flows;
  - (d) Rising ground water;
  - (e) Groundwater infiltration to storm drains;
  - (f) Pumped groundwater;
  - (g) Foundation or footing drains;
  - (h) Crawl space pumps;
  - (i) Air conditioning condensation;
  - (j) Springs;
  - (k) Non-commercial washing of vehicles;
  - (l) Natural riparian habitat or wet-land flows;
  - (m) Swimming pools (if dechlorinated - typically less than one PPM chlorine);
  - (n) Firefighting activities; and,
  - (o) Any other uncontaminated water source.
  
- (2) Discharges specified in writing by MTSU Environmental Health and Safety Services as being necessary to protect public health and safety.
  
- (3) Dye testing is an allowable discharge if MTSU Environmental Health and Safety Services has so specified in writing.

### **Prohibition of Illicit Connections**

- (1) The construction, use, maintenance, or continued existence of unlawful connections to MTSU Separate Storm Sewer System is prohibited.
- (2) This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

### **Reduction of Stormwater Pollutants by the Use of Best Management Practices (BMPs)**

Any person responsible for a property owned or leased by the university which is, or may be, the source of an illicit *discharge*, may be required to implement, at the person's expense, the BMP's necessary to prevent the further discharge of pollutants to MTSU Separate Storm Sewer System.

### **Notification of Spills**

Any person responsible for a property, premises, or activity, which is, or may *be*, the source of a spill and which is or maybe discharging pollutants to MTSU's storm sewer system and/or ponds or streams shall notify Environmental Health and Safety Services of such a spill within a reasonable time and in any event within 24 hours of knowledge the spill is occurring or has occurred. Notification to MTSU EH&S Services does not relieve the party of spill notification requirements under federal, state, or other local laws, regulations, or rules. For the purpose of this section, a spill is an urgent, one-time, unintentional release of materials such as hazardous substances, hazardous materials, hazardous wastes, chemicals, solid wastes, liquid wastes, sludges, pollutants, contaminants, and other similar substances. On-going, intentional releases of these materials shall not be classified as a spill and may be an illicit discharge.



## APPENDIX A ACCIDENT INVESTIGATION

### Purpose

Injuries and illnesses are caused by one of two things, either unsafe acts or unsafe conditions. The purpose of any investigation into the circumstances surrounding an injury or an illness should be to identify the unsafe act or condition that led to that injury or illness. The process starts with the first line supervisor, who should objectively examine his or her own role in the case as well as the roles of others involved. The purpose of the investigation process is to identify hazards requiring remedial action, not fix blame.

### Investigation Objectives

Identification and location of the principal sources of injuries, illnesses, and property damages on campus through determination of the materials, machines, tools, job classifications, and areas most frequently involved in accidents.

Identification of needs for engineering revisions through identification of principal hazards associated with equipment and facilities on campus.

Disclosure of inefficiencies in operating procedures or outdated methods that expose members of the campus community to unnecessary hazards.

Disclosure of unsafe practices that indicate a need for training and education of personnel.

Provision of information about the principal hazards and unsafe practices in their areas of responsibility to individuals with supervisory authority.

### Responsibilities

**Supervisors:** The individual having direct supervisory control over the organization, department, or area where the accident occurred is responsible for:

Taking control of the situation at the scene of the accident, directing, and coordinating everything that is done.

Ensuring first aid is provided and calling for any emergency assistance necessary.

Controlling potential secondary accidents.

Identifying sources of evidence at the scene, noting items such as light, noise, ventilation, equipment/material condition, housekeeping, and other potential contributing factors. These conditions change rapidly and should be noted immediately.

Preserving evidence from alteration or removal.

Notifying the appropriate department heads, directors, and Environmental Health and Safety Services.

Providing the injured or ill person with an Accident Report form and ensuring the completeness and validity of the reported information.

Completing the supervisor's section upon receipt of the Accident Report from the injured employee, making a prompt appraisal of the causes of the injury or illness, how likely it is to happen again, noting the locations of any similar conditions existing elsewhere on campus, and whether further investigation by Environmental Health and Safety Services is recommended. It is often advisable to establish the injured or ill person's activities immediately prior to the injury or illness, type of shoes or clothing worn, and whether any personal protective equipment was in use.

Making an accurate assessment of the severity of an injury or illness. This is extremely important for regulatory reporting. OSHA has established guidelines for assessing accident severity and the reporting times are much shorter for anything requiring more than simple first aid.

Filing the completed Accident Report with Human Resource Services by the close of business the next working day when possible if the injury results in medical treatment or lost time beyond the day the injury or illness occurs and in no case later than three working days because that severity. *It is not necessary to wait until an individual returns to work to file the report.* Copies may also be submitted to administration officials, department heads, and directors with authority over the area where the incident occurred.

Cases that do not involve lost workdays or medical treatment **must still be reported** to Human Resource Services within 30 days for consideration by Workers' Compensation.

**Environmental Health and Safety Services:** Environmental Health and Safety Services is responsible for:

Reviewing reports of injuries, illnesses, property damage, and public liability accidents and the compilation, analysis, and interpretation of relevant causal factors and information.

The establishment of a classification system to identify significant causal factors and determine priorities for corrective action.

The conduct of thorough investigations of those incidents where specialized knowledge and skill are required.

## Definitions

**First Aid:** OSHA, in 29CFR1904.12(e) of the regulations, defines first aid as:

Any one-time treatment, and any follow-up visit for the purpose of observation, of minor scratches, cuts, burns, splinters, and so forth, which do not ordinarily require medical care. Such one-time treatment and follow-up visit for the purpose of observation is considered first aid even though provided by a physician or registered professional personnel.

Examples of first aid, according to OSHA, are:

- Application of **ANTISEPTICS during first visit** to medical personnel
- Treatment of **FIRST-DEGREE BURN(S)**
- Application of **BANDAGE(S)** during any visit to medical personnel
- Use of **ELASTIC BANDAGE(S) during first visit** to medical personnel
- Removal of **FOREIGN BODIES NOT EMBEDDED IN EYE** if only irrigation is required
- Removal of **FOREIGN BODIES FROM WOUND**; if procedure is **UNCOMPLICATED**, and is, for example, by tweezers or other simple technique
- Use of **NONPRESCRIPTION MEDICATIONS AND** administration of **single dose of PRESCRIPTION MEDICATION** on first visit for minor injury or discomfort
- **SOAKING THERAPY on initial visit** to medical personnel or removal of bandage(s) by **SOAKING**
- Application of hot or cold **COMPRESS(ES) during first visit** to medical personnel
- Application of **OINTMENTS** to abrasions to prevent drying and cracking
- Application of **HEAT THERAPY during first visit** to medical personnel
- Use of **WHIRLPOOL BATH THERAPY during first visit** to medical personnel
- **NEGATIVE X-RAY DIAGNOSIS**
- **OBSERVATION** of injury during visit to medical personnel

**Medical Treatment:** Medical treatment is for injuries that can be treated **only** by licensed medical personnel, impair bodily functions, result in damage to the body's physical structure (fractures, etc.), or that involve complications requiring follow-up medical treatment. A visit to a doctor to determine whether or not someone has an injury is not medical treatment. Administration of a tetanus shot, or booster is not, by itself, medical treatment.

Examples of medical treatment, according to OSHA, are:

- Treatment of **INFECTION**.
- Application of **ANTISEPTICS** during **second or subsequent visits** to medical personnel.
- Treatment of **SECOND- OR THIRD-DEGREE BURN(S)**.
- Application of **SUTURES** (stitches).
- Application of **BUTTERFLY ADHESIVE DRESSING(S)** or **STERI STRIPS** in lieu of sutures.
- Removal of **FOREIGN BODIES EMBEDDED IN EYE**.
- Removal of **FOREIGN BODIES FROM WOUND**; if procedure is **COMPLICATED**, because of depth of embedment, size, or location.
- Use of **PRESCRIPTION MEDICATIONS** (except a single dose administered on first visit for minor injury or discomfort)
- Use of hot or cold **SOAKING THERAPY** during **second or subsequent visit** to medical personnel
- Application of hot or cold **COMPRESS(ES)** during **second or subsequent visit** to medical personnel
- **CUTTING AWAY DEAD SKIN** (surgical debridement)
- Application of **HEAT THERAPY** during **second or subsequent visit** to medical personnel
- Use of **WHIRLPOOL BATH THERAPY** during **second or subsequent visit** to medical personnel
- **POSITIVE X-RAY DIAGNOSIS** (fractures, broken bones, etc.)
- **ADMISSION TO A HOSPITAL** or equivalent medical facility **FOR TREATMENT**

**Lost Workdays or Lost Time:** Lost workdays are when the person reporting the injury or illness is away from work for recuperation or medical treatment, or unable to perform their regular job duties over a normal work shift, *beyond* the day of the injury or initial onset of the illness, even though able to continue working. The day of the injury or initial onset of the illness and any days the employee would not have worked even if able (regular days off, holidays, vacation days, etc.) are not counted as lost workdays. Students and visitors need not record this information. If an employee reports for work on his or her next regularly scheduled workday, then there is not a lost workday or lost time.

## Investigation Procedure

### General:

Respond to the incident promptly. The supervisor should go to the scene of the accident immediately.

The appropriate administration official, department head, or director should be notified immediately or as soon as possible.

Collect pertinent information about the incident as identified on the injury/illness report form.

Examine the facility, equipment, tools, materials, etc. involved.

### Interview witnesses:

Interview separately and in an appropriate place, at the scene if possible.

Put the person at ease and get the individual's version. Do not interrupt unless the comments get off the subject. Ask necessary questions at the right time to prompt more detail.

Put key points in your own words and repeat them back to assure that you understood what was said and to give the witness the opportunity to correct details.

Record critical information quickly. Make notes of key points.

Use visual aids such as sketches, drawings, blueprints, or photographs if not interviewing at the scene.

Thank the witness for his or her time and effort and end the interview on a positive note.

Ask the witness to contact you if anything else comes to mind.

### Analyze all significant causes:

Identify the damage, injuries, and illnesses.

Identify the source of the damage, injuries, and illnesses.

Identify the actions that allowed the victim to come into contact with the source of the damage, injuries, and illnesses.

Identify the job and personal factors for each action and condition.

Develop recommendations for corrective action.

Implement corrective action.

## Scope of Investigation

### **Injuries/Illnesses:**

All occupational injuries and illnesses should be investigated by the person with direct supervisory authority over the victim.

Injuries/illnesses that result in lost workdays may also be investigated by Environmental Health and Safety Services.

Injuries/illnesses that result in death will be investigated by Environmental Health and Safety Services.

**Fires and Explosions:** All fires and explosions will be investigated by Environmental Health and Safety Services in addition to any investigations conducted by fire and law enforcement officials.

### **Property Damage:**

Property damages valued less than \$5,000 will be investigated by the person with direct supervisory authority over the area or equipment damaged.

Property damages valued more than \$5,000 will be investigated by Environmental Health and Safety Services.

**Chemical Spills:** All spills releasing reportable quantities of hazardous materials to the environment will be investigated by Environmental Health and Safety Services in addition to any investigations conducted by fire, law enforcement, hazmat, and environmental officials.

**Other Incidents:** Any incident with a high potential for tort liability to the University will be investigated by Environmental Health and Safety Services in addition to any investigations conducted by other agencies or officials.

## Completing the Supervisor's Section of the Accident Report Form

**Identifying Causal Factors:** The following pages have a reproducible Guide for Identifying Causal Factors to aid supervisors in conducting effective reviews of injuries and illnesses occurring in their areas of responsibility. The most common causal factors are listed. Causal factors will generally be identifiable with a minimum of investigation, but they **MUST** be adequately investigated. Environmental Health and Safety Services may be called upon to assist in a complex case if a supervisor feels that he or she cannot adequately determine the causal factors.

Remember that injuries and illnesses are caused only by unsafe acts and unsafe conditions. The information given must be accurate. Simply stating nothing or "Not known" appears to indicate that the supervisor has not taken the time to investigate the circumstances surrounding the injury or illness and has no interest in identifying unsafe acts and conditions in his or her area of responsibility. Identifying the causal factor as "accident" or "purely accidental" also seems to indicate a lack of interest in identifying unsafe acts and conditions. It is usually assumed that injuries and illnesses are accidental unless the circumstances indicate they are self-inflicted.

Supervisors are not expected to conduct extensive technical investigations in the manner of a detective. The causal factors identified are recognized as being the supervisor's opinion based

on his or her knowledge of the work, the worker, and the work environment. It also affords the supervisor an opportunity to review the contributing factors throughout his or her area of responsibility. Any time a supervisor believes that an in-depth technical investigation is warranted, he or she can call on MTSU Environmental Health and Safety Services for assistance.

### OSHA Considerations

There are some supervisors who mistakenly believe that if they have no direct knowledge of a hazard or safety standard violation, they cannot be held responsible if an injury or illness occurs. In fact, they **can** be held responsible by OSHA. If OSHA investigates a fatality or other accident the inspector can establish hazard recognition by the University through one of several means. According to Chapter IV of **OSHA CPL 2-45B, The Field Operations Manual** (1993):

(b) Employer Recognition. A recognized hazard can be established by evidence of actual employer knowledge. Evidence of such recognition may consist of written or oral statements made by the employer or other management or supervisory personnel during or before the OSHA inspection.

1 Company memorandums, safety rules, operating manuals or operating procedures, and collective bargaining agreements may reveal the employer's awareness of the hazard. In addition, **accident, injury, and illness reports prepared for OSHA, workmen's compensation, or other purposes may show this knowledge.**

2 Employee complaints or grievances to supervisory personnel may establish recognition of the hazard, but the evidence should show that the complaints were not merely infrequent, off-hand comments.

3 The employer's own corrective action may serve as the basis for establishing employer recognition of the hazard if the employer did not adequately continue or maintain the corrective action or if the corrective action did not afford any significant protection to the employees.

(c) Common-sense Recognition. If industry or employer recognition of the hazard cannot be established in accordance with (a) and (b), **recognition can still be established if it is concluded that any reasonable person would have recognized the hazard.** This theory of recognition shall be used only in flagrant cases. *Example:* In a general industry situation, a court has held that any reasonable person would recognize that it is hazardous to dump bricks from an unenclosed chute into an alleyway between buildings which is 26 feet below and in which unwarned employees work. (In construction, 5(a)(1) could not be cited in this situation because 29 CFR 1926.252 or 1926.852 applies.)

Further, OSHA may conclude that a violation should be classified as willful or criminal willful. According to Chapter IV of OSHA CPL 2-45B, the Field Operations Manual (1993):

3. Willful Violations. The following definitions and procedures apply whenever the OSHA Compliance Safety and Health Officer (CSHO) suspects that a willful violation may exist:

a. A willful violation exists under the Act where the evidence shows either an intentional violation of the Act or plain indifference to its requirements.

(1) The employer committed an intentional and knowing violation if:

(a) An employer representative was aware of the requirements of the Act, or the existence of an applicable standard or regulation, and was also aware of a condition or practice in violation of those requirements.

(b) An employer representative was not aware of the requirements of the Act or standards but was aware of a comparable legal requirement (e.g., state, or local law) and was also aware of a condition or practice in violation of that requirement.

(2) The employer committed a violation with plain indifference to the law where:

(a) **Higher management officials were aware of an OSHA requirement applicable to the company's business but made little or no effort to communicate the requirement to lower-level supervisors and employees.**

(b) **Company officials were aware of a continuing compliance problem but made little or no effort to avoid violations.** EXAMPLE: Repeated issuance of citations addressing the same or similar conditions.

(c) An employer representative was not aware of any legal requirement but was aware that a condition or practice was hazardous to the safety or health of employees and made little or no effort to determine the extent of the problem or to take the corrective action. **Knowledge of a hazard may be gained from such means as insurance company reports, safety committee or other internal reports, the occurrence of illnesses or injuries, media coverage, or, in some cases, complaints of employees or their representatives.**

(d) Finally, in particularly flagrant situations, **willfulness can be found despite lack of knowledge of either a legal requirement or the existence of a hazard if the circumstances show that the employer would have placed no importance on such knowledge even if he or she had possessed it.**

**b. It is not necessary that the violation be committed with a bad purpose or an evil intent to be deemed "willful." It is sufficient that the violation was deliberate, voluntary, or intentional as distinguished from inadvertent, accidental, or ordinarily negligent.**

c. The CSHO shall carefully develop and record on the OSHA-1B all evidence available that indicates employer awareness of the disregard for statutory obligations or of the hazardous conditions. **Willfulness could exist if an employer is advised by employees or employee representatives regarding an alleged hazardous condition and the employer does not make a reasonable effort to verify and correct the condition.** Additional factors which can influence a decision as to whether violations are willful include:

(1) The nature of the employer's business and the knowledge regarding safety and health matters which could reasonably be expected in the industry.

(2) The precautions taken by the employer to limit the hazardous conditions.



- (3) The employer's awareness of the Act and of the responsibility to provide safe and healthful working conditions.
- (4) Whether similar violations and/or hazardous conditions have been brought to the attention of the employer.
- (5) Whether the nature and extent of the violations disclose a purposeful disregard of the employer's responsibility under the Act.

d. The determination of whether to issue a citation for a willful or repeated violation will frequently raise difficult issues of law and policy and will require the evaluation of complex factual situations. Accordingly, a citation for a willful violation shall not be issued without consultation with the Regional Administrator, who shall, as appropriate, discuss the matter with the Regional Solicitor.

4. Criminal/Willful Violations. Section 17(e) of the Act provides that: **"Any employer who willfully violates any standard, rule or order promulgated pursuant to Section 6 of this Act, or of any regulations prescribed pursuant to this Act, and that violation caused death to any employee, shall, upon conviction, be punished by a fine of not more than \$10,000 or by imprisonment for not more than six months, or by both; except that if the conviction is for a violation committed after a first conviction of such person, punishment shall be a fine of not more than \$20,000 or by imprisonment for not more than one year, or by both."**

a. The Area Director, in coordination with the Regional Administrator and Regional Solicitor, shall carefully evaluate all cases involving workers' deaths to determine whether they involve criminal violation of Section 17(e) of the Act.

b. In cases where an employee's death has occurred which may have been caused by a willful violation of an OSHA standard, the supervisor shall be consulted prior to the completion of the investigation to determine whether evidence exists and whether further evidence is necessary to establish the elements of a criminal/willful violation. The Area Director shall consult with the Regional Administrator and, if appropriate, with the Regional Solicitor after the initial determination has been made concerning possible willful violation.

c. The following criteria shall be considered in investigating possible criminal/willful violations:

(1) Establishment of Criminal/Willful. In order to establish a criminal/willful violation OSHA must prove that:

(a) The employer violated an OSHA standard. A criminal/willful violation cannot be based on violation of Section 5(a)(1).

(b) The violation was willful in nature; i.e.,

1 The employer committed an intentional and knowing violation if:

**a An employer representative was aware of the requirements of the Act, or the existence of an applicable standard or regulation, and was**

**also aware of a condition or practice in violation of those requirements.**

b An employer representative was not aware of the requirements of the Act or standards but was aware of a comparable legal requirement (e.g., state, or local law) and was also aware of a condition or practice in violation of that requirement.

2 The employer committed a violation with plain indifference to the law where:

a **Higher management officials were aware of an OSHA requirement applicable to the company's business but made little or no effort to communicate the requirement to lower-level supervisors and employees.**

b Company officials were aware of a continuing compliance problem but made little or no effort to avoid violations. **EXAMPLE:** Repeated issuance of citations addressing the same or similar conditions.

c An employer representative was not aware of any legal requirement but was aware that a condition or practice was hazardous to the safety or health of employees and made little or no effort to determine the extent of the problem or to take the corrective action. **Knowledge of a hazard may be gained from such means as insurance company reports, safety committee or other internal reports, the occurrence of illnesses or injuries, media coverage, or, in some cases, complaints of employees or their representatives.**

d In flagrant situations, **willfulness can be found despite lack of knowledge of either a legal requirement or the existence of a hazard if the circumstances show that the employer would have placed no importance on such knowledge even if he or she had possessed it.**

(c) The violation of the standard caused the death of an employee. In order to prove that the violation of the standard caused the death of an employee, there must be evidence in the file which clearly demonstrates that the violation of the standard was the **cause of** or a **contributing factor** to an employee's death.

Chapter IV goes on to state that "...the knowledge requirement is met if it is determined that the employer actually knew of the hazardous condition which constituted the apparent violation." Further,

1 In this regard, **the supervisor represents the employer and a supervisor's knowledge of the hazardous condition amounts to employer knowledge.** The CSHO shall record any evidence which establishes that the employer knew of the hazardous condition on the appropriate worksheet.

(b) If, after reasonable attempts to do so, it cannot be determined that the employer has actual knowledge of the hazardous condition, **the knowledge requirement is**

**met if the CSHO is satisfied that the employer could have known through the exercise of reasonable diligence. As a general rule, if the CSHO was able to discover a hazardous condition, it can be presumed that the employer could have discovered the same condition through the exercise of reasonable diligence.** The CSHO shall record any evidence which substantiates that the employer could have known of the hazardous condition with the exercise of reasonable diligence on the appropriate worksheet.

A thorough review of each workplace injury or illness is the trademark of a safety conscious supervisor, however, a superficial or non-existent review may indicate of a lack of hazard awareness or even negligence and willful disregard. Remember that OSHA **always** investigates workplace fatalities. OSHA **always** investigates any incident resulting in hospitalization or medical care for five or more employees. OSHA **may** investigate **any** injury or illness in the workplace when they receive employee complaints concerning that injury or illness. A supervisor's failure to identify hazards in his or her area of responsibility that are causing injuries or illnesses, as evidenced by injury and illness reports with incomplete, inaccurate, or superficial reviews, may establish that supervisor's knowledge of and willful disregard of those hazards. The purpose of any injury or illness investigation is to identify hazards requiring remedial action, not to fix blame. However, OSHA standards require both employees and supervisors to be aware of pertinent standards and regulatory requirements. Employees and supervisors who fail to respond appropriately to hazardous conditions or to maintain minimum safety standards may risk both university and regulatory sanctions.

### **Conclusion**

In order to be a useful part of the Safety Program, accident investigations by supervisors should always be fact finding and not fault finding. They should also be considered as a primary responsibility of supervision any time an occupational injury or illness occurs. According to the National Safety Council, accident investigation and analysis is a defense against hazards overlooked in safety inspections, training programs, job, or task analysis. Complete, accurate, and thorough reviews of workplace injuries and occupational illnesses establish the supervisor's good faith to identify and abate hazards to employee safety and health.

**Guide for Identifying Causal Factors**

<b>SECTION I: CAUSAL FACTORS - EQUIPMENT</b>		
<input type="radio"/> <b>Yes</b> <input type="radio"/> <b>No</b>	<input type="checkbox"/> <b>No</b>	<b>WAS A HAZARDOUS CONDITION A CONTRIBUTING FACTOR?</b> If yes, answer all questions in this part. If no, proceed to Section II: Causal Factors - Environment.
<b>Causal Factors</b>		
<input type="radio"/> <b>Yes</b> <input type="radio"/> <b>No</b>	<input type="checkbox"/> <b>No</b>	1. Did any defect(s) in equipment or tools contribute to the hazardous condition(s)?
<input type="radio"/> <b>Yes</b> <input type="radio"/> <b>No</b>	<input type="checkbox"/> <b>No</b>	2. Was the hazardous condition(s) recognized?  If yes, answer A and B. If no proceed to 3.
<input type="radio"/> <b>Yes</b> <input type="radio"/> <b>No</b>	<input type="checkbox"/> <b>No</b>	A. Was the hazardous condition reported?
<input type="radio"/> <b>Yes</b> <input type="radio"/> <b>No</b>	<input type="checkbox"/> <b>No</b>	B. Was employee(s) informed of the hazardous condition(s) and the procedures for temporary protective measures?
<input type="radio"/> <b>Yes</b> <input type="radio"/> <b>No</b>	<input type="checkbox"/> <b>No</b>	3. Was there an equipment inspection procedure(s) to detect the hazardous condition(s)?
<input type="radio"/> <b>Yes</b> <input type="radio"/> <b>No</b>	<input type="checkbox"/> <b>No</b>	4. Did the equipment inspection procedure(s) detect the hazardous condition?
<input type="radio"/> <b>Yes</b> <input type="radio"/> <b>No</b>	<input type="checkbox"/> <b>No</b>	5. Was the correct tool(s), equipment, or material(s) used?
<input type="radio"/> <b>Yes</b> <input type="radio"/> <b>No</b>	<input type="checkbox"/> <b>No</b>	6. Was the correct tool(s), equipment, or material(s) readily available?
<input type="radio"/> <b>Yes</b> <input type="radio"/> <b>No</b>	<input type="checkbox"/> <b>No</b>	7. Did employee(s) know where to obtain the correct tool(s), equipment, or material(s) required for the job?
<input type="radio"/> <b>Yes</b> <input type="radio"/> <b>No</b>	<input type="checkbox"/> <b>No</b>	8. Was substitute tool(s), equipment, or material(s) used in place of the correct one(s)?
<input type="radio"/> <b>Yes</b> <input type="radio"/> <b>No</b>	<input type="checkbox"/> <b>No</b>	9. Did the design of the tool(s) or equipment create operator stress or encourage operator error?
<input type="radio"/> <b>Yes</b> <input type="radio"/> <b>No</b>	<input type="checkbox"/> <b>No</b>	10. Did the general design or quality of the tool(s) or equipment contribute to a hazardous condition?
<input type="radio"/> <b>Yes</b> <input type="radio"/> <b>No</b>	<input type="checkbox"/> <b>No</b>	11. Were there other causal factors related to tool(s) or equipment? If so what:

<b>SECTION II: CAUSAL FACTORS - ENVIRONMENT</b>		
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	<b>WAS THE LOCATION OR POSITION OF EQUIPMENT, MATERIALS, OR EMPLOYEE(S) A CONTRIBUTING FACTOR?</b> If yes, answer all questions in this part. If no, proceed to Section III: Causal Factors - People (Procedures).
<b>Causal Factors</b>		
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	1. Did the location or position of equipment, material, or employee(s) contribute to a hazardous condition(s)?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	2. Was the hazardous condition(s) recognized?  If yes, answer A and B. If no proceed to 3.
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	A. Was the hazardous condition reported?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	B. Was employee(s) informed of the hazardous condition(s) and the procedures for temporary protective measures?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	3. Was employee(s) supposed to be in the vicinity of the equipment or material?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	4. Was the hazardous condition created by the location of the equipment or material visible to the employee(s)?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	5. Was there sufficient workspace?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	6. Were environmental conditions a contributing factor? For example: inadequate or excessive illumination, noise levels, air contaminant, extreme heat or cold, ventilation, vibration, or radiation.
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	7. Were there other causal factors related to the environment? If so what:

<b>SECTION III: CAUSAL FACTORS - PEOPLE (PROCEDURES)</b>		
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	<b>WAS THE PROCEDURE(S) USED A CONTRIBUTING FACTOR?</b> If yes, answer all questions in this part. If no, proceed to Section IV: Causal Factors - People (Personal Protective Equipment).
<b>Causal Factors</b>		
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	1. Was there a written or known procedure (rules) for this job?  If yes, answer A and B. If no proceed to 2.
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	A. Was the hazardous condition reported?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	B. Was employee(s) informed of the hazardous condition(s) and the procedures for temporary protective measures?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	2. Was employee(s) mentally and physically capable of performing the job?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	3. Were any tasks in the job procedure too difficult to perform? For example: Excessive concentration or physical demands.
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	4. Is the job structured to encourage or require deviation from job procedures?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	5. Were there other causal factors related to the job procedures? If so what:

<b>SECTION IV: CAUSAL FACTORS - PEOPLE (PERSONAL PROTECTIVE EQUIPMENT)</b>		
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	<b>WAS THE LACK OF PERSONAL PROTECTIVE EQUIPMENT OR EMERGENCY EQUIPMENT A CONTRIBUTING FACTOR?</b> If yes, answer all questions in this part. If no, proceed to Section V: Causal Factors - Management.
<b>Causal Factors</b>		
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	1. Was appropriate personal protective equipment (PPE) specified for the task or job?  If yes, answer A , B, and C. If no proceed to 2.
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	A. Was appropriate personal protective equipment (PPE) available?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	B. Did employee(s) know that wearing specified personal protective equipment (PPE) was required?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	C. Did employee(s) know how to use and maintain the personal protective equipment (PPE)?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	2. Was the personal protective equipment (PPE) used properly when the injury occurred?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	3. Was the personal protective equipment (PPE) adequate?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	4. Was emergency equipment specified for this job? For example: Emergency showers or eyewashes.  If yes, answer A , B, and C. If no proceed to 5.
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	A. Was appropriate emergency equipment readily available?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	B. Was the emergency equipment properly used?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	C. Did the emergency equipment function properly?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	5. Were there other causal factors related to personal protective equipment or emergency equipment? If so what:

<b>SECTION V: CAUSAL FACTORS - MANAGEMENT</b>		
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	<b>WAS A MANAGEMENT SYSTEM DEFECT A CONTRIBUTING FACTOR?</b> If yes, answer all questions in this part. If no, proceed to Section VI: Causal Factors - Health.
<b>Causal Factors</b>		
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	1. Was there a failure by supervision to detect, anticipate, or report a hazardous condition?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	2. Was there a failure by supervision to detect or correct deviations from job procedure?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	3. Was there a supervisor - employee review of hazards and job procedures for tasks performed infrequently?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	4. Was the supervisor responsibility and accountability adequately defined and understood?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	5. Was the supervisor adequately trained to fulfill assigned responsibility in accident prevention?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	6. Was there a failure to initiate corrective action for a known hazardous condition that contributed to this accident?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	7. Were there other causal factors related to management? If so what:



<b>SECTION VI: CAUSAL FACTORS - HEALTH</b>		
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	<b>WAS AN ADVERSE HEALTH ENVIRONMENT A CONTRIBUTING FACTOR?</b> If yes, answer all questions in this part. If no, proceed to Summary.
<b>Adverse Environments</b>		
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	1. Physical - Was the injured or ill exposed to an adverse environment involving high noise levels, extreme heat or cold, high radiation levels, repetitive motion, awkward body position, unusual physical stress, or extreme exertion?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	2. Chemical - Was the injured or ill exposed to an adverse environment involving exposure, by inhalation, ingestion, or absorption, to high levels of potentially toxic liquids, vapors, gases, dusts, or fumes?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	3. Biological - Was the injured or ill exposed to an adverse environment involving exposure to bacteria, viruses, insects (including bees, spiders, etc.), animals (including livestock), or allergens (anything causing an allergic reaction)?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	4. Medical - Did the injured or ill have a medical condition of any kind that may have been a contributing factor? If so, what?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	5. Were there other causal factors related to adverse environments? If so what:
<b>Physical Agents</b>		
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	1. Was the injured or ill exposed to high levels of noise, or vibration?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	2. Was the injured or ill exposed to extremes in temperatures, either heat or cold?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	3. Was the injured or ill exposed to ionizing radiation such as X-rays or from a nuclear source (alpha, beta, or gamma)?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	4. Was the injured or ill exposed to non-ionizing radiation such as microwave, laser, ultraviolet, or radio frequency radiation?
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	5. Were there other causal factors related to physical agents? If so what:
<b>Chemical Agents</b>		
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	1. Was the injured or ill exposed to a solvent? Identify:
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	2. Was the injured or ill exposed to an acid or base? Identify:
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	3. Was the injured or ill exposed to particulates (dusts)? Identify:
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	4. Was the injured or ill exposed to any other toxic chemical? Identify:
<b>Biological Agents</b>		
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	1. Was the injured or ill exposed to a microorganism? Identify:
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	2. Was the injured or ill exposed to an insect? Identify:
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	3. Was the injured or ill exposed to an animal? Identify:
<input type="radio"/> <b>Yes</b>	<input type="checkbox"/> <b>No</b>	4. Was the injured or ill exposed to an allergen? Identify:

## APPENDIX B

*(The text of OSHA Publication 3151 is provided here in annotated form as a guide for department heads and supervisors to assess the need for personal protective equipment in their department's operations. This publication was downloaded from <http://www.osha.gov/> where it can be viewed in its entirety.)*

### **OSHA 3151 Assessing the Need for Personal Protective Equipment: A Guide for Small Business Employers**

Small Business Safety Management Series

U.S. Department of Labor  
Occupational Safety and Health Administration

OSHA 3151  
1997

#### **About This Booklet**

The materials in this handbook are based upon the federal OSHA standards and other requirements in effect at the time of publication, and upon generally accepted principles and activities within the job safety and health field but should not be considered as a substitute for the standards.

This booklet is not intended to be a legal interpretation of the provisions of the Occupational Safety and Health Act of 1970 or to place any additional requirements on employers or employees.

The material presented herein will be useful to small business owners or managers and can be adapted to individual establishments.

All employers should be aware that there are certain states (and similar jurisdictions) which operate their own programs under agreement with the U.S. Department of Labor, pursuant to section 18 of the Act. The programs in these jurisdictions may differ in some details from the federal program.

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What kind of equipment is necessary to protect hands and arms?  
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What if my employees are exposed to different levels of noise throughout the day?  
What kinds of devices protect against high noise levels? Is cotton sufficient as earplugs?  
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## Introduction

### **Who should read this guide?**

If you employ one or more persons, you should read this guide.

### **How will this guide help protect my employees?**

The Occupational Safety and Health Administration (OSHA) requires employers to protect their employees from workplace hazards such as machines, work procedures, and hazardous substances that can cause injury. The preferred way to do this is through engineering controls or work practice and administrative controls, but when these controls are not feasible or do not provide sufficient protection, an alternative or supplementary method of protection is to provide workers with personal protective equipment (PPE) and the know-how to use it properly.

This guide will help you to

Examine your workplace,

Review the work procedures you require your employees to follow,

Select appropriate PPE (except for respirators and insulating rubber equipment) to protect your employees, and

Teach your employees how to wear and care for the PPE you provide.

This guide will help you comply with OSHA's general PPE requirements, but it is not a substitute for OSHA standards requiring PPE (Title 29, Code of Federal Regulations [CFR] 1910.132).(1) This standard requires employers to establish general procedures, called a PPE program, to give employees necessary protective equipment and to train them to use it properly. Respirators and insulating devices are not included in this guide because OSHA requires employers to develop separate programs specifically addressing the issues associated with those types of protective devices (29 CFR 1910.134 and 29 CFR 1910.137, respectively). Although not specifically directed to construction and maritime industry, the information, methods, and procedures in this guide are also applicable to, and will help you comply with, OSHA's general PPE requirements for the construction industry at 29 CFR 1926.95 and for the maritime industry at 29 CFR 1915.152.

Although the checklists and other information presented in this guide are intended to help you to the greatest extent possible, please keep in mind that this publication is general in nature and does not address all workplace hazards or PPE requirements.

**What are work practice and engineering controls?**

These controls can be described by the following examples once you've identified a potential hazard on a machine or in the room in which your employees work

<b>If...</b>	<b>Then...</b>
You can physically change the machine or work environment to prevent employee exposure to the potential hazard (adding a guard to the machine or building a barrier in the room between employees and the hazard).	You have eliminated the hazard with an engineering control.
You can remove your employees from exposure to the potential hazard by changing the way they do their jobs.	You have eliminated the hazard with a work practice control.

Employers should institute all feasible engineering, work practice, and administrative controls to eliminate or reduce hazards *before* using PPE to protect employees against hazards.

### What is personal protective equipment?

Personal protective equipment, or PPE, includes a variety of devices and garments to protect workers from injuries. You can find PPE designed to protect

Eyes,  
Face,  
Head,  
Ears,  
Feet,

Hands and arms, and  
Whole body.

PPE includes such items as

Goggles,  
Face shields,  
Safety glasses,  
Hard hats,  
Safety shoes,  
Gloves,  
Vests,  
Earplugs, and  
Earmuffs.

Respirators and rubber insulating equipment (gloves, sleeves, blankets) are also considered PPE, but because OSHA has specific requirements for those kinds of PPE, this general guide does not address such equipment. For assistance in determining the need for and the appropriate choice of respiratory protection for your employees, see OSHA Instruction CPL 2-2.54, Respiratory Protection Program Manual.(2)

## **Establishing a PPE Program**

### **What is a PPE program?**

This program sets out procedures for selecting, providing, and using PPE as part of your routine operation. A written PPE program is easier to establish and maintain as company policy and easier to evaluate than an unwritten one.

### **How do I develop a PPE program for my company?**

You have already begun to establish a PPE program by thinking about how best to protect your employees from potential hazards. Use Checklist A for information on establishing a PPE program. Working through the PPE selection process in this guide will produce the foundation for your program. Then you will need to decide how to enforce PPE use at your facility, provide for any required medical examinations, and evaluate your PPE program.

### ***Checklist A: Establishing a PPE Program***

- Identify steps taken to assess potential hazards in every employee's workspace and in workplace operating procedures.
- Identify appropriate PPE selection criteria
- Identify how you will train employees on the use of PPE, including:
  - What PPE is necessary
  - When PPE is necessary
  - How to properly inspect PPE for wear or damage
  - How to properly put on and adjust the fit of PPE
  - How to properly take off PPE
  - The limitations of PPE

- How to properly care for and store PPE
- Identify how you will assess employee understanding of PPE training
- Identify how you will enforce proper PPE use
- Identify how you will provide for any required medical examinations
- Identify how and when to evaluate the PPE program

## **The Need For PPE**

### **Who must provide PPE?**

You must provide PPE for your employees if

Their work environment presents a hazard or is likely to present a hazard to any part of their bodies;

OR

Their work processes present a hazard or are likely to present a hazard to any part of their bodies;

OR

During their work, they might come into contact with hazardous chemicals, radiation, or mechanical irritants;

AND

You are unable to eliminate their exposure or potential exposure to the hazard by engineering, work practice, or administrative controls.

### **How do I identify potential hazards in my workplace?**

Begin with a survey of your workplace. Observe the environment in which your employees work. Ask employees how they perform their tasks. Look for sources of potential injury such as the following:

Objects that might fall from above.

Exposed pipes or beams at work level.

Exposed liquid chemicals.

Sources of heat, intense light, noise, or dust.

Equipment or materials that could produce flying particles.

Checklist B at the end of this section will help you conduct this survey.

### **I have identified potential hazards. Now what?**

Determine if there are feasible engineering and work practice controls that could be used to avoid hazards.

### **All feasible engineering and work practice controls are in place, but my employees are still exposed to potential hazards. Is now the time to provide PPE?**

Yes. You must examine each likely hazard very carefully and determine the nature of the threat the hazard poses to your employees. Then choose the appropriate PPE for protection against that hazard, and make sure that any PPE you choose will fit the employee(s) who must wear it. Next, train your employees in the proper use and care of the PPE you provide.



### **How do I get started assessing my workplace operations for PPE needs?**

Use Checklist B to assess the work environment and procedures. Keep in mind, though, that this is not an exhaustive list of operations that could cause injury. Many workplace operations create hazards; all of them could not be listed here. If you do not find a specific task on the checklist

Look for similarities between your workplace operations and those listed here.

Try to anticipate whether such operations also might create similar hazards, and

Remember, an operation need only have the potential to cause injury to require PPE.

Once you have identified the tasks that require PPE, read the specific sections in the checklist to help you choose the appropriate PPE for your employees.

**Checklist B: Need for PPE**

Suggested Questions	Typical Operations or Concerns	Yes	No
<b>EYES</b>			
Do employees perform tasks, or work near employees who perform tasks, that might produce airborne dust or flying particles?	Sawing, cutting, drilling, sanding, grinding, hammering, chopping, abrasive blasting, or punch press operations	<input type="checkbox"/>	<input type="checkbox"/>
Do your employees handle, or work near employees who handle, hazardous liquid chemicals or encounter blood splashes?	Pouring, mixing, painting, cleaning, siphoning, dip tank operations, and dental or health care services	<input type="checkbox"/>	<input type="checkbox"/>
Are your employees' eyes exposed to other potential physical or chemical irritants?	Battery charging, installing fiberglass insulation, and compressed air or gas operations	<input type="checkbox"/>	<input type="checkbox"/>
Are your employees' eyes exposed to intense light or lasers?	Welding, cutting, and laser operations	<input type="checkbox"/>	<input type="checkbox"/>
<b>FACE</b>			
Do your employees handle, or work near employees who handle, hazardous liquid chemicals?	Pouring, mixing, painting, cleaning, siphoning, and dip tank operations	<input type="checkbox"/>	<input type="checkbox"/>
Are your employees' faces exposed to extreme heat?	Welding, pouring molten metal, smithing, baking, cooking, or drying	<input type="checkbox"/>	<input type="checkbox"/>
Are your employees' faces exposed to other potential irritants?	Cutting, sanding, grinding, hammering, chopping, pouring, mixing, painting, cleaning, and siphoning	<input type="checkbox"/>	<input type="checkbox"/>
<b>HEAD</b>			
Might tools or other objects fall from above and strike your employees on the head?	Work stations or traffic routes located under catwalks or conveyor belts, construction, trenching, and utility work	<input type="checkbox"/>	<input type="checkbox"/>
When your employees stand or bend, are their heads near exposed beams, machine parts, or pipes?	Construction, confined space operations, and building maintenance	<input type="checkbox"/>	<input type="checkbox"/>
Do your employees work with or near exposed electrical wiring or components?	Building maintenance; utility work; construction; wiring; work on or near communications, computer, or other high-tech equipment; and arc or resistance welding	<input type="checkbox"/>	<input type="checkbox"/>
<b>FEET</b>			
Could tools, heavy equipment, or other objects roll, fall onto, or strike your employees' feet?	Construction, plumbing, smithing, building maintenance, trenching, utility work, and grass cutting	<input type="checkbox"/>	<input type="checkbox"/>
Do your employees work with or near exposed electrical wiring or components?	Building maintenance; utility work; construction; wiring; work on or near communications, computer, or other high-tech equipment; and arc or resistance welding	<input type="checkbox"/>	<input type="checkbox"/>
Do your employees work with explosives or in explosive atmospheres?	Demolition, explosives manufacturing, grain milling, spray painting, abrasive blasting, and work with highly flammable materials	<input type="checkbox"/>	<input type="checkbox"/>
<b>HANDS</b>			
Do your employees' hands come into contact with tools or materials that might scrape, bruise, or cut?	Grinding, sawing, hammering, and material handling	<input type="checkbox"/>	<input type="checkbox"/>
Do your employees handle chemicals that might irritate the skin or come into contact with blood?	Pouring, mixing, painting, cleaning, siphoning, dip tank operations, and dental or health care services	<input type="checkbox"/>	<input type="checkbox"/>
Do work procedures require your employees to place their hands and arms near extreme heat?	Welding, pouring molten metal, smithing, baking, cooking, or drying	<input type="checkbox"/>	<input type="checkbox"/>

## Eye and Face Protection

### When must I provide eye protection for employees?

You must provide eye protection for employees whenever they are exposed to potential eye injuries during their work if work practice or engineering controls do not eliminate the risk of injury. Some of the things that might cause eye injuries include the following:

Dust and other flying particles, such as metal shavings or wool fibers.

Molten metal that might splash.

Acids and other caustic liquid chemicals that might splash.

Blood and other potentially infectious body fluids that might splash, spray, or splatter.

Intense light such as that created by welding arcs and lasers.

### How do I select the proper protective eyewear for employees?

Begin with the following criteria:

Eye protection must protect against the specific hazard(s) encountered in the workplace.

It must be reasonably comfortable to wear.

Eye protection must not restrict vision or movement.

Eye protection must be durable and easy to clean and disinfect.

Eye protection must not interfere with the function of other required PPE.

In addition, the American National Standards Institute, Inc. (ANSI)(3) has issued standard requirements for the design, construction, testing, and use of protective devices for eyes and face.

OSHA requires that all protective eyewear you purchase for your employees meet the requirements of ANSI Z87.1-1989 for devices purchased after July 5, 1994, and ANSI Z87.1-1968 for devices purchased before that date.(4)

### If employees wear eyeglasses with prescription lenses, may I consider these eye protection?

No. Eyeglasses designed for ordinary wear do not provide the level of protection necessary to protect against workplace hazards. Special care must be taken when choosing eye protectors for employees who wear eyeglasses with corrective lenses such as the following:

Prescription spectacles, with side shields and protective lenses meeting the requirements of ANSI Z87.1, that also correct the individual employee's vision.

Goggles that can fit comfortably over corrective eyeglasses without disturbing the alignment of the eyeglasses.

Goggles that incorporate corrective lenses mounted behind protective lenses.

You also must provide protective eyewear to employees who wear contact lenses and are exposed to potential eye injury. Eye protection provided to these employees may also incorporate corrective eyeglasses. Thus, if an employee must don eyeglasses in the event of contact lens failure or loss, he or she will still be able to use the same protective eyewear.

### **What kind of eye and face protectors are there? What are they for?**

**Safety spectacles.** These protective eyeglasses are made with safety frames constructed of metal and/or plastic and are fitted with either corrective or plano impact-resistant lenses. They come with and without side shields, but most workplace operations will require side shields.

**Impact-resistant spectacles.** This eyewear can be used for moderate impact from particles produced by such jobs as carpentry, woodworking, grinding, and scaling.

**Side shields.** These protect against particles that might enter the eyes from the side. Side shields are made of wire mesh or plastic. Eye-cup type side shields provide the best protection.

**Goggles.** You may choose from many different types of goggles, each designed for specific hazards. Generally, goggles protect eyes, eye sockets, and the facial area immediately surrounding the eyes from impact, dust, and splashes. Some goggles fit over corrective lenses.

**Welding shields.** Constructed of vulcanized fiber or fiberglass and fitted with a filtered lens, these protective devices are designed for the specific hazards associated with welding. Welding shields protect your employees' eyes from burns caused by infrared or intense radiant light, and they protect face and eyes from flying sparks, metal spatter, and slag chips produced during welding, brazing, soldering, and cutting. See Table 1 for assistance in choosing the appropriate filter for your employees' tasks.

**Laser safety goggles.** Laser safety goggles provide a range of protection against the intense concentrations of light produced by lasers. The type of laser safety goggles you choose will depend upon the equipment and operating conditions in your workplace. Table 2 of this document and Chapter II:6, "Laser Hazards," in the OSHA Technical Manual(5) will help you select the appropriate protection for your employees.

**Face shields.** These transparent sheets of plastic extend from the brow to below the chin across the entire width of the employee's head. Some are polarized for glare protection. Choose face shields to protect your employees' faces from nuisance dusts and potential splashes or sprays of hazardous liquids.

**Table 1.  
Eye and Face Protector Selection Guide**

Operation	Hazards	Recommended protectors: (numbers refer to Figure 1)
Acetylene-burning, acetylene-cutting, acetylene-welding	Sparks, harmful rays, molten metal, flying particles	7,8,9
Chemical handling	Splash, acid burns, fumes	2,10 (for severe exposure add 10 over 2)
Chipping	Flying particles	1,3,4,5,6,7A,8A
Electric (arc) welding	Sparks, intense rays, molten metal	9,11 (11 in combination with 4,5,6 in tinted lenses advisable)
Furnace operations	Glare, heat, molten metal	7,8,9 (for severe exposure add 10)
Grinding - light	Flying particles	1,3,4,5,6,10
Grinding - heavy	Flying particles	1,3,7A,8A (for severe exposure add 10)
Laboratory	Chemical splash, glass breakage	2 (10 when in combination with 4,5,6)
Machining	Flying particles	1,3,4,5,6,10
Molten metals	Heat, glare, sparks, splash	7,8 (10 in combination with 4,5,6 in tinted lenses)
Spot welding	Flying particles, sparks	1,3,4,5,6,10

Source: 29 CFR 1926.102(a)(3)

### Can face shields protect employees instead of goggles or protective spectacles?

Face shields do not protect employees from impact hazards. You may use however, face shields in combination with goggles or safety spectacles, to protect against impact hazards, even in the absence of dust or potential splashes, for additional protection beyond that offered by goggles or spectacles alone.

### How do I choose the correct eye protection from among all the different types?

Each kind of protective eyewear is designed to protect against specific hazards. By completing the hazard assessment of your workplace outlined in the previous section, you will identify the specific workplace hazards that pose a threat to your employees' eyes and faces. Tables 1 through 3 and Figure 1 will help you find the protective devices most suited for your employees and your workplace. Locate the operations and hazards most similar to those in your workplace in Table 1 and match the number to the corresponding drawing in Figure 1. Welding and laser operations require lenses to be tinted to a degree sufficient to protect against the specific intensity of light present during the tasks your employees perform (see Tables 2 and 3).

### How dark do lenses on welding helmets and goggles need to be?

The intensity of light or radiant energy produced by welding, cutting, or brazing operations varies according to a number of factors including the task producing the light, the electrode size, and the arc current. Table 2 shows the minimum protective shade for a variety of welding, cutting, and brazing operations. To protect employees who are exposed to intense radiant energy, begin by selecting a shade too dark to see the welding zone. Then try lighter shades until you find one that allows a sufficient view of the welding zone without going below the minimum protective shade.

**Table 2.**  
**Filter Lenses for Protection Against Radiant Energy**

Operations	Electrode size in 1/32" (0.8mm)	Arc current	Minimum* protective shade
Shielded metal arc welding	<3	<60	7
	3-5	60-160	8
	5-8	160-250	10
	>8	250-550	11
Gas metal-arc welding and flux-cored arc welding		<60	7
		60-160	10
		160-250	10
		250-500	10
Gas tungsten-arc welding		<50	8
		50-150	8
		150-500	10
Air carbon arc cutting	(light)	<500	10
	(heavy)	500-1,000	11
Plasma arc welding		<20	6
		20-100	8
		100-400	10
		400-800	11
Plasma arc cutting	(light)**	<300	8
	(medium)**	300-400	9
	(heavy)**	400-800	10
Torch blazing			3
Torch soldering			2
Carbon arc welding			14
Gas welding:			
Light	<1/8	<3.2	4
Medium	1/8-1/2	3.2-12.7	5
Heavy	>1/2	>12.7	6
Oxygen cutting:			
Light	<1	<25	3
Medium	1-6	25-150	4
Heavy	>6	>150	5

Source: 29 CFR 1910.133(a)(5).

\*As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go to a lighter shade which gives sufficient view of the weld zone without going below the minimum. In oxygen gas welding or cutting where the torch produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium line in the visible light of the spectrum operation.

\*\*These values apply where the actual arc is clearly seen. Experience has shown that lighter filters may be used when the arc is hidden by the workpiece.

## How do I protect employees from exposure to laser beams?

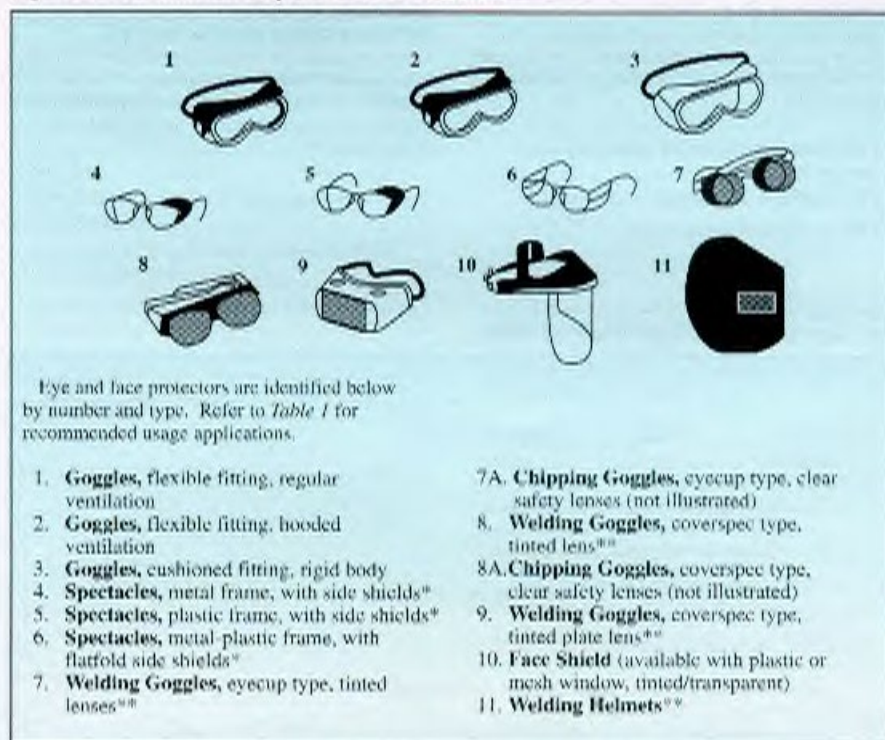
You must provide safety goggles specifically designed to protect the employees' eyes from the specific intensity of light produced by the laser. The level of protection will vary according to the level of radiation emitted by the laser. If your employees are exposed to laser beams, you must determine the maximum power density, or intensity, that the lasers can produce.(6) Based on this knowledge, you must select lenses that will protect against this maximum intensity. Table 3 shows the minimum optical density of lenses required for various laser intensities. Employers with lasers emitting radiation between two measures of power density (or light blocking capability) must provide lenses that offer protection against the higher of the two intensities.

**Table 3.  
Selecting Laser Safety Glass**

Intensity, CW maximum power density (watts/cm <sup>2</sup> )	Optical density (O.D.)	Attenuation factor
10 <sup>-2</sup>	5	10 <sup>5</sup>
10 <sup>-1</sup>	6	10 <sup>6</sup>
1	7	10 <sup>7</sup>
10	8	10 <sup>8</sup>

Source: 29 CFR 1926.102(b)(2)(i)

**Figure 1. Recommended Eye and Face Protectors**



Eye and face protectors are identified below by number and type. Refer to Table 1 for recommended usage applications.

1. **Goggles**, flexible fitting, regular ventilation
2. **Goggles**, flexible fitting, hooded ventilation
3. **Goggles**, cushioned fitting, rigid body
4. **Spectacles**, metal frame, with side shields<sup>†</sup>
5. **Spectacles**, plastic frame, with side shields<sup>†</sup>
6. **Spectacles**, metal-plastic frame, with flatfold side shields<sup>†</sup>
7. **Welding Goggles**, eyecup type, tinted lenses<sup>†\*</sup>
- 7A. **Chipping Goggles**, eyecup type, clear safety lenses (not illustrated)
8. **Welding Goggles**, coverspec type, tinted lens<sup>†\*</sup>
- 8A. **Chipping Goggles**, coverspec type, clear safety lenses (not illustrated)
9. **Welding Goggles**, coverspec type, tinted plate lens<sup>†\*</sup>
10. **Face Shield** (available with plastic or mesh window, tinted/transparent)
11. **Welding Helmets**<sup>†\*</sup>

Source: 29 CFR 1926.102 (a)(5) Table E-1.

<sup>†</sup>These are also available without side shields for limited use requiring only frontal protection.

<sup>\*</sup>See Table 2, Filter Lenses for Protection Against Radiant Energy.

### How can I be sure that laser safety goggles provide enough protection?

Every pair of safety goggles intended for use with laser beams must bear a label with the following information:

The laser wavelengths for which they are intended to be used.

The optical density of those wavelengths.

The visible light transmission.




## Once I have selected the appropriate eye protection equipment, how do I make sure employees use it properly?

Train your employees to use the protective eyewear. Checklist C will help you prepare your employees to use and care for the eye protection you provide.

**Checklist C:**  
**Use and Care of Eye and Face Protection**

*Train your employees to know...*

- Why eye protection is necessary—i.e., the workplace hazards that threaten their eyes
- How the eye protection will protect them
- The limitations of the eye protection
- When they must wear the eye protectors
- How to put the protective eyewear on properly
- How to adjust straps and other parts for a comfortable and effective fit
- How the protective eyewear fits over or contains an employee's corrective lenses
- How to identify signs of wear such as
  - Chipped, scratched, or scraped lenses
  - Loss of elasticity or fraying of head bands
- How to clean and disinfect the safety eyewear



## My workplace gets pretty dirty. How will my employees keep their protective eyewear clean and effective?

Train your employees how to clean the eye protectors. Allow them time at the end of their shifts to do the following:

- Disassemble goggles or spectacles,
- Thoroughly clean all parts with soap and warm water,
- Carefully rinse off all traces of soap, and
- Replace all defective parts.

Occasionally, you must disinfect the protective eyewear. To do so, after cleaning you can do the following:

- Immerse and swab all parts for 10 minutes in a germicidal solution.
- Remove all parts from the solution and hang in a clean place to air dry at room temperature or with heated air.



Do not rinse the parts after submerging them in the disinfectant. Rinsing will remove the germicidal residue that remains after drying.

Also use ultraviolet disinfecting and spray-type disinfecting solutions also may be used after washing.

**My employees work in shifts. Could I provide one pair of protective eyewear for each position instead of each employee?**

Yes. If you do this, however, you must disinfect shared protective eyewear after each use. If the goggles or spectacles do not have to be individually designed to incorporate an employee's corrective lenses and you disinfect the eyewear between uses by different employees, more than one employee may use the same set of protective eyewear.

### **Head Protection**

**When do my employees need head protection?**

You must provide head protection for your employees if:

Objects might fall from above and strike them on the head;

They might bump their heads against fixed objects, such as exposed pipes or beams; or

They work near exposed electrical conductors.

**What should I look for in head protection?**

In general, protective helmets, or hard hats, should

Resist penetration by objects,  
Absorb the shock of a blow,  
Be water resistant and slow burning, and  
Come with instructions explaining proper adjustment and replacement of the suspension  
and  
headband.

Hard hats require a hard outer shell and a shock-absorbing lining. The lining should incorporate a head band and straps that suspend the shell from 1 to 1 1/4 inches (2.54 cm to 3.18 cm) away from the user's head. This design provides shock absorption during impact and ventilation during wear.

As with devices designed to protect eyes, the design, construction, testing, and use of protective helmets must meet standards established by ANSI. Protective helmets purchased after July 5, 1994, must comply with ANSI Z89.1-1986,(7) whereas, those purchased before this date must meet the ANSI Z89.1-1969 standard.

**What types of head protection are available?**

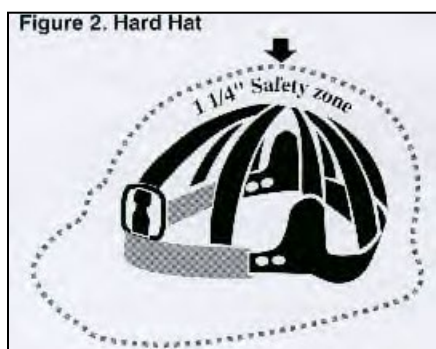
Hard hats are divided into three industrial classes:

Class A. These helmets are for general service. They provide good impact protection but limited voltage protection. They are used mainly in mining, building construction, shipbuilding, lumbering, and manufacturing.

Class B. Choose Class B helmets if your employees are engaged in electrical work. They protect against falling objects and high-voltage shock and burns.

Class C. Designed for comfort, these light-weight helmets offer limited protection. They protect workers from bumping against fixed objects but do not protect against falling objects or electric shock.

Look at the inside of any protective helmet you are considering for your employees, and you should see a label showing the manufacturer's name, the ANSI standard it meets, and its class. Figure 2 shows the basic design of hard hats.



### How do I choose the correct protective helmets from among the different types?

Each kind of protective helmet is designed to protect against specific hazards. By completing the hazard assessment outlined above; you will identify the specific workplace hazards that pose a threat to your employee's head.

### I have purchased new hard hats that meet the ANSI requirements. Have I fulfilled my responsibility to protect my employees' heads?

No. Issuing appropriate head protection to employees is a major first step, but you must make sure that the hard hats continue to provide sufficient protection to your employees. Do this by training your employees in the proper use and maintenance of hard hats including daily inspection of them. If your employees identify any of the following defects, remove the hard hats from service:

The suspension system shows signs of deterioration such as:

- Cracking,
- Tearing, or
- Fraying.

The suspension system no longer holds the shell from 1 inch to 1 1/4 inches (2.54cm - 3.18cm) away from the employee's head.

The brim or shell is cracked, perforated, or deformed.

The brim or shell shows signs of exposure to heat, chemicals, ultraviolet light, or other radiation. Such signs include:

Loss of surface gloss,  
Chalking, or  
Flaking (a sign of advanced deterioration).

**Could employees wearing hard hats and working at elevations create a potential hazard for the employees working below?**

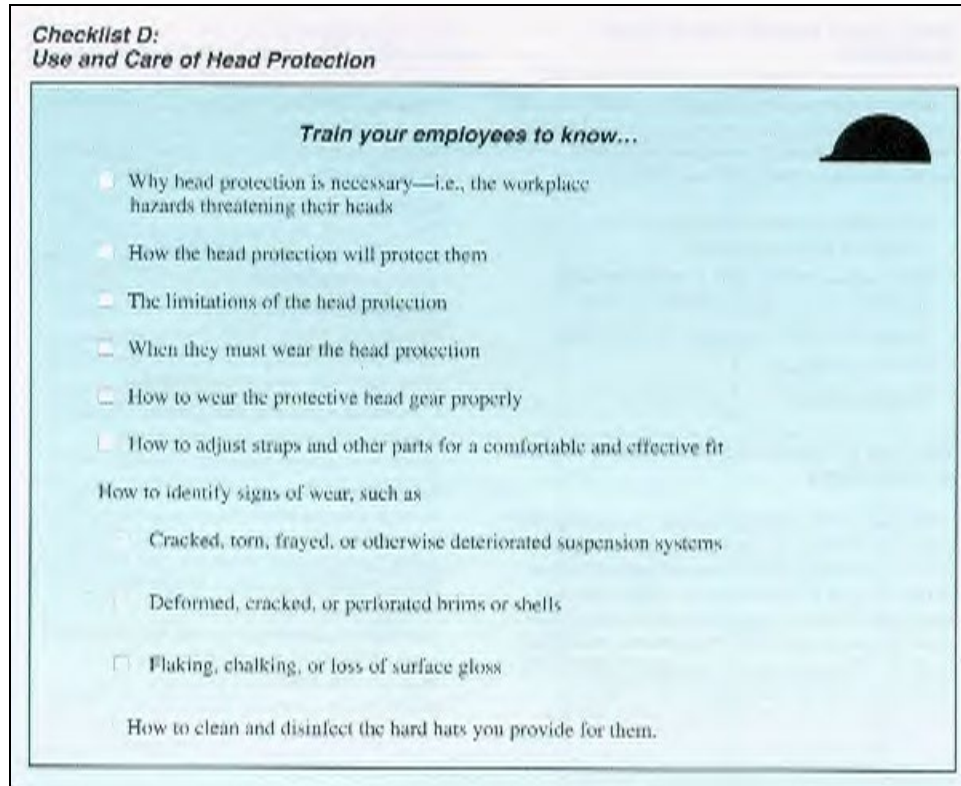
To protect employees working below, you must provide chin straps for the protective helmets worn by employees working at higher elevations, whether in an aerial lift or at the edge of a pit. The chin straps should be designed to prevent the hard hats from being bumped off the employees' heads.

**Can I require employees to cut their hair if it is long enough to get tangled in machinery?**

Long hair (longer than four inches) can be drawn into machine parts such as chains, belts, rotating devices, suction devices, and blowers. Hair may even be drawn into machines otherwise guarded with mesh. Although you need not require your employees to cut their hair, you must require them to cover and protect their hair with bandanas, hair nets, turbans, soft caps, or the like. These items, however, must not themselves present a hazard.

**Once I have selected helmets to protect my employees' heads, how do I make sure they use them properly?**

Train your employees to use the hard hats. Checklist D will help you instruct your employees to use and care for the head protection you provide.



**How do I make sure that the hard hats I provide will be kept in good condition?**

You must train your employees to maintain and care for the head protection. Your training communicates the importance of wearing head protection and taking proper care of it. Important information you will want to consider when training employees on how to care for their hard hats includes the following:

Paints, paint thinners, and some cleaning agents can weaken the shell of the hard hat and may eliminate electrical resistance. Consult the helmet manufacturer for information on the effects of paint and cleaning materials on their hard hats. Keep in mind that paint and stickers can also hide signs of deterioration in the hard hat shell. Limit their use.

Ultraviolet light and extreme heat, such as that generated by sunlight, can reduce the strength of the hard hats. Therefore, employees should not store or transport hard hats on the rear-window shelves of automobiles or otherwise in direct sunlight.

Also, instruct employees to clean the protective helmets periodically by:

Immersing for one minute in hot (approximately 140o F, or 60o C) water and detergent,

Scrubbing, and

Rinsing in clear hot water.

## Foot and Leg Protection

### When must I provide foot and leg protection?

You must provide foot and leg protection if your workplace hazard assessment reveals potential dangers to these parts of the body. Some of the potential hazards you might identify include the following:

- Heavy objects such as barrels or tools that might roll onto or fall on employees' feet.
- Sharp objects such as nails or spikes that might pierce the soles or uppers of ordinary shoes.
- Molten metal that might splash on feet or legs
- Hot or wet surfaces.
- Slippery surfaces.

### What are the types of protection and where do I use them?

The type of foot and leg protection you provide your employees will depend upon the specific workplace hazards you identify, and the specific parts of the feet or legs exposed to potential injury. Safety footwear must meet minimum compression and impact performance standards and testing requirements established by ANSI. Protective footwear purchased after July 5, 1994, must meet the requirements of ANSI Z41-1991.(8) Protective footwear bought before that date must comply with ANSI Z41-1967. Foot and leg protection choices includes the following:

**Leggings.** Use these to protect the lower legs and feet from heat hazards, like molten metal or welding sparks. Safety snaps allow leggings to be removed quickly.

**Metatarsal guards.** Made of aluminum, steel, fiber, or plastic, these guards maybe strapped to the outside of shoes to protect the instep area from impact and compression.

**Toe guards.** Toe guards may be made of steel, aluminum, or plastic. They fit over the toes of regular shoes. These guards protect only the toes from impact and compression hazards.

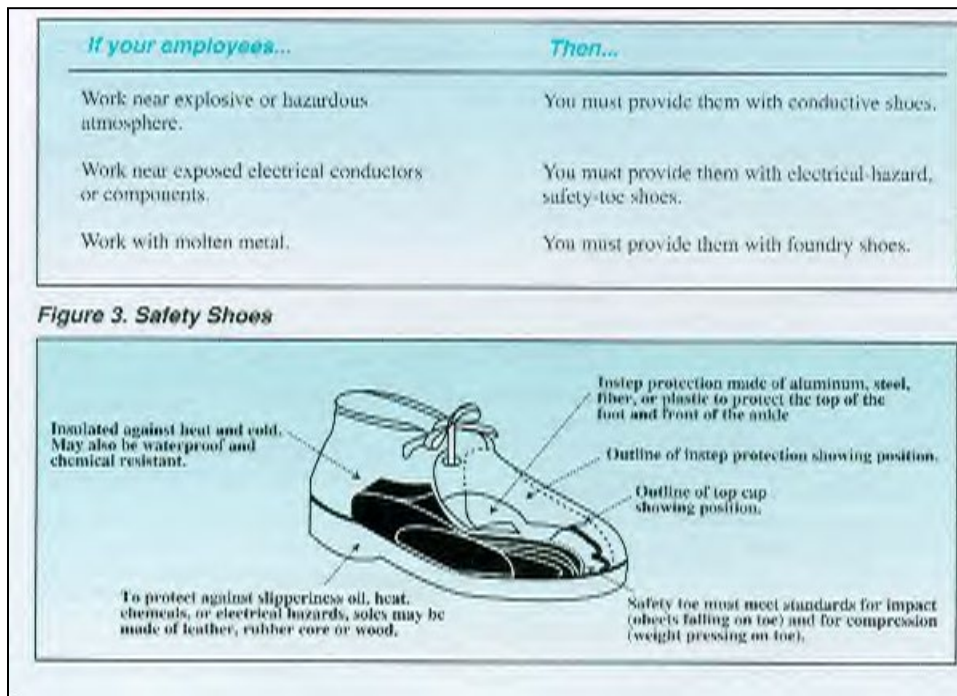
Combination foot and shin guards. These guards may be used in combination with toe guards when greater protection is needed.

**Safety shoes.** These sturdy shoes have impact-resistant toes and heat-resistant soles that protect against hot work surfaces common in roofing, paving, and hot metal industries. The metal insoles of some safety shoes protect against puncture wounds. Safety shoes may also be designed to be electrically conductive to prevent the buildup of static electricity in areas with the potential for explosive atmospheres, or nonconductive to protect workers from workplace electrical hazards.

### What should I look for when choosing safety shoes for my employees?

Generally, safety shoes must be sturdy and must have impact-resistant safety toes, instep protection, and heat-resistant soles (see Figure 3). All safety shoes must comply with the ANSI standard(s) mentioned above. In addition, depending on the types of worker exposures, you may

need to provide specially designed safety shoes such as conductive or electrical-hazard safety shoes.



### Conductive Shoes

Electrically conductive shoes protect against the buildup of static electricity. Essentially, these shoes ground the employees wearing them. Employees working in explosive and hazardous locations such as explosives manufacturing facilities or grain elevators must wear conductive shoes to reduce the risk of static electricity buildup on an employee's body that could produce a spark and cause an explosion or fire. During training, employees must be instructed not to use foot powder or wear socks made of silk, wool, or nylon with conductive shoes. Foot powder insulates and retards the conductive ability of the shoes. Silk, wool, and nylon produce static electricity.

Conductive shoes are not general-purpose shoes and must be removed upon completion of the tasks for which they are required. Employees exposed to electrical hazards must never wear conductive shoes.

### Electrical Hazard, Safety-Toe Shoes

Electrical hazard, safety-toe shoes are nonconductive and will prevent your employees' feet from completing an electrical circuit to the ground. They can protect employees against open circuits of up to 600 volts in dry conditions. Electrical hazard, safety-toe shoes should be used in conjunction with other insulating equipment and precautions to reduce or eliminate the potential for your employees' bodies or parts of their bodies to provide a path for hazardous electrical energy. Note: Nonconductive footwear must not be used in explosive or hazardous locations; in such locations, electrically conductive shoes are required.

Train your employees to recognize that the insulating protection of electrical hazard, safety-toe shoes may be compromised if

- The shoe is wet
- The rubber sole is worn through
- Metal particles become embedded in the sole or heel; or
- Other parts of the employees' bodies come into contact with conductive, grounded items.


**Checklist E:  
Use and Care of Foot and Leg Protection**

*Train your employees to know...*

- Why foot or leg protection is necessary—i.e., the workplace hazards that threaten the feet or legs
- How the equipment you provide will protect your employees
- The limitations of the foot or leg protection
- When employees must wear the protective leggings, guards, or shoes
- How to properly put on the protective equipment
- How to adjust straps, laces, and other parts for a comfortable and effective fit

How to identify signs of wear such as

- Scuffed, cracked, or lacerated uppers
- Signs of separation between soles and uppers
- Holes or cracks in soles or heel
- Metal embedded in heels or soles of electrical hazard, safety-toe shoes
- How to clean and maintain the leg and foot protection you provide



## Foundry Shoes

In addition to insulating your employees' feet from the extreme heat of molten metal, foundry shoes prohibit hot metal from lodging in shoe eyelets, tongues, or other parts. These snug-fitting leather or leather-substitute shoes have leather or rubber soles and rubber heels. In addition, all foundry shoes must have built-in safety toes.

### **Once I have selected equipment to protect my employees' feet and legs, how do I make sure they use it properly?**

Train your employees to use the protective footwear. Checklist E will help you instruct your employees to use and care for the foot and leg protection you provide.

## Hand and Arm Protection

### When must I provide hand and arm protection?

If your workplace hazard assessment reveals that your employees risk injury to their hands and arms, and engineering and work practice controls do not eliminate the hazards, you must provide your employees with appropriate protection. The injuries you may need to guard against in your workplace include the following:

- Burns
- Bruises
- Abrasions
- Cuts
- Punctures
- Fractures
- Amputations
- Chemical exposures.

### What kind of equipment is necessary to protect the hands and arms?

For many workplace operations, machine guards such as point-of-operation guards will be sufficient. For example, install a barrier that makes it impossible for employees to put their hands at the point where a table saw blade contacts the wood it cuts. For other hazardous operations, you may be able to institute work procedures that eliminate the risk of injury to your employees' hands or arms. When such measures fail to eliminate the hazard, however, protective gloves will be the primary means of protecting employees' hands. When the risk of injury includes the arm, protective sleeves, often attached to the gloves, may be appropriate.

### Is there one kind of glove that will protect against all workplace hazards?

No. The nature of the hazard(s) and the operation to be performed will determine your selection of gloves. The variety of potential occupational hand injuries may make selecting the appropriate pair of gloves more difficult than choosing other protective equipment. Take care to choose gloves designed for the particular circumstances of your workplace.

### What kinds of protective gloves are available?

Gloves made from a wide variety of materials are designed for virtually every workplace hazard. In general, however, they may be divided into four groups:

- Durable work gloves made of metal mesh, leather, or canvas.
- Fabric and coated fabric gloves.
- Chemical and liquid resistant gloves.
- Insulating rubber gloves. (9)

### Metal Mesh, Leather, or Canvas Gloves

Sturdy gloves made from metal mesh, leather, or canvas provide protection against cuts, burns, and sustained heat.



**Leather gloves.** Leather gloves protect against sparks, moderate heat, blows, chips, and rough objects. Welders in particular need the durability of higher-quality leather gloves.

**Aluminized gloves.** These gloves usually are used for welding, furnace, and foundry work because they provide reflective and insulating protection against heat. Aluminized gloves require an insert made of synthetic materials that protect against heat and cold.

**Aramid fiber gloves.** Aramid is a synthetic material that protects against heat and cold. Many glove manufacturers use aramid fiber to make gloves that are cut- and abrasive-resistant and wear well.

**Other synthetic materials.** Several manufacturers make gloves with other synthetic fabrics that offer protection against heat and cold. In addition to protection against temperature extremes, gloves made with other synthetic materials are cut- and abrasive-resistant and may withstand some diluted acids. These materials do not stand up against alkalis and solvents.

### **Fabric and Coated Fabric Gloves**

These gloves are made of cotton or other fabric to provide varying degrees of protection.

**Fabric gloves.** These gloves can protect against dirt, slivers, chafing, and abrasion. These gloves do not provide sufficient protection, however, to be used with rough, sharp, or heavy materials.

Adding a plastic coating to some fabric gloves strengthens them and makes them effective protection for a variety of tasks.

**Coated fabric gloves.** Manufacturers normally make these gloves from cotton flannel with napping on one side. By coating the unnapped side with plastic, fabric gloves are transformed into general-purpose hand protection offering slip-resistant qualities. These gloves are used for tasks ranging from handling bricks and wire rope to handling chemical containers in laboratory operations. When selecting gloves to protect against chemical exposure hazards, always check with the manufacturer (or review the manufacturer's product literature) to determine the gloves' effectiveness against the specific chemicals and conditions in the workplace.

### **Chemical- and Liquid-Resistant Gloves**

Gloves made of rubber (latex, nitrile, or butyl), plastic, or synthetic rubber-like material such as neoprene protect workers from burns, irritation, and dermatitis caused by contact with oils, greases, solvents, and other chemicals. The use of rubber gloves also reduces the risk of exposure to blood and other potentially infectious substances. Some common gloves used for chemical protection are described below. In addition, Table 4 rates various gloves as protectors against specific chemicals and will help you select the most appropriate gloves to protect your employees.

**Butyl rubber gloves.** These gloves protect against nitric acid, sulfuric acid, hydrofluoric acid, red fuming nitric acid, rocket fuels, and peroxide. Highly impermeable to gases, chemicals, and water vapor, butyl rubber gloves also resist oxidation and ozone corrosion. In addition, they resist abrasion and remain flexible at low temperatures.

**Natural latex or rubber gloves.** The comfortable wear and pliability of latex gloves as well as their protective qualities make them a popular general-purpose glove. In addition to resisting abrasions caused by sandblasting, grinding, and polishing, these gloves protect workers' hands from most water solutions of acids, alkalis, salts, and ketones. When selecting hand protection, you should be aware that latex gloves have caused allergic reactions in some individuals and thus may not be appropriate for all your employees. Hypoallergenic gloves, glove liners, and powderless gloves are possible alternatives for individuals who are allergic to latex gloves.

**Neoprene gloves.** These gloves have good pliability, finger dexterity, high density, and tear resistance which protect against hydraulic fluids, gasoline, alcohols, organic acids, and alkalis.

**Nitrile rubber gloves.** These sturdy gloves provide protection from chlorinated solvents such as trichloroethylene and perchloroethylene. Although intended for jobs requiring dexterity and sensitivity, nitrile gloves stand up to heavy use even after prolonged exposure to substances that cause other gloves to deteriorate. In addition, nitrile gloves resist abrasions, punctures, snags, and tears.


### How do I make sure my employees properly use the equipment I have selected?

Train your employees to use the protective gloves and sleeves. Checklist F will help you teach your employees how to use and care for the equipment.

**Checklist F:**  
**Use and Care of Hand and Arm Protection**

*Train your employees to know...*

- Why hand and arm protection is necessary—i.e., the workplace hazards that threaten their hands and arms,
- How the protective gloves and sleeves will protect them
- The limitation of the protective equipment you've supplied
- When they must wear the gloves and sleeves
- How to wear the protective gloves and sleeves properly
- How to ensure a comfortable and effective fit
- How to identify signs of wear, such as
  - Cracks, scrapes, or lacerations
  - Thinning or discoloration
  - Break through to the skin
- How to clean and disinfect the nondisposable protective gloves and sleeves



## Body Protection

### When must I provide my employees with full body protection?

You must provide body protection for employees if they are threatened with bodily injury of one kind or another while performing their jobs, and if engineering, work practice, and administrative controls have failed to eliminate these hazards. Workplace hazards that could cause bodily injury include the following:

- Intense heat
- Splashes of hot metals and other hot liquids
- Impacts from tools, machinery, and materials
- Cuts
- Hazardous chemicals
- Contact with potentially infectious materials, like blood
- Radiation.

### If only part of the body faces potential injury, must I provide my employees with full body protection?

As with all protective equipment, protective clothing is available to protect against specific hazards. You need to provide personal protective equipment only for the parts of the body exposed to possible injury. Depending upon hazards in your workplace, you may need to provide your employees with one or more of the following:

- Vests
- Jackets
- Aprons
- Coveralls
- Surgical gowns
- Full body suits.

If your hazard assessment indicates that you must provide full body protection against toxic substances or harmful physical agents, you must:

- Inspect the clothing carefully,
- Ensure proper fit, and
- Make sure the protective clothing functions properly.

### From what material should protective clothing be made?

Protective clothing comes in a variety of materials, each suited to particular hazards. Conduct your hazard assessment. Identify the sources of any possible bodily injury. Install any feasible engineering controls, and institute work practice controls to eliminate the hazards. If the possibility of bodily injury still exists, provide protective clothing constructed of material that will protect against the specific hazards in your workplace. Materials for protective clothing include the following:

- Paper like fiber.** Disposable suits made of this material provide protection against dust and splashes.

**Treated wool and cotton.** Protective clothing made from treated wool and cotton adapts well to changing workplace temperatures and is comfortable as well as fire resistant. Treated cotton and wool clothing protects against dust, abrasions, and rough and irritating surfaces.

**Duck.** This closely woven cotton fabric protects employees against cuts and bruises while they handle heavy, sharp, or rough materials.

**Leather.** Leather protective clothing is often used against dry heat and flame.

**Rubber, rubberized fabrics, neoprene, and plastics.** Protective clothing made from these materials protect against certain acids and other chemicals.

Be aware that different materials will protect against different chemical and physical hazards. When chemical or physical hazards are present, check with the clothing manufacturer to make sure that the material selected will provide protection from the specific chemical or physical hazards in your workplace.

### How do I make sure employees properly use the body protection I provide?

Train your employees to use the protective clothing. Checklist G will help you instruct them in the use and care of the body protection.

**Avoiding the Itch...**

Among the services offered by a general contractor is the installation of fiberglass insulation. In addition to the hazards posed by airborne glass fibers from the insulation, fiberglass insulation irritates skin. Also, the insulation often is installed in attics during the summer heat.


The contractor provides employees with cotton gloves and long-sleeve cotton flannel shirts to wear while installing fiberglass insulation. The heavy cotton protects against the skin irritation while still providing as much breathability as possible.

The contractor also provides employees with respirators selected in accordance with applicable OSHA standards to protect against breathing fiberglass.

**Checklist G:  
Use and Care of Body Protection**

**Train your employees to know...**

- Why protective clothing is necessary—i.e. the workplace hazards that threaten their bodies
- How the protective clothing will protect them
- The limitation of the body protection
- When they must wear the protective clothing
- How to put on the protective clothing properly
- How to adjust parts for a comfortable and effective fit
- How to identify signs of wear, such as
  - Rips, tears, scuffs, and
  - Loss of elasticity in tight-fitting parts
- How to clean and disinfect the protective clothing



## Hearing Protection

### When must I provide hearing protection for my employees?

Determining the need to provide hearing protection can be tricky. Employee exposure to excessive noise depends upon a number of factors:

How loud is the noise as measured in decibels (dBA)?

What is the duration of each employee's exposure to the noise?

Do employees move between separate work areas with different noise levels?

Is noise generated from one source or multiple sources?

Generally, the louder the noise, the shorter the exposure time before you must provide hearing protection. For instance, employees may be exposed to a noise level of 90 dBA for 8 hours per day before you must provide hearing protection for them. Suppose, however, that the noise level reaches 115 dBA in your workplace. Then you must provide hearing protection if their anticipated exposure exceeds 15 minutes.

Table 5 shows when you must provide hearing protection to employees exposed to occupational noise at specific levels for specific periods. Noises are considered continuous if the interval between occurrences of the maximum noise level is 1 second or less. Noises not meeting this definition are considered impact or impulse noises. Exposure to impact or impulse noises (loud momentary explosions of sound) must not exceed 140 dB. Examples of impact or impulse noises may include the noise from a powder-actuated nail gun, the noise from a punch press, or the noise from drop hammers.

Duration per day, hours	Sound level dBA slow response
8	90
6	92
4	95
3	97
2	100
1 1/2	102
1	105
1/2	110
1/4 or less	115

*Source: 29 CFR 1910.95 Table G-16.*

For more information on noise, consult Chapter II:5, "Noise Measurement," of the OSHA Technical Manual.(10)

### Will earplugs reduce employee exposure to high noise levels?

As with other types of hazards, you must implement feasible engineering controls and work practices before resorting to PPE such as earplugs or earmuffs. If engineering and work practice controls do not lower employee exposure to workplace noise to acceptable levels, then you must provide employees with appropriate PPE.

### What if my employees are exposed to different levels of noise throughout the day?

If employees move from location to location and the noise level is different in each location, or if the noise levels in an area change throughout the day (e.g., equipment turns on or off), you must calculate an "equivalent noise factor" to determine whether you must provide hearing protection. The formula for calculating this exposure is as follows:

$$F_e = (C_1/T_1) + (C_2/T_2) \dots (C_n/T_n)$$

Where

$F_e$  = the equivalent noise factor.  
 $C$  = the period of actual noise exposure at an essentially constant level at each location in which the employee works.  
 $T$  = the permissible duration of noise exposure at an essentially constant noise level, from *Table 5*.

Measure the noise level at each location in which the employee works.

For each noise level, find the allowable duration in Table 5.

For each location, divide the actual time the employee spends there by the permissible duration for the noise at the measured level, according to Table 5.

Add all the results from your division.

If the total is greater than one, you must implement engineering controls or work practices or provide hearing protection to your exposed employees.

### What kinds of devices protect against high noise levels? Is cotton sufficient as earplugs?

**Plain cotton.** Plain cotton does not effectively protect against occupational noise. You may, however, choose from several products that are effective at protecting your employees' hearing.

**Single-use earplugs.** Made of waxed cotton, foam, or fiberglass wool, these ear plugs are self-forming and, when properly inserted, work as well as most molded earplugs.

**Preformed or molded earplugs.** Sometimes single use and disposable, these plugs must be individually fitted by a professional. Non-disposable plugs should be cleaned after each use.

**Earmuffs.** Earmuffs require a perfect seal around the ear. Glasses, long sideburns, long hair, and facial movements such as chewing may reduce the protective value of earmuffs. You may purchase special earmuffs designed for use with eyeglasses or beards.

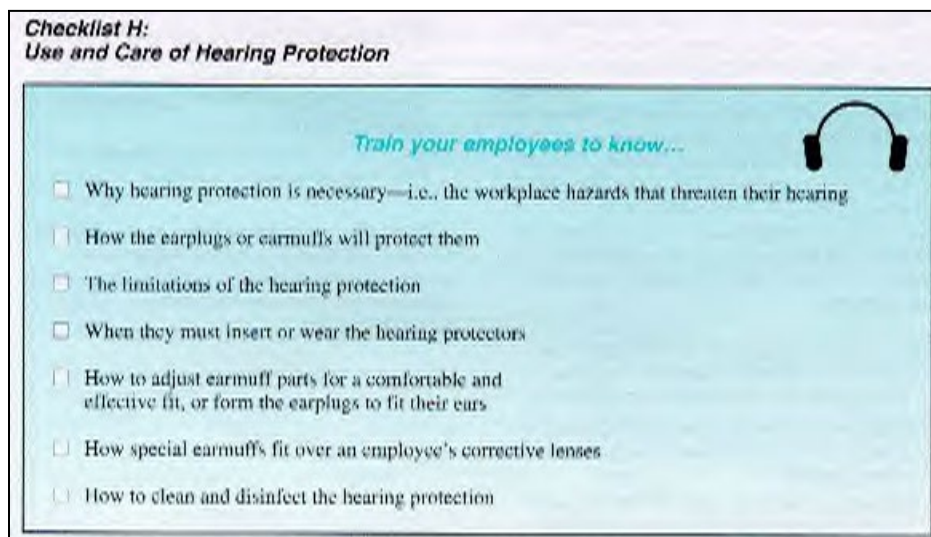


**If I provide my employees with hearing protection, can they then work in areas with any level of noise for any period of time?**

No. Hearing protectors reduce only the amount of noise that gets through to the ears. The amount of this reduction is referred to as attenuation. Attenuation differs according to the type of hearing protection used and how well they fit. The hearing protectors you choose must be capable of achieving the attenuation needed to reduce the employee's noise exposure to within the acceptable limits noted in Table 5. Appendix B of 29 CFR 1910.95, Occupational Noise Exposure, describes methods for estimating the attenuation of a particular hearing protector based on the device's noise reduction rating (NRR). Manufacturers of hearing protection devices must report the device's NRRs on the product packaging.

**Once I have selected equipment to protect my employees' hearing, how do I make sure they use it properly?**

Train your employees to use the hearing protection. Checklist H will help you train your employees to use and care for the earplugs or earmuffs that you provide.



**Once I have provided my employees with hearing protection and training in how to use it, how do I know that it is really protecting their hearing?**

If your employees are exposed to occupational noise at or above 85 dBA averaged over an 8-hour period, then you must institute a hearing conservation program that includes regular testing of employees' hearing by qualified professionals. The OSHA occupational noise standard, at 29 CFR 1910.95, sets forth the requirements for a hearing conservation program.

## Summary

You must consider many factors when selecting PPE to protect your employees from workplace hazards. With all the types of operations that can present hazards and all of the types of PPE available to protect the different parts of a worker's body from specific types of hazards, this selection process can be confusing and at times overwhelming. Because of this, OSHA requires that you implement a PPE program to help you systematically assess the hazards in the workplace and select the appropriate PPE that will protect your workers from those hazards. As part of this PPE program, you must do the following:

Assess the workplace to identify equipment, operations, chemicals, and other workplace components that could harm your employees.

Implement engineering controls and work practices to control or eliminate these hazards to the extent feasible.

Select the appropriate types of PPE to protect your employees from hazards that cannot be eliminated or controlled through engineering controls and work practices.

Inform your employees why the PPE is necessary and when it must be worn.

Train your employees how to use and care for the selected PPE and how to recognize PPE deterioration and failure.

Require your employees to wear the selected PPE in the workplace.

The basic information presented here attempts to establish and illustrate a logical, structured approach to hazard assessment and PPE selection and application for you to use as a starting point for your PPE program.

## Safety and Health Program Management Guidelines

Effective management of worker safety and health protection is a decisive factor in reducing the extent and severity of work-related injuries and illnesses and their related costs. To assist employers and employees in developing effective safety and health programs, OSHA published recommended Safety and Health Program Management Guidelines (Federal Register 54 (18): 3908-3916, January 26, 1989). These voluntary guidelines apply to all places of employment covered by OSHA.

The guidelines identify four elements that are critical to the development of a successful safety and health management program:

- Management commitment and employee involvement
- Worksite analysis
- Hazard prevention and control
- Safety and health training.

The guidelines recommend specific actions under each of these general elements to achieve an effective safety and health program. A single free copy of the guidelines can be obtained from the U.S. Department of Labor, OSHA/OSHA Publications, P.O. Box 37535, Washington, DC



20013-7535, by sending a self-addressed mailing label with your request. See also Federal Register notices on OSHA'S Web site at <http://www.osha.gov>.

### **State Programs**

The Occupational Safety and Health Act of 1970 encourages states to develop and operate their own job safety and health plans. States with plans approved under section 18(b) of the Act must adopt standards and enforce requirements that are at least as effective as federal requirements. There are currently 25 state-plan states: 23 of these states administer plans covering both private and public (state and local government) employees (*including Tennessee*); the other two states, Connecticut, and New York, cover public employees only. Plan states must adopt standards comparable to Federal requirements within 6 months of a Federal standard's promulgation. Until a state standard is promulgated, Federal OSHA provides interim enforcement assistance, as appropriate, in these states.

### **Training and Education**

OSHA's area offices offer a variety of information services such as publications, audiovisual aids, technical advice, and speakers for special engagements. OSHA's Training Institute in Des Plaines, IL, provides basic and advanced courses in safety and health for federal and state compliance officers, state consultants, federal agency personnel, and private-sector employers, employees, and their representatives.

The OSHA Training Institute also has established OSHA Training Institute Education Centers to address the increased demand for its courses from the private sector and from other Federal agencies. These centers are nonprofit colleges, universities, and other organizations that have been selected after a competition for participation in the program. They are located in various parts of the United States.

OSHA also provides grants to nonprofit organizations for workplace training and education in subjects where OSHA believes there is a lack of workplace training. Grants are awarded annually, and grant recipients are expected to contribute 20 percent of the total grant cost.

For more information on grants, training, and education, contact the OSHA Training Institute, Office of Training and Education, 1555 Times Drive, Des Plaines, IL 60018, telephone (847) 297-4810.

## Electronic Information

**Internet:** OSHA standards, interpretations, directives, and additional information are now on the Worldwide Web at <http://www.osha.gov/>.

**CD-ROM:** A wide variety of OSHA materials including standards, interpretations, directives, and more can be purchased on the OSHA CD-ROM.

## Emergencies

For life-threatening situations, call *MTSU Environmental Health and Safety Services at 898-5784 or TOSHA at 741-2793*.

## Further Information

For further information on any OSHA program, contact your nearest OSHA area or regional office.

TOSHA  
Tennessee Department of Labor  
3rd Floor  
710 James Robertson Parkway  
Nashville, TN 37243-0659  
(615) 741-2793

## Footnotes

**Footnote(1)** To obtain copies of the CFR, *contact MTSU Environmental Health and Safety Services at 898-5784 or TOSHA at 741-2793*.

**Footnote(2)** CPL 2-2.54, 2/10/1992, on <http://www.osha-slc.gov/>.

**Footnote(3)** ANSI, 11 West 42nd St., New York, NY 10035. (Back to Text)

**Footnote(4)** ANSI, Z87. 1, Occupational and Educational Eye and Face Protection. (Back to

**Footnote(5)** TED 1.15, September 22, 1995. See OSHA Technical Manual under Other OSHA Documents at <http://www.osha.gov>. Copies of the manual may also be purchased from the Superintendent of Documents, Government Printing Office, Washington, DC 20402. The price of the subscription is \$40 and the order number is 929-060-0000-8. GPO's phone number is (202) 512-1800; the fax number is (202) 512-2250.

**Footnote(6)** The manufacturer usually provides this information on the laser.

**Footnote(7)** ANSI Z89.1, Protective Headwear for Industrial Workers.

**Footnote(8)** ANSI Z41, Protective Footwear.

**Footnote(9)** See 29 CFR 1910.137 for detailed requirements for the selection and use of insulating rubber gloves.

**Footnote(10)** TED 1.15, 9/22/1995, on <http://www.osha-slc.gov/>.

## **APPENDIX C OSHA GENERAL INDUSTRY STANDARDS**

### **Introduction**

The following information is the text of a booklet produced by OSHA that is intended to provide a non-exhaustive, generic overview of particular standards related topics. This information is public domain and may be reproduced, fully or partially, without permission of the Federal Government or MTSU. However, because interpretations and OSHA enforcement policy may change over time, users of this handbook should consult current administrative interpretations and decisions by the Occupational Safety and Health Review Commission and the courts. This information is available internet at <http://www.osha.gov/>.

### **GENERAL INDUSTRY DIGEST**

**U.S. Department of Labor  
Robert B. Reich, Secretary**

**Occupational Safety and Health Administration  
Joseph A. Dear, Assistant Secretary**

**OSHA 2201  
1994 (Revised)**

### **Foreword**

The General Industry safety and health standards contained in this booklet are to aid employers, supervisors, and safety and health personnel in their efforts toward achieving voluntary compliance with OSHA standards in the workplace.

Although the digest does not contain all the General Industry safety and health standards, the ones presented here are (1) standards most frequently overlooked by the employer, and (2) standards covering particularly hazardous situations. The standards are presented alphabetically followed by the reference to the appropriate standard. With few exceptions, the standards in this digest are from Title 29 of the Code of Federal Regulations (CFR), Part 1910.

This booklet also contains (1) a brief discussion of the essential elements of a generally applicable safety and health program, (2) a reminder to the employer of the advisability of regular employee training for job safety and health, and (3) a description of OSHA's Onsite Consultation Program available to the employer.

Remember... This booklet is only a digest of basic applicable standards. This digest should in no way be considered as a complete substitute for any provisions of the Occupational Safety and Health Act of 1970, or for any standards promulgated under the Act. The requirements contained herein have been summarized and are abbreviated. The actual source standards are noted at the end of each paragraph; the CFR should be consulted for a more complete explanation of the specific standards listed.

## **Safety and Health Program Management Guidelines**

Effective management of worker safety and health protection is a decisive factor in reducing the extent and severity of work-related injuries and illnesses and related costs. In 1982, OSHA began to approve worksites with exemplary safety and health management programs for participation in Voluntary Protection Programs (VPP). More information on VPP can be obtained from your OSHA Regional or Area Office listed at the end of this publication.

In 1989, OSHA issued recommended guidelines for the effective management and protection of worker safety and health. These guidelines are summarized in the following paragraphs.<sup>1</sup>

<sup>1</sup>The complete original text of the non-mandatory guidelines is found in the *Federal Register* 54 (18): 3094-3916, January 26, 1989.

### **General**

Employers are advised and encouraged to institute and maintain in their establishments a program that provides adequate systematic policies, procedures, and practices that protect their employees from, and allow them to recognize, job-related safety and health hazards.

An effective program includes provisions for the systematic identification, evaluation, and prevention or control of general workplace hazards, specific job hazards, and potential hazards that may arise from foreseeable conditions.

Although compliance with the law, including specific OSHA standards, is an important objective, an effective address all hazards. It seeks to prevent injuries and illnesses, whether or not compliance is at issue.

The extent to which the program is described in writing is less important than how effective it is in practice. As the size of a worksite or the complexity of a hazardous operation increases, however, the need for written guidance increases to ensure clear communication of policies and priorities as well as a consistent and fair application of rules.

### **Major Elements**

An effective occupational safety and health program will include the following four main elements: management commitment and employee involvement, worksite analysis, hazard prevention and control, and safety and health training.

#### **1. Management Commitment and Employee Involvement**

The elements of management commitment and employee involvement are complementary and form the core of any occupational safety and health program. Management's commitment provides the motivating force and the resources for organizing and controlling activities within an organization. In an effective program, management regards worker safety and health as a fundamental value of the organization and applies its commitment to safety and health protection with as much vigor as to other organizational goals.

Employee involvement provides the means by which workers develop and/or express their own commitment to safety and health protection for themselves and for their fellow workers.

In implementing a safety and health program, there are various ways to provide commitment and support by management and employees. Some recommended actions are described briefly as follows:

- State clearly a worksite policy on safe and healthful work and working conditions so that all personnel with responsibility at the site (and personnel at other locations with responsibility for the site) fully understand the priority and importance of safety and health protection in the organization.
- Establish and communicate a clear goal for the safety and health program and define objectives for meeting that goal so that all members of the organization understand the results desired and the measures planned for achieving them.
- Provide visible top management involvement in implementing the program so that all employees understand that management's commitment is serious.
- Arrange for and encourage employee involvement in the structure and operation of the program and in decisions that affect their safety and health so they will commit their insight and energy to achieving the safety and health program's goals and objectives.
- Assign and communicate responsibility for all aspects of the program so that managers, supervisors, and employees in all parts of the organization know what performance is expected of them.
- Provide adequate authority and resources to responsible parties so that assigned responsibilities can be met.
- Hold managers, supervisors, and employees accountable for meeting their responsibilities so that essential tasks will be performed.
- Review program operations at least annually to evaluate their success in meeting the goals and objectives, so that deficiencies can be identified and the program and/or the objectives can be revised when they do not meet the goal of effective safety and health protection.

## **2. Worksite Analysis**

A practical analysis of the work environment involves a variety of worksite examinations to identify existing hazards and conditions and operations in which changes might occur to create new hazards. Unawareness of a hazard stemming from failure to examine the worksite is a sign that safety and health policies and/or practices are ineffective. Effective management actively analyzes the work and worksite to anticipate and prevent harmful occurrences. So that all hazards and potential hazards are identified, the following measures are recommended:

- Conduct comprehensive baseline worksite surveys for safety and health and periodic comprehensive update surveys and involve employees in this effort.
- Analyze planned and new facilities, processes, materials, and equipment.
- Perform routine job hazard analyses.
- Conduct regular site safety and health inspections so that new or previously missed hazards and failures in hazard controls are identified.
- Assess risk factors of ergonomic applications to workers' tasks.
- Provide a reliable system for employees to notify management personnel about conditions that appear hazardous and to receive timely and appropriate responses and encourage employees to use the system without fear or reprisal. This system utilizes employee insight and experience in safety and health protection and allows employee concerns to be addressed.

- Investigate accidents and "near miss" incidents so that their causes and means for their prevention can be identified.
- Analyze injury and illness trends over time so that patterns with common causes can be identified and prevented.
- Use OSHA's Computer-Disk, Read-Only-Memory (CD-ROM)<sup>2</sup>, to review case studies that might be pertinent to worksite analyses and hazard identification.

<sup>2</sup>OSHA's CD-ROM contains various data on standards, directives, and variances. Order from the U.S. Government Printing Office, Superintendent of Documents, Washington, DC 20402-9325, (202) 783-3238, Fax (202) 512-2250. Order No. 729-013-00000-5, \$88 per year (quarterly updates), or \$28 per single disk.

### **3. Hazard Prevention and Control**

Where feasible, workplace hazards are prevented by effective design of the job site or job. Where it is not feasible to eliminate such hazards, they must be controlled to prevent unsafe and unhealthful exposure. Elimination or control must be accomplished in a timely manner once a hazard or potential hazard is recognized. Specifically, as part of the program, employers should establish procedures to correct or control present or potential hazards in a timely manner. These procedures should include measures such as the following:

- Use engineering techniques where feasible and appropriate.
- Establish, at the earliest time, safe work practices and procedures that are understood and followed by all affected parties. Understanding and compliance are a result of training, positive reinforcement, correction of unsafe performance, and if necessary, enforcement through a clearly communicated disciplinary system.
- Provide personal protective equipment when engineering controls are not feasible.
- Use administrative controls, such as reducing the duration of exposure.
- Maintain the facility and equipment to prevent equipment breakdowns.
- Plan and prepare for emergencies, and conduct training and emergency drills, as needed, to ensure that proper responses to emergencies will be "second nature" for all persons involved.
- Establish a medical program that includes first aid onsite as well as nearby physician and emergency medical care to reduce the risk of any injury or illness that occurs.

### **4. Safety and Health Training**

Training is an essential component of an effective safety and health program. Training helps identify the safety and health responsibilities of both management and employees at the site. Training is often most effective when incorporated into other education on performance requirements and job practices. The complexity of training depends on the size and complexity of the worksite as well as the characteristics of the hazards and potential hazards at the site.

#### ***Employee Training***

Employee training programs should be designed to ensure that all employees understand and are aware of the hazards to which they may be exposed and the proper methods for avoiding such hazards.

## **Supervisory Training**

Supervisors should be trained to understand the key role they play in job site safety and to enable them to carry out their safety and health responsibilities effectively. Training programs for supervisors should include the following objectives:

- Analyze the work under their supervision to anticipate and identify potential hazards.
- Maintain physical protection in their work areas.
- Reinforce employee training on the nature of potential hazards in their work and on needed protective measures through continual performance feedback and, if necessary, through enforcement of safe work practices.
- Understanding their safety and health responsibilities.

## **Employee Training for Safety and Health**

Many standards promulgated by OSHA explicitly require the employer to train employees in the safety and health aspects of their jobs. Other OSHA standards make it the employer's responsibility to limit certain job assignments to employees who are "certified," "competent," or "qualified," meaning that they have had special previous training. This should be an essential part of every employer's program for protecting workers from accidents and illnesses. Many researchers conclude that those who are new on the job have a higher rate of accidents and injuries than more experienced workers. This may be due to ignorance of specific job hazards and/or of proper work practices, and if so, training may help provide a solution.

It is good safety and business practice for employers to keep records of all safety and health training. Records can provide evidence of the employer's good faith and compliance with OSHA standards. Documentation can also supply an answer to one of the first questions an accident investigator will ask: "Was the injured employee properly trained to do the job?"

Training in the proper performance of a job is time and money well spent, and the employer should regard it as an investment rather than an expense. An effective program of safety and health training for workers can result in fewer accidents and illnesses, improved morale, lower insurance premiums, and reduced liability, among other benefits.

## **The Onsite Consultation Program**

The onsite safety and health consultation program is available in all states to employers who want help in recognizing and correcting safety and health hazards in their workplaces through free onsite consultation services funded by OSHA. The service is performed by state governments using well-trained professional staffs.

The onsite consultation program is one of the several that OSHA designed to assist employers in voluntarily fulfilling their responsibilities for workplace safety and health.

Primarily targeted for smaller businesses, the onsite consultation program is completely separate from the OSHA inspection effort. No citations are issued, or penalties proposed for any safety or health problems found in your workplace. The service is confidential. Your name, your firm's name, and any information you provide about your workplace, plus any unsafe or unhealthful working conditions that the consultant uncovers, will not be reported routinely to the OSHA inspection staff.

The only obligation is your commitment to correcting, in a timely manner, serious job safety and health hazards. As an employer, you will be asked to make this commitment prior to the actual visit.

The onsite consultants perform the following services:

- Help recognize hazards in the workplace.
- Suggest general approaches or options for solving a safety or health problem.
- Assist the employer in developing or maintaining an effective safety and health program.
- Identify the kinds of help available if further assistance is needed.
- Offer training and education for the employer and employees at the workplace.
- Provide the employer with a written report summarizing findings.
- Under specified circumstances, recommend the employer for recognition by OSHA and a 1-year exclusion from general schedule enforcement inspections.

The onsite consultants will not:

- Issue citations or propose penalties for violations of OSHA standards.
- Report possible violations to OSHA enforcement staff.
- Guarantee that the employer's workplace will "pass" an OSHA inspection.

For more information on consultation programs and other sources of help, *contact TOSHA at 741-2793.*



## GENERAL INDUSTRY STANDARDS

### Abrasive Blasting

Blast cleaning nozzles shall be equipped with an operating valve which must be held open manually (deadman or positive-pressure control). A support shall be provided on which the nozzle may be mounted when not in use. *1910.244(b)*

Blast-cleaning enclosures shall be exhaust ventilated in such a way that a continuous inward flow of air will be maintained at all openings in the enclosure during the blasting operation. *1910.94(a)(3)*

### Abrasive Grinding

Abrasive wheel machinery and portable power tools shall be used only on machines provided with safety guards with the following exceptions:

- Wheels used for internal work while within the work being ground;
- Mounted wheels, used in portable operations, 2 inches (5 centimeters) and smaller in diameter; and
- Type 16, 17, 18, 18R, and 19 cones, plugs, and threaded hole pot balls where the work offers protection. *1910.215(a)(1) & 1910.243(c)*

Abrasive wheel machinery and portable power tool safety guards shall cover the spindle end, nut, and flange projections, except:

- Safety guards on all operations where the work provides a suitable measure of protection to the operator may be so constructed that the spindle end, nut, and outer flange are exposed;
- Where the nature of the work is such as to entirely cover the side of the wheel, the side covers of the guard may be omitted; and
- The spindle end, nut, and outer flange may be exposed on machines designed as portable saws. *1910.215(a)(2) & 1910.243(c)*

Work rests shall be adjusted so that they are no more than 1/8 inch (3.2 millimeters) from the abrasive wheel. *1910.215(a)(4)*

Abrasive wheel safety guards for bench and floor stands and for cylindrical grinders shall not expose the grinding wheel periphery for more than 65 degrees above the horizontal plane of the wheel spindle. The protecting member shall be adjustable for variations in wheel size so that the distance between the wheel periphery and adjustable tongue (tongue guard) or end of the peripheral member at the top shall never exceed 1/4 inch (6 millimeters). *1910.215(b)(3) & (4)*

Machines designed for a fixed location shall be securely anchored to prevent movement or designed in such a manner that in normal operation they will not move. *1910.212(b)*

### Accident Recordkeeping Requirements

Each employer shall maintain in each establishment a log and summary (OSHA Form No. 200 or equivalent) of all recordable injuries and illnesses (resulting in a fatality, hospitalization, lost workdays, medical treatment, job transfer or termination, or loss of consciousness) for that establishment, and enter each recordable event no later than 6 working days after receiving the

information. Where the complete log and summary records are maintained at a place other than the establishment, a copy of the log that reflects the injury and illness experience of the establishment complete and current to date within 45 calendar days, must be available at the original site. 1904.2(a) & (b)(2)

In addition to the log of occupational injuries and illnesses, each employer shall have available for inspection at each establishment within 6 working days after notification of a recordable case, a supplementary record (OSHA Form No. 101 or equivalent) for each occupational injury or illness for that establishment. 1904.4

Each employer shall post an annual summary of occupational injuries and illnesses for each establishment, compiled from the collected OSHA Form No. 200, and including the year's totals, calendar year covered, company name, establishment, name and address, certification signature, title, and date. An OSHA Form No. 200 shall be used in presenting the summary. The summary shall be posted by February 1 of each year and shall remain in place until March 1 of the same year. 1904.5

The log and summary, the supplementary record, and the annual summary shall be retained in each establishment for 5 years following the end of the year to which they relate. Records shall be made available, as authorized, upon request. 1904.6(a) & (b) & 1904.7(a) & (b)

**Note:** Certain establishments classified as retail trades, finance, insurance, real estate, and services may be exempt from the requirement for maintaining records relating to occupational illness and injuries. (See 29 CFR 1904.16, Establishments Classified in Standard Industrial Classification Codes 52-89, except 52-54, 70, 75, 76, 79, and 80).

### **Accident Reporting Requirements**

Within 48 hours after its occurrence, an employment accident that is fatal to one or more employees or that results in the hospitalization of five or more employees shall be reported by the employer, either orally or in writing, to the nearest OSHA Area Office.

1904.8

### **Air Receivers**

All new air receivers installed, shall be designed and constructed to meet the standards of the American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel Code*, Section VII, 1968. 1910.169(a)(2)

A drainpipe and valve shall be installed for the removal of accumulated oil and water.

1910.169(b)(2)

Indicating gauges and safety valves shall be installed and tested frequently. 1910.169(b)(3)(i) & (iv)

### **Aisles and Passageways**

Where mechanical handling equipment is used, sufficient safe clearance shall be allowed for aisles, at loading docks, through doorways, and wherever turns or passage must be made. Aisles and passageways used by mechanical equipment shall be kept clear and in good repair with no obstruction across or in aisles that could create hazards. 1910.22(b)(1) & 1910.176(a)

Permanent aisles and passageways shall be appropriately marked. *1910.22(b)(2) & 1910.176(a)*

Covers and/or guardrails shall be provided to protect personnel from the hazards of open pits, tanks, vats, and ditches. *1910.22(c)*

### **Asbestos**

The employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 0.2 fibers per cubic centimeter of air (0.2 f/cc) as an 8-hour time-weighted average (TWA). *1910.1001(c)(1)*

The employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 1 f/cc as averaged over a sampling period of 30 minutes. *1910.1001(c)(2)*

To help reduce worker exposure to airborne fibers, asbestos must be handled, mixed, applied, removed, cut, scored, or otherwise worked in a wet state. This "wet" method also must be used when products containing asbestos are removed from bags, cartons, or containers. If this is not possible, removal must be done in an enclosed or well-ventilated area. *1910.1001(f)(1)(vi) & (vii)*

Respirators must be used (1) while feasible engineering and work practice controls are being installed or implemented; (2) during maintenance and repair activities or other activities where engineering and work practice controls are not feasible; (3) if feasible engineering and work practice controls are insufficient to reduce employee exposure; and (4) in emergencies. *1910.1001(g)(1)*

### **Belt Sanding Machines**

Belt sanding machines used for woodworking shall be provided with guards at each nip point where the sanding belt runs onto a pulley, and the unused run of the sanding belt shall be shielded to prevent accidental contact. *1910.213(p)(4)*

### **Bloodborne Pathogens**

Each employer having employee(s) who may incur skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials as a result of performing their professional duties shall establish a written exposure control plan designed to eliminate or minimize exposure. *1910.1030(c)(1)(i)*

Universal precautions shall be observed to prevent contact with blood or other potentially infectious materials. Under circumstances in which differentiation between body fluid types is difficult or impossible, all body fluids shall be considered potentially infectious. *1910.1030(d)(1)*

Engineering and work practice controls shall be used to eliminate or minimize employee exposure. Where occupational exposure remains after instituting engineering and work practice controls, personal protective equipment shall also be used. *1910.1030(d)(2)(i)*

## **Boilers**

Boiler design, construction, and inspection is referenced in the ASME Boiler and Pressure Vessel Code, 1968 and current. *1910.106(b) & 1910.217(b)(12) & 1910.261(a)(3) & OSHA Technical Manual CPL 2-2.0B, Change 10, (Pressure Vessel Guidelines)*

## **Cadmium**

The standard establishes a single 8-hour, TWA permissible exposure limit (PEL) of 5 micrograms per cubic meter of air (5 ug/m-cubed) and an action level of 2.5 ug/m-cubed for all industries. The PEL applies to all cadmium compounds and does not differentiate between exposure to cadmium fumes or dust. *1910.1027(b) & (c)*

In six major cadmium industries covered by the general industry standard (nickel-cadmium batteries, cadmium/zinc refining, lead smelting, pigments, plating, plastics), OSHA determined that it was not technologically or economically feasible to engineer to a TWA PEL of 5 ug/m-cubed. A separate engineering control air limit (SECAL) of either 15 ug/m-cubed or 50 ug/m-cubed was established for these industries. *1910.1027(f)(1)(ii)*

Employers must institute medical surveillance programs for all employees who, for 30 or more days per year, are exposed at or above the action level. Medical surveillance also is required for all employees who, although not currently exposed at or above the action level, have been exposed to cadmium prior to this standard by the employer for an aggregate period of more than 60 months. *1910.1027(1)(1)(A) & (B)*

## **Chains, Cables, Ropes, and Hooks**

Hooks and chains shall be visually inspected daily and monthly with a full, written, dated, and signed report of condition kept on file and be readily available to appointed personnel. Running ropes shall be inspected monthly and a written report of condition kept on file and be readily available to appointed personnel. *1910.179(j)(2) & (m)(1)*

Hoist ropes on crawler, locomotive, and truck cranes shall be free from kinks or twists and shall not be wrapped around the load. *1910.180(h)(2)*

All U-bolt rope clips on hoist ropes on overhead and gantry cranes shall be installed so that the U-bolt is in contact with the dead end (short or nonload carrying end) of the rope. Clips shall be installed in accordance with the clip manufacturer's recommendation. All nuts on newly installed clips shall be tightened after 1 hour of use. *1910.179(h)(2)(v)*

## **Chemical Information (See Hazard Communication or Specific Chemical Term)**

### **Compressed Air, Use of**

Compressed air used for cleaning purposes shall not exceed 30 pounds (13.5 kilograms) per square inch (6.5 square centimeters) when the nozzle end is obstructed or dead-ended, and then only with effective chip guarding and personal protective equipment. *1910.242(b)*

## Compressed Gas Cylinders

Compressed gas cylinders shall be kept away from excessive heat, shall not be stored where they might be damaged or knocked over by passing or falling objects and shall be stored at least 20 feet (6 meters) away from highly combustible materials. 1910.252(b)(2)(ii)

Where a cylinder is designed to accept a valve protection cap, caps shall be in place except when the cylinder is in use or is connected for use. 1910.253(b)(2)(iv)

Inside of buildings, cylinders shall be stored in a well-protected, well-ventilated, dry location at least 20 feet (6 meters) from highly combustible materials such as oil or excelsior. Cylinders should be stored in definitely assigned places away from elevators, stairs, or gangways. Assigned storage spaces shall be located where cylinders will not be knocked over or damaged by passing or falling objects, or subject to tampering by unauthorized persons. Cylinders shall not be kept in unventilated enclosures such as lockers and cupboards. 1910.253(b)(2)(ii)

Also, the in-plant handling, storage, and utilization of all compressed gases in cylinders, portable tanks, rail tank cars, or motor vehicle cargo tanks shall be in accordance with Compressed Gas Association Pamphlet P-1-1965.

## Compressed Gases

### Acetylene

Acetylene cylinders shall be stored and used in a vertical, valve-end-up position only. 1910.253(b)(3)(ii)

Under no conditions shall acetylene be generated, piped (except in approved cylinder manifolds) or utilized at a pressure in excess of 15 pounds per square inch (psi) (103 kPa gauge pressure) or 30 psi (206 kPa absolute). The use of liquid acetylene is prohibited. 1910.253(a)(2)

The in-plant transfer, handling, and storage of acetylene in cylinders shall be in accordance with Compressed Gas Association Pamphlet G-1.3-1959. 1910.102(a)

### Hydrogen

Hydrogen containers shall comply with one of the following: (1) designed, constructed, and tested in accordance with appropriate requirements of ASME Boiler and Pressure Vessel Code, Section VIII---Unfired Pressure Vessels---1968; or (2) designed, constructed, tested and maintained in accordance with U.S. Department of Transportation specifications and regulations. 1910.103(b)(1)(i)(a)(1) & (2)

Hydrogen systems shall be located so that they are readily accessible to delivery equipment and to authorized personnel, shall be located aboveground, and shall not be located beneath electric power lines. Systems shall not be located close to flammable liquid piping or piping of other flammable gases. 1910.103(b)(2)(a) through (d)

Permanently installed containers shall be provided with substantial noncombustible supports on firm noncombustible foundations. 1910.103(b)(2)(b)

### **Nitrous Oxide**

The piped systems for the in-plant transfer and distribution of nitrous oxide shall be designed, installed, maintained, and operated in accordance with Compressed Gas Association Pamphlet G-8.1-1964. 1910.105

### **Oxygen**

Oxygen cylinders in storage shall be separated from fuel-gas cylinders or combustible materials (especially oil or grease) a minimum distance of 20 feet (6 meters) or by a noncombustible barrier at least 5 feet high (1.5 meters) having fire resistance rating of 1/2 hour. 1910.253(b)(4)(iii)

### **Control of Hazardous Energy (Lockout/Tagout)**

Whenever service or maintenance is performed on machines and equipment, it must be done with the machine or equipment stopped and isolated from all sources of energy. The energy-isolating device(s) for that machine or equipment must be locked out or tagged out in accordance with a documented procedure. Employees involved in the energy control program must be given training. Periodic inspections of the use of the procedures must be conducted at least annually to ensure the continued effectiveness of the program. The periodic inspection must include a review of the procedures with all employees who are authorized to use the procedures when lockout is used, and with all authorized and affected employees when tagout is used. When outside contractors are performing servicing or maintenance within a plant or facility, each employer must coordinate with the other employers to ensure that no employees are endangered. When a group of employees are performing a servicing or maintenance activity, each employee must be afforded protection equivalent to the utilization of individual lockout or tagout. When servicing or maintenance extends over more than one shift, specific procedures shall be utilized to ensure continuity of personnel protection, including provision for the orderly transfer of lockout tagout control. This must be done to minimize exposure to hazards from unexpected energizing, startup of the machine or equipment, or the release of stored or residual energy. 1910.147

### **Cranes (Overhead and Mobile), Hoists, and Derricks**

All functional operating mechanisms, air and hydraulic systems, chains, ropes slings, hooks, and other lifting equipment shall be visually inspected daily (frequent inspections). 1910.179(j)(2) & 1910.180(d)(3) & 1910.184(d)(2)

Complete inspection of the crane shall be performed at 1 month to 12-month intervals (periodic inspections depending on its activity, severity of service, and environmental conditions. The inspection shall include the following areas: deformed, cracked, corroded, worn, or loose members or parts; the brake system; limit indicators (wind, load); power plant, and electrical apparatus. 1910.179(j)(3) & 1910.180(d)(4) & 1910.181(d)(3)

Unsafe conditions disclosed by the inspection requirements shall be corrected before the operation is resumed and the crane shall not be operated until all guards have been reinstalled. 1910.179(1)(3) & 1910.180(f) & 1910.181(e)(3)

Overhead cranes shall have stops at the limit of travel of the trolley. Bridge and trolley bumpers or equivalent automatic devices shall be provided. Bridge trucks shall have tail sweeps. 1910.179(e)(1) through (4)

The rated load of the crane shall be plainly marked on each side of the crane, and if the crane has more than one hoisting unit, each hoist shall have its rated load marked on it or its load block, and this marking shall be clearly legible from the ground or floor. 1910.179(b)(5)

Pendant control boxes shall be clearly marked for identification of functions. 1910.179(g)(1)(v)

There shall be no hoisting, lowering, or traveling while any employee is on the load or hook. 1910.179(n)(3)(v) & 1910.180(h)(3)(v) & 1910.181(i)(3)(v)

### **Dip Tanks Containing Flammable or Combustible Liquid**

Dip tanks with more than 150 gallons (570 liters) capacity, or 10 square feet (0.9 square meters) in liquid surface area, shall be equipped with a properly trapped overflow pipe leading to a safe location outside the building. 1910.108(c)(2)

There shall be no open flames, spark producing devices, or heated surfaces having a temperature sufficient to ignite vapors in any vapor area. 1910.108(e)(1)

Areas in the vicinity of dip tanks shall be kept as clear of combustible stock as practical and shall be kept entirely free of combustible debris. 1910.108(f)(1)

All dip tanks exceeding 150 gallons (570 liters) liquid capacity or having a liquid surface area exceeding 4 square feet (.36 square meters) shall be protected with at least one of the following automatic extinguishing facilities: water spray system, foam system, carbon dioxide system, dry chemical system, or automatic dip tank cover. This provision shall apply to hardening and tempering tanks having a liquid surface area of 25 square feet (2.25 square meters) or more or a capacity of 500 gallons (1,900 liters) or more. 1910.108(c)(5) & (h)(1)(v)

### **Dockboards**

Dockboards shall be strong enough to carry the load imposed on them. 1910.30(a)(1)

Portable dockboards shall be anchored or equipped with devices that will prevent their slipping. 1910.30(a)(2)

Dockboards shall have hand holds or other effective means to allow safe handling. 1910.30(a)(4)

Positive means shall be provided to prevent railroad cars from being moved while dockboards are in position. 1910.30(a)(5)

### **Drinking Water**

Potable water shall be provided in all places of employment. 1910.141(b)(1)(i)

Potable drinking water dispensers shall be designed, constructed, and serviced to ensure sanitary conditions, shall be capable of being closed, and shall have a tap. 1910.141(b)(1)(iii)

### **Electrical**

Electrical equipment shall be free from recognized hazards that are likely to cause death or serious physical harm to employees. 1910.303(b)(1)

### **Flexible Cords and Cables (Extension Cords)**

Flexible cords and cables shall be protected from accidental damage. 1910.305(a)(2)(iii)(G)

Unless specifically permitted, flexible cords and cables may not be used as a substitute for the fixed wiring of a structure, where attached to building surfaces, where concealed or where run through holes in walls, ceilings, or floors, or where run through doorways, windows, or similar openings. Flexible cords shall be connected to devices and fittings so that strain relief is provided that will prevent pull from being directly transmitted to joints or terminal screws. 1910.305(g)(2)(iii)

### **Grounding/Grounded**

For a grounded system, a grounding electrode conductor shall be used to connect both the equipment grounding conductor and the grounded circuit conductor to the grounding electrode. Both the equipment grounding conductor and the grounding electrode conductor shall be connected to the grounded circuit conductor on the supply side of the service disconnecting means or overcurrent devices if the system is separately derived. 1910.304(f)(3)(i)

For an ungrounded service-supplied system, the equipment grounding conductor shall be connected to the grounding electrode conductor at the service equipment. 1910.304(f)(3)(ii)

The path to ground from circuits, equipment, and enclosures shall be permanent and continuous. 1910.304(f)(4)

### **Guarding**

Electrical equipment shall be free from recognized hazards that are likely to cause death or serious physical harm to employees. 1910.303(b)(1)

### **Identification**

Each disconnecting means shall be legibly marked to indicate its purpose, unless it is located so the purpose is evident. 1910.303(f)

### **Listing and Labeling**

Listed or labeled equipment shall be used or installed in accordance with any instructions included in the listing or labeling. 1910.303(b)(2)

### **Openings**

Unused openings in cabinets, boxes, and fittings shall be effectively closed. 1910.305(b)(1)

### **Safety-Related Work Practices**

Safety-related work practices shall be employed to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts, when work is performed near or on equipment of circuits that are or may be energized. 1910.333(a)

Electrical safety-related work practices cover both qualified persons (those who have training in avoiding the electrical hazards of working on or near exposed energized parts) and unqualified persons (those with little or no such training). 1910.331(a)

There must be written lockout and/or tagout procedures (This may be a copy of 1910.333(b)(2)). 1910.333(b)(2)(i)

Overhead power lines must be deenergized and grounded by the owner or operator of the lines, or other protective measures must be provided before work is started. Protective measures, such



as guarding or insulating the lines, must be designed to prevent employees from contacting the lines. 1910.333(c)(3)

Unqualified employees and mechanical equipment must be at least 10 feet (3 meters) away from overhead power lines of 50kV and below. If the voltage exceeds 50kV, the clearance distance should be increased by 4 inches (6.6 centimeters) for each additional 10kV over 50kV. 1910.333(c)(3)(i) & (iii)

OSHA requires portable ladders to have nonconductive side rails if used by employees who would be working where they might contact exposed energized circuit parts. 1910.333(c)(3)(iii)(7)

### **Splices**

Conductors shall be spliced or joined with devices identified for such use or by brazing, welding, or soldering with a fusible alloy or metal. All splices, joints, and free ends of conductors shall be covered with an insulation equivalent to that of the conductor or with an insulating device suitable for the purpose. 1910.303(c)

### **Emergency Action Plans**

An emergency action plan to ensure employee safety in the event of fire and other emergencies shall be prepared in writing and reviewed with affected employees. The plan shall include the following elements: escape procedures and routes, critical plant operations, employee accounting following an emergency evacuation, rescue and medical duties, means of reporting emergencies, and persons to be contacted for information or clarification. 1910.38(a) & (b)(2)(i) through (iii) & 1910.120(q)

Employers should apprise employees of the fire hazards of the materials and processes to which they are exposed. 1910.38(b)(4) & 1910.120(q)

### **Emergency Flushing, Eyes and Body**

Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use. 1910.151(c)

### **Ergonomics (See General Duty Clause)**

An ergonomic hazard may be caused or aggravated by repetitive motions, forceful exertions, vibration, sustained or awkward positioning or mechanical compression of the hand, wrist, arm, back neck, shoulder, and leg over extended periods or from other ergonomic stressors.

### **Exits**

Every building designed for human occupancy shall be provided with exits sufficient to permit the prompt escape of occupants in case of emergency. 1910.36(b)(1)

In hazardous areas, or where employees may be endangered by the blocking of any single means of egress due to fire or smoke, there shall be at least two means of egress remote from each other. 1910.36(b)(3) & (8)

Exits and the way of approach and travel from exits shall be maintained so that they are unobstructed and are accessible at all times. 1910.36(d)(1), 1910.37(f)(1) & (k)(2)

All exits shall discharge directly to the street or other open space that gives safe access to a public way. 1910.37(h)(1)

Exit doors serving more than 50 people, or at high-hazard areas, shall swing in the direction of exit travel. 1910.37(f)(2)

Exits shall be marked by readily visible, suitably illuminated exit signs. Exit signs shall be distinctive in color and provide contrast with surroundings. The word "EXIT" shall be of plainly legible letters, not less than 6 inches (15 centimeters) high. 1910.37(g)(1), (4), & (8)

Any door, passage, or stairway that is neither an exit nor a way of exit access and that is so located or arranged as to be likely to be mistaken for an exit, shall be identified by a sign reading "Not an Exit" or similar designation. 1910.37(q)(2)

### **Explosives and Blasting Agents**

All explosives shall be kept in approved magazines. 1910.109(c)(10)(i)

Stored packages of explosives shall be laid flat with top side up. Black powder, when stored in magazines with other explosives, shall be stored separately. 1910.109(c)(5)(i)

Smoking, matches, open flames, spark-producing devices, and firearms (except firearms carried by guards) shall not be permitted inside of or within 50 feet (15 meters) of magazines. The land surrounding a magazine shall be kept clear of all combustible materials for a distance of at least 25 feet (7.5 meters). Combustible materials shall not be stored within 50 feet (15 meters) of magazines. The manufacture of explosives and pyrotechnics shall meet the requirements of OSHA's *Process Safety Management* standard. 1910.109(k)(2) & (3)

### **Extension Cords (See Electrical, Flexible Cords, and Cables)**

#### **Eye and Face Protection**

Protective eye and face equipment shall be required, used, and maintained in a sanitary and reliable condition, as necessary to protect employees from workplace hazards. 1910.133(a)(1)

Eye and face protection equipment shall be in compliance with ANSI Z87.1-1968 (or a standard that is equally effective for eye and face protection, i.e., ANSI Z87.1-1989) and is in compliance with OSHA 1910.133. 1910.133(a)(6)

#### **Eyewash/Drench Shower**

Suitable facilities for quick drenching or flushing of the eyes and body shall be provided if there is a possibility that an employee might be exposed to injurious, corrosive materials. 1910.151(c)

## **Fan Blades**

When the periphery of the blades of a fan is less than 7 feet (2.1 meters) above the floor or working level, the blades shall be guarded. The guard shall have openings no larger than 1/2 inch (12.5 millimeters) 1910.212(a)(5)

## **Fire Protection**

Where the employer has provided portable fire extinguishers for employee use in the workplace, the employer also shall provide an educational program to familiarize employees with the general principles of fire extinguisher use and the hazards involved with incipient stage fire fighting. 1910.157(e)(3)

If portable fire extinguishers are provided for employee use, the employer shall mount, locate, and identify them so they are readily accessible to employees without subjecting the employees to possible injury. These fire extinguishers shall be maintained in a fully charged and operable condition and kept in their designated places at all times except during use. 1910.157(c)(1) & (4)

Portable fire extinguishers shall be given maintenance service at least once a year and a written record kept to show the maintenance or recharge date. A record shall be maintained of the service. 1910.157(c)(1)

## **Flammable Liquids**

Flammable liquids shall be kept in covered containers or tanks when not actually in use. 1910.106(e)(2)(iv)

Flammable and combustible liquids shall be drawn from or transferred into containers within a building only through a closed piping system, from safety cans, by means of a device drawing through the top, or by gravity through an approved self-closing valve. Transferring by means of air pressure shall be prohibited. 1910.106(e)(2)(iv)(d)

Not more than 60 gallons (228 liters) of Class I or Class II liquids, nor more than 120 gallons (456 liters) of Class III liquids may be stored in a storage cabinet. 1910.106(d)(3)(i)

Inside storage rooms for flammable and combustible liquids shall be constructed to meet the required fire-resistive rating and wiring for their uses. 1910.106(d)(4)(i) & (iii)

Outside storage areas shall be graded so as to divert spills away from buildings or other exposures or be surrounded with curbs at least 6 inches (15 centimeters) high with appropriate drainage to a safe location for accumulated liquids. The areas shall be protected against tampering or trespassing, where necessary, and shall be kept from weeds, debris, and other combustible material not necessary to the storage. 1910.106(d)(6)(iii) & (iv)

Adequate precautions shall be taken to prevent the ignition of flammable vapors. Sources of ignition include, but are not limited to, open flames, lightning, smoking, cutting and welding, hot surfaces, frictional heat, static, electrical and mechanical sparks, spontaneous ignition, including heat-producing chemical reactions, and radiant heat. 1910.106(e)(6)(i)

Class I liquids shall not be dispensed into containers unless the nozzle and container are electrically interconnected. 1910.106(e)(6)(ii)

## Floors, General Conditions

All floor surfaces shall be kept clean, dry, and free from protruding nails, splinters, loose boards, holes, or projections. 1910.22(a)(1) through (3)

Where wet processes are used, drainage shall be maintained, and false floors, platforms, mats, or other dry standing places shall be provided where practicable. 1910.22(a)(2)

## Floor Loading Limit

In every building or other structure, or part thereof, used for mercantile, business, industrial, or storage purposes, the loads approved by the building official shall be marked on plates of approved design that shall be supplied and securely affixed by the owner of the building, or his duly authorized agent, in a conspicuous place in each space to which they relate. Such plates shall not be removed or defaced but, if lost, removed, or defaced, shall be replaced by the owner or his agent. 1910.22(d)(1)

## Floor Openings and Open Sides

Every stairway and ladderway floor opening shall be guarded by standard railings with standard toeboards on all exposed sides except at the entrance. For infrequently used stairways, the guard may consist of a hinged cover and removable standard railings. The entrance to ladderway openings shall be guarded to prevent a person walking directly into the opening. 1910.23(a)(1) & (2)

Every hatchway and chute floor opening shall be guarded by a hinged floor opening cover equipped with standard railings to leave only one exposed side or a removable railing with toeboard on not more than two sides and a fixed standard railing with toeboards on all other exposed sides. 1910.23(a)(3)

Every floor hole into which persons can accidentally walk shall be guarded by either a standard railing with standard toeboard on all exposed sides, or a floor hole cover that should be hinged in place. While the cover is not in place, the floor hole shall be attended or shall be protected by a removable standard railing. 1910.23(a)(8)

Every open-sided floor, platform or runway 4 feet (1.2 meters) or more above adjacent floor or ground level shall be guarded by a standard railing with toeboard on all open sides, except where there is entrance to a ramp, stairway, or fixed ladder. Runways not less than 18 inches (45 centimeters) wide used exclusively for special purposes may have the railing on one side omitted where operating conditions necessitate. 1910.23(c)(1) & (2)

Regardless of height, open-sided floors, walkways, platforms, or runways above or adjacent to dangerous equipment shall be guarded with a standard railing and toeboard. 1910.23(a)(3)

## Foot Protection

Foot protection equipment shall be worn when there is reasonable probability that injury can be prevented by such equipment. 1910.132(a)

Safety-toe footwear shall meet the requirements of ANSI Z41.1-1983, Standard for Men's Safety-Toe Footwear. 1910.136

### **Forklift Trucks (Powered Industrial Trucks)**

If at any time a powered industrial truck is found to be in need of repair, defective, or in any way unsafe, the truck shall be taken out of service until it has been restored to safe operating condition. *1910.178(p)(1)*

High-lift rider trucks shall be equipped with substantial overhead guards unless operating conditions do not permit. *1910.178(e)(1)*

Fork trucks shall be equipped with vertical-load backrest extensions when the types of loads present a hazard to the operators. *1910.178(e)(2)*

The brakes of trucks shall be set and wheel chocks placed under the rear wheels to prevent the movement of trucks, trailers, or railroad cars while loading or unloading. *1910.178(m)(7)*

Only a trained and authorized operator shall be permitted to operate a powered industrial truck. Methods shall be devised to train operators in the safe operation of powered industrial trucks. *1910.178(1)*

### **Formaldehyde**

Employee exposure to formaldehyde shall be limited to 0.75 parts per million (ppm) as an 8-hour TWA; a 2 ppm 15-minute short-term exposure limit (STEL); and an action level of 5 ppm. *1910.1048(c)(1) & (2)*

A medical surveillance program shall be instituted for any employee whose exposure exceeds the STEL or action level. Medical removal provisions with economic, seniority, and benefits protection may supplement medical surveillance programs, where necessary. *1910.1048(1)(1)(i) & (1)(8)(vi) through (viii)*

Hazard warning labels are required for all forms of formaldehyde, including solutions and mixtures composed of 0.1 percent or greater of formaldehyde and materials capable of releasing the substance in concentrations of 0.1 ppm or higher. Comprehensive labels must include warnings of potential carcinogenic effects where concentrations may exceed 0.5 ppm. *1910.1048(m)(1)(i) & (m)(3)(iii)*

The employer shall conduct training at the time of employees' initial assignment and annually thereafter for all employees exposed to a formaldehyde concentration of 0.1 ppm or higher. Such training is required to increase employees' awareness of formaldehyde hazards in their workplace and the control methods employed as well as an awareness of the signs and symptoms of health effects related to formaldehyde exposure. *1910.1048(n)(1) through (3)*

### **General Duty Clause (PL 91-596)**

Hazardous conditions or practices not covered in an OSHA standard may be covered under Section 5(a)(1) of the Act, which states: "Each employer shall furnish to each of his employees' employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees."

## Hand Tools

Portable electric equipment shall be handled in a manner that will not cause damage. When the cord and plug connected tools are relocated, they should be visually inspected before use. *1910.334(a)(2)*

Each employer shall be responsible for the safe condition of tools and equipment used by employees, including tools and equipment which may be furnished by employees. *1910.242(a)*

The frames of portable electrical tools and equipment, except when UL-approved double-insulated construction, shall be properly grounded. *1910.304(f)(5)(v)*

All hand tools shall be kept in safe condition. Handles of tools shall be kept tight in the tool and wooden handles shall be free of splinters or cracks. Wedges and chisels shall be free of mushroomed heads. Wrenches shall not be used when sprung to the point that slippage occurs. *1910.266(c)(2)(i) through (iv)*

All non-current-carrying metal parts of portable equipment and fixed equipment including their associated fences, housings, enclosures, and supporting structures shall be grounded. *1910.304(f)(7)(iii)*

## Hazard Communication

The purpose of this standard is to ensure that the hazards of all chemicals produced or imported are evaluated and that information concerning their hazards is transmitted to employers and employees. This transmittal of information is to be accomplished by means of comprehensive hazard communication programs, which are to include container labeling and other forms of warning, material safety data sheets, and employee training. *1910.1200(a)(1)*

Employers shall develop, implement, and maintain at the workplace a written hazard communication program for their workplaces. Employers must inform their employees of the availability of the program, including the required list(s) of hazardous chemicals and material safety data sheets. *1910.1200(e)(1)(i) & (ii)*

The employer shall ensure that each container of hazardous chemicals in the workplace is labeled, tagged, or marked with the identity of the hazardous chemical(s) contained there in and must show hazard warnings appropriate for employee protection. *1910.1200(f)(1)(i) & (ii)*

Chemical manufacturers and importers shall obtain or develop a material safety data sheet for each hazardous chemical they produce or import. Employers shall have a material safety data sheet for each hazardous chemical that they use and shall ensure that they are readily accessible to employees when they are in their work area. *1910.1200(g)(8)*

Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released); the physical and health hazards of the chemicals in the work area; the measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used; and the details of the hazard communication program developed by the employer, including an explanation of the

labeling system and the material safety data sheet, and how employees can obtain and use the appropriate hazard information. *1910.1200(h)(2)(i) through (iv)*

### **Hazardous Waste Operations (Emergency Response)**

Any information concerning the chemical, physical, and toxicological properties of each substance known or expected to be present on site that is available to the employer and relevant to the duties an employee is expected to perform shall be made available to the affected employees prior to the commencement of their work activities. The employer may utilize information developed for the hazard communication standard for this purpose. *1910.120(c)(8)*

An emergency response plan is required for all potential emergencies involving hazardous substances. This includes plant emergencies involving those substances to which employees are expected to respond. *1910.120(q)*

Training is required for all employees who work at hazardous waste cleanup sites, treatment storage and disposal (TSD) sites (Environmental Protection Agency permitted sites), and who respond to any emergencies involving hazardous substances. Training must cover the necessary information to perform these jobs safely including information on the proper personal protective equipment and procedures to safeguard employees against hazards and effects of exposure to toxic substances. *1910.120(e)*

A safety and health program that delineates responsibilities and methods for assuring employee safety is necessary for employees engaged in hazardous waste cleanup or TSD activities. *1910.120(b)(1) & (p)(1)*

Medical surveillance (physical examination) is required for employees dealing with hazardous waste, TSD, and hazardous materials. It is used to monitor employees for adverse exposure to harmful substances. *1910.120(f)*

Personal protective equipment must be selected and used to protect employees from hazardous substances and physical hazards. *1910.120(g)(3)*

When necessary, a decontamination procedure must be used to assure that hazardous substances are removed from workers before they leave the worksite as well as from equipment that is to be taken off site. *1910.120(k)(1) & (2)*

### **Head Protection**

Head protection equipment (helmets) shall be worn when there is a possible danger of head injuries from impact, flying or falling objects, or electrical shock and burns. *1910.132(a)(1) & (c)*

Employees shall wear nonconductive head protection wherever there is a possible danger of head injury from impact electric shock or burns due to contact with exposed energized parts. *1910.335(a)(1)(v)*

### **Hooks (See Chains, Cables, Ropes, Hooks)**

## Housekeeping

All places of employment, passageways, storerooms, and service rooms shall be kept clean and orderly and in a sanitary condition. 1910.22(a)(1) & 1910.141(a)(3)

## Ionizing Radiation

Employers shall be responsible for proper controls to prevent any employee from being exposed to ionizing radiation in excess of acceptable limits. 1910.96(b)(1) & (c)(1)

Except as provided below, no employer shall possess, use, or transfer sources of ionizing radiation in such a manner as to cause any individual in a restricted area to receive in any period of one calendar quarter from sources in the employer's possession or control a dose in excess of those in the following table:

	Rems <sup>3</sup> per calendar quarter
Whole body: Head and trunk; active blood forming organs; lens of eyes; or gonads	1.25
Hands and forearms; feet and ankles	18.75
Skin of whole body	7.5

<sup>3</sup> Rem is the measure of the dose of any ionizing radiation to body tissue in terms of its estimated biological effect relative to a dose of 1 roentgen (r) of x-rays (1 millirem [mrem] = 0.001 rem). The relation of the rem to other dose units depends on the biological effect under consideration and upon the conditions for irradiation.

Exceptions: An employer may permit an individual in a restricted area to receive doses to the whole body greater than those permitted so long as:

(1) During the calendar quarter the dose to the whole body shall not exceed 3 rems; (2) the dose to the whole body, when added to the accumulated occupational dose to the whole body, shall not exceed 5 (N-18) rems, where "N" equals the individual's age in years at his/her last birthday; and (3) the employer maintains adequate past and current exposure records. 1910.96(b)(2)(ii)

Each radiation area shall be conspicuously posted with appropriate signs and/or barriers. 1910.96(e)(2)

Employers shall maintain records of the radiation exposure to all employees for whom personnel monitoring is required. 1910.96(b)(2)(iii) & (n)(1)

## Ladders, Fixed

All rungs shall have a minimum diameter of 3/4 inch (1.8 centimeters), if metal, or 1 1/8 inches (2.8 centimeters), if wood. They shall be a minimum of 16 inches (40 centimeters) wide and should be spaced uniformly no more than 12 inches (30 centimeters) apart. 1910.27(b)(1)(i) through (iii)

Cages, wells, or ladder safety devices for ladders affixed to towers, water tanks, or chimneys shall be provided on all ladders more than 20 feet (6 meters) long. Landing platforms shall be provided



each 30 feet (9 meters) of length, except where no cage is provided, landing platforms shall be provided for every 20 feet (6 meters) of length. 1910.27(d)(1)(2) & (5)

Tops of cages on fixed ladders shall extend 42 inches (1 meter) above the top of landing, unless other acceptable protection is provided, and the bottom of the cage shall be not less than 7 feet (2.1 meters) nor more than 8 feet (2.4 meters) above the base of the ladder. 1910.27(d)(1)(iii) & (iv)

Side rails shall extend 3 1/2 feet (1 meter) above the landing. 1910.27(d)(3)

### **Ladders, Portable**

Stepladders shall be equipped with a metal spreader or locking device of sufficient size and strength to securely hold the front and back sections in an open position. 1910.25(c)(2)(i)(f) & 1910.26(a)(3)(viii)

Ladders shall be inspected frequently and those that have developed defects shall be withdrawn from service for repair or destruction and tagged or marked as "Dangerous, Do Not Use." 1910.25(d)(1)(x) & 1910.26(c)(2)(vii)

Non-self-supporting ladders shall be erected on a sound base with the base of ladder a distance from the wall or upper support equal to one-quarter the length of the ladder and placed to prevent slipping. 1910.(d)(2)(i) & (iii); 1910.26(c)(3)(i) & (iii)

The top of a ladder used to gain access to a roof should extend at least 3 feet (0.9 meters) above the point of contact. 1910.25(d)(2)(xv)

OSHA requires portable ladders to have nonconductive side rails if used by employees who would be working where they might contact exposed energized circuit parts. 1910.333(c)(iii)(7)

### **Lead**

The employer shall ensure that no employee is exposed to lead at concentrations greater than 50 ug/m<sup>3</sup> averaged over an 8-hour period. 1910.1025(c)(1)

### **Lockout/Tagout (See Control of Hazardous Energy)**

### **Lunchrooms**

Employees shall not consume food or beverages in toilet rooms or in any area exposed to a toxic material. 1910.141(g)(2)

A covered receptacle of corrosion-resistant or disposable material shall be provided in lunch areas for disposal of waste food. The cover may be omitted when sanitary conditions can be maintained without the use of a cover. 1910.141(g)(3)

## **Machine Guarding**

Machine guarding shall be provided to protect employees in the machine area from hazards such as those created by point of operation, nip points, rotating parts, flying chips, and sparks. The guard shall be such that it does not offer an accident hazard in itself. 1910.212(a)(1) & (2)

The point-of-operation guarding device shall be so designed as to prevent the operator from having any part of his body in the danger zone during the operating cycle. 1910.212(a)(3)(ii)

Special supplemental hand tools for placing and removing material shall permit handling of material without the operator placing a hand in the danger zone. 1910.212(a)(3)(iii)

Some of the machines that usually require point-of-operation guarding are guillotine cutters, shears, alligator shears, power presses, milling machines, power saws, jointers, portable power tools, and forming rolls and calenders. 1910.212(a)(3)(iv)

## **Machinery, Fixed**

Machines designed for a fixed location shall be securely anchored to prevent walking or moving or designed in such a manner that they will not move during normal operation. 1910.212(b)

## **Mechanical Power Presses**

The employer shall provide and ensure the usage of point-of-operation devices to prevent entry of hands or fingers into the point of operation by reaching through, over, under, and around the guard on every operation performed on a mechanical power press. This requirement shall not apply when the point-of-operation opening is 1/4 inch (6 millimeters) or less. 1910.217(c)(1) & (c)(2)(i)(a)

Hand and foot operations shall be provided with guards to prevent inadvertent initiation of the press. 1910.217(b)(4) & (3)(i)(a) through (g)

All dies shall be stamped with the tonnage and stroke requirements or be otherwise recorded and readily available to the die setter. 1910.217(d)(6)

The employer shall provide and enforce the use of safety blocks whenever dies are being adjusted or repaired in the press. Brushes, Swabs, or other tools shall be provided for lubrication so that employees shall not reach into the point of operation. 1910.217(d)(9)(iv) & (v)

Presence-sensing devices may not be used to initiate the slide motion except when used in total conformance with paragraph (h), 29 CFR 1910.217, which requires certification of the control system. 1910.217(h)

Machines using full-revolution clutches shall incorporate a single-stroke mechanism. 1910.217(b)(3)(i)

A main disconnect switch capable of being locked in the off position shall be provided with every power press control system. 1910.217(b)(8)(i)

To ensure safe operating condition and to maintain a record of inspections and maintenance work, the employer shall establish a program of regular inspections of the power presses that shall

include the date, serial number of the equipment, as well as the signature of the inspector. 1910.217(e)(1)(i)

All point-of-operation injuries must be reported to OSHA or the State agency within 30 days. 1910.217(g)(1)

### **Medical Records**

Employers must provide newly hired workers with information on and the availability of the employee's medical records, the person responsible for the records, and employees' rights of access. 1910.20(g)(i) through (iii)

### **Medical Services and First Aid**

The employer shall ensure the ready availability of medical personnel for advice and consultation on matters of occupational health. 1910.151(a)

When a medical facility for treatment of injured employees is not available in proximity to the workplace, a person or persons shall be trained to render first aid. First-aid supplies approved by a consulting physician shall be readily available. 1910.151(b)

### **4,4 Methylenedianiline (MDA)**

An employer must ensure that no employee is exposed to an airborne concentration of MDA in excess of 10 parts per billion (ppb) as an 8-hour TWA; a 100 ppb, 15-minute STEL; an action level of 5 ppb; and that there is no dermal contact with MDA. 1910.1050(b) & (c)

Employers must determine whether employees are subject to MDA exposure above the action level, 8-hour TWA, or STEL, or dermally. 1910.1050(e)(1)(i), (e)(2) & (e)(8)

Employers must limit airborne exposures to MDA with feasible engineering and work practice controls, supplemented by the use of respirators if necessary, and must limit dermal exposure by providing appropriate personal protective clothing and equipment; regulated areas must be established where exposure may exceed the 8-hour TWA, or dermal exposures to MDA can occur. 1910.1050(f)(1)(i) & (ii), (g)(i) & (ii) & (i)(1)

Hygiene facilities to include decontamination, change, equipment, shower, and lunch areas may be required to be provided by employers where dermal or elevated levels of exposure to MDA may occur. 1910.1050(j)

Hazards of exposure to MDA must be communicated to employees via posting signs in regulated areas, labeling containers of MDA, maintaining an MSDS for MDA, and by providing employees with an information and training program. 1910.1050(k)(1) through (3)

Medical surveillance must be made available to employees exposed dermally to MDA for 15 or more days, exposed above the action level for 30 or more days per year, and in other situations where exposure to MDA may present health risks to employees. Benefits (pay, seniority) must be afforded employees whose exposure to MDA leads to a medical determination that, based on health considerations, the employee must be removed from such exposure. 1910.1050(m)(1) & (m)(9)(v)

## Noise Exposure

Protection against the effects of occupational noise exposure shall be provided when the sound levels exceed those shown in Table G-16 of the Safety and Health Standards. Feasible engineering and/or administrative control shall be utilized to keep exposure below the allowable limit. 1910.95(a)

When engineering or administrative controls fail to reduce the noise level to within the levels of Table G-16 of the Safety and Health Standards, personal protective equipment shall be provided and used to reduce the noise to an acceptable level. 1910.95(b)(1)

In all cases, where the sound levels equal or exceed an 8-hour TWA of 85 decibels measured on the A scale, a continuing, effective hearing conservation program shall be administered. In addition, the employer shall develop and implement a monitoring program. 1910.95(c) & (d)(1)

Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level.

**Table G-16 Permissible Noise Exposure<sup>4</sup>**

Duration per day, hours	Sound level dBa slow response
8	90
6	92
4	95
3	97
2	100
1 1/2	102
1	105
1/2	110
1/4 or less	115

1910.95(b)(2)

The employer shall make available to affected employees or their representatives' copies of this standard and also shall post a copy in the workplace. 1910.95(l)(1)

<sup>4</sup>When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. If the sum of the following fractions:  $C_1/T_1 + C_2/T_2 + \dots + C_n/T_n$  exceeds unity, then the mixed exposure should be considered to exceed the limit value.  $C_n$  indicates the total time in hours of exposure at a specified noise level, and  $T_n$  indicates the total time in hours of exposure permitted at that level. Exposure to impulsive or impact noise should not exceed 140 db peak sound pressure level.

### **Nonionizing Radiation (Electromagnetic Radiation)**

Employers shall be responsible for proper controls to prevent any employee from being exposed to electromagnetic radiation in excess of acceptable limits. 1910.97(a)(2)

Each electromagnetic radiation area shall be conspicuously posted with appropriate signs and/or barriers. 1910.97(a)(3)

### **Permit-Required Confined Spaces**

The employer shall evaluate the workplace to determine if confined space conditions exist that necessitate permits for entry. 1910.146(c)(1)

If permit-required confined spaces exist, exposed employees must be informed of the existence, location, and dangers of the permit space by positive means, such as signs, or there must be an equally effective means of communicating the hazards of these spaces. 1910.146(c)(2)

If confined space entry is required, a written permit program must be developed and initiated by the employer. 1910.146(c)(4)

### **Personal Protective Equipment**

Proper personal protective equipment----including covers for the eyes, face, head, and extremities, respiratory devices, and protective shields and barriers----shall be provided, used, and maintained in a sanitary and reliable condition where there is a hazard from processes or environments that may cause injury or illness to the employee. 1910.132(a)

Where employees furnish their own personal protective equipment, the employer shall be responsible to ensure its adequacy and to ensure that the equipment is properly maintained and in a sanitary condition. 1910.132(b)

### **Portable Power Tools (Pneumatic)**

For portable tools, a tool retainer shall be installed on each piece of utilization equipment which, without such a retainer, may eject the tool. 1910.243(b)(1)

Hose and hose connections used for conducting compressed air shall be designed for the pressure and service to which they are subjected. 1910.243(b)(2)

### **Power Transmission Equipment Guarding**

All belts, pulleys, sprockets and chains, flywheels, shafting and shaft projections, gears, and couplings, or other rotating or reciprocating parts, or any portion thereof, within 7 feet (2.1 meters) of the floor or working platform shall be effectively guarded. 1910.219(b)(1), (c)(2)(i) & (f)(3)

All guards for inclined belts shall conform to the standards for construction of horizontal belts and shall be arranged in such a manner that a minimum clearance of 7 feet (2.1 meters) is maintained between the belt and floor at any point outside the guard. 1910.219(e)(3)

Flywheels located so that any part is 7 feet (2.1 meters) or less above the floor or platform shall be guarded with an enclosure of sheet, perforated, or expanded metal or woven wire. 1910.219(b)(1)(i)

Flywheels protruding through a working floor shall be entirely enclosed by a guardrail and toeboard. 1910.219(b)(1)(iii)

Where both runs of horizontal belts are 7 feet (2.1 meters) or less from the floor or working surface, the guard shall extend at least 15 inches (37.5 centimeters) above the belt or to a standard height except that where both runs of a horizontal belt are 42 inches (1.05 meters) or less from the floor, the belt shall be fully enclosed by guards made of expanded metal, perforated or solid sheet metal, wire mesh on a frame of angle iron, or iron pipe securely fastened to the floor to the frame of the machine. 1910.219(e)(1)(i) & 1910.219(m)(1)(i)

Gears, sprocket wheels, and chains shall be enclosed; unless they are more than 7 feet (2.1 meters) above the floor, or the mesh points are guarded. 1910.219(f)(1) & 1910.219(f)(3)

Couplings with bolts, nuts or set screws extending beyond the flange of the coupling shall be guarded by a safety sleeve. 1910.219(i)(2)

### **Process Safety Management of Highly Hazardous Chemicals**

Employers shall develop a written plan of action regarding employee participation and shall consult with employees and their representatives on the conduct and development of process hazards analyses and on the development of the other elements of process safety management. 1910.119(c)(1) & (2)

The employer shall complete a compilation of written process safety information prior to conducting a process hazard analysis. 1910.119(d)

The employer shall perform a process hazard analysis appropriate to the complexity of the company's processes and shall identify, evaluate, and control the hazards involved in the process. 1910.119(e)(1)

The employer shall develop and implement written operating procedures that provide clear instructions for safely conducting activities involved in each covered process consistent with process safety information. 1910.119(f)(1)

Each employee presently involved in operating a process and each employee before being involved in operating a newly assigned process shall be trained in an overview of the process and in the operating procedures specified in paragraph (f). 1910.119(g)(1)

The employer, when selecting a contractor, shall obtain and evaluate information regarding the contract employer's safety performance and programs. 1910.119(h)(2)(i)

The contract employer shall assure that each contract employee is trained in the work practices necessary to safely perform his/her job. 1910.119(h)(3)(i)

The employer shall perform a pre-start up safety review for new facilities and for modified facilities when the modification is significant enough to require a change in the process safety information. 1910.119(i)(1)

The employer shall establish and implement written procedures to maintain the ongoing integrity of process equipment. 1910.119(j)(2)

The employer shall establish and implement written procedures to manage changes to process chemicals, technology, equipment, and procedures, and changes to facilities that affect a covered process. 1910.119(i)(1)

## **Railings**

A standard railing shall consist of top rail, intermediate rail, and posts, and shall have a vertical height of 42 inches (1.05 meters) from upper surface to top rail and/or platform. 1910.23(e)(1)

A railing for open-sided floors, platforms, and runways, shall have toeboard whenever, beneath the open sides, persons can pass, there is moving machinery, or there is equipment with which falling materials could cause a hazard. 1910.23(c)(1)

Railings shall be of such construction that the complete structure shall be capable of withstanding a load of at least 200 pounds (90 kilograms) in any direction on any point on the top rail. 1910.23(e)(3)(iv)

A stair railing shall be of construction similar to a standard railing, but the vertical height shall be no more than 34 inches (85 centimeters) nor less than 30 inches (75 centimeters) from upper surface of top rail to surface of tread in line with face of riser at forward edge of tread. 1910.23(e)(2)

## **Respiratory Protection**

Suitable respirators selected on the basis of the hazard to which the worker is exposed shall be provided by the employer as necessary to protect the health of the workers. 1910.134(a)(2) & (b)(2)

Where respirators are required, the employer shall establish and maintain a respiratory protective program. The program shall be regularly evaluated to determine its continued effectiveness. 1910.134(a)(2)

Written procedures shall be prepared covering the selection and safe use of respirators in dangerous atmospheres encountered in normal operations and emergencies. 1910.134(b)(1) & (e)(3)

Supervisors and workers shall be properly instructed in the selection, use, and maintenance of respirators. 1910.134(b)(3)

Respirators shall be regularly cleaned and disinfected and shall be inspected during the cleaning. Deteriorating parts shall be replaced. Respirators for emergency use shall be inspected at least once a month and after each use. When not in use, respirators shall be stored in a convenient, clean, and sanitary location. 1910.134(b)(5)(6) & (7)

Surveillance of work area conditions and the degree of employee exposure or stress shall be maintained. 1910.134(b)(8)

Persons shall not be assigned tasks requiring the use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. Respirator users' medical status shall be reviewed periodically. 1910.134(b)(10)

After inspection, cleaning, and necessary repair, respirators shall be stored to protect against dust, sunlight, heat, extreme cold, excessive moisture, or damaging chemicals. Respirators should be quickly accessible at all times. Respirators should not be stored in lockers or toolboxes unless they are in carrying cases or cartons. 1910.134(f)(5)(i)

Respirator users must be properly instructed in the devices' use and maintenance. 1910.134(e)(5)

### **Ropes (See Chains, Cables, Ropes, Hooks)**

### **Saws, Portable Circular (See Woodworking Machinery)**

All portable, power-driven circular saws (except those used for cutting meat) having a blade diameter greater than 2 inches (5 centimeters) shall be equipped with guards above and below the base plate or shoe. The upper guards shall cover the saw to the depth of the teeth, except for the minimum arc required to permit the base plate to be tilted for bevel cuts. The lower guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. When the tool is withdrawn from the work, the lower guard shall automatically return to the covering position. 1910.243(a)(1)

### **Scaffolds**

All scaffolds and their supports shall be capable of supporting the load they are designed to carry with a safety factor of at least 4. 1910.28(a)(4)

All planking shall be Scaffold Grade, as recognized by grading rules for the species of wood used. The maximum permissible spans for 2-inch (5 centimeters) x 9-inch (22.5 centimeters) or wider planks are shown in the following table:

<b>Maximum intended load:</b>	<b>Maximum permissible span using full thickness undressed lumber:</b>	<b>Maximum permissible span using nominal thickness lumber:</b>
25 lbs (11.3 kg) psf	10 ft (3 meters)	8 ft (2.4 meters)
50 lbs (22.7 kg) psf	8 ft (2.4 meters)	6 ft (1.8 meters)
75 lbs (34.0 kg) psf	6 ft (1.8 meters)	Not Applicable

The maximum permissible span for 1 1/4-inch (3.12 centimeters) x 9-inch (22.5 centimeters) or wider plank for full thickness is 4 feet (1.2 meters), with medium loading of 50 pounds (22.5 kilograms) per square foot. 1910.28(a)(9)

Scaffolds planks shall extend over their end supports not less than 6 inches (15 centimeters) nor more than 18 inches (45 centimeters). 1910.28(a)(13)

Scaffold planking shall be overlapped a minimum of 12 inches (30 centimeters) or secured from movement. 1910.28(a)(11)



## Skylights

Every skylight floor opening, and hole shall be guarded by a standard skylight screen or a fixed standard railing on all exposed sides. 1910.23(4)

## Spray-Finishing Operations

In conventional dry-type spray booths, overspray dry filters or filter rolls, if installed, shall conform to the following: The spraying operations, except electrostatic spraying must ensure an average air velocity over the open face of the booth of not less than 100 feet (30 meters) per minute. Electrostatic spraying operations may be conducted with an air velocity of not less than 60 feet (18 meters) per minute, depending on the volume of the finishing material being applied and its flammability and explosion characteristics. Visible gauges, or audible alarm or pressure-activated devices, shall be installed to indicate or ensure that the required air velocity is maintained. Filter pads shall be inspected after each period of use and clogged filter pads discarded and replaced. Filter pads shall be inspected to ensure proper replacement of filter media. 1910.107(b)(5)(i)

Spray booths shall be so installed that all portions are readily accessible for cleaning. 1910.107(b)(9)

A clear space of not less than 3 feet (0.9 meters) on all sides shall be kept from storage or combustible construction. 1910.107(b)(9)

Space within the spray booth on the downstream and upstream sides of filters shall be protected with approved automatic sprinklers. 1910.107(b)(5)(iv)

There shall be no open flame or spark producing equipment in any spraying area nor within 20 feet (6 meters) thereof, unless separated by a partition. 1910.107(c)(2)

Electrical wiring and equipment not subject to deposits of combustible residues but located in a spraying area as herein defined shall be explosion proof. 1910.107(c)(6)

The quantity of flammable or combustible liquids kept in the vicinity of spraying operations shall be the minimum required for operations and should ordinarily not exceed a supply for 1 day or one shift. 1910.107(e)(2)

Bulk storage of portable containers of flammable or combustible liquids shall be in separate, constructed building detached from other important buildings or cut off in a standard manner. 1910.107(e)(2)

Whenever flammable or combustible liquids are transferred from one container to another, both containers shall be effectively bonded and grounded to prevent discharge sparks of static electricity. 1910.107(e)(9)

All spraying areas shall be kept as free from the accumulation of deposits of combustible residues as practical, with cleaning conducted daily if necessary. Scrapers, spuds, or other such tools used for cleaning purposes shall be of nonspark material. 1910.107(g)(2)

Residue scrapings and debris contaminated with residue shall be immediately removed from the premises. 1910.107(g)(3)

"No smoking" signs in large letters on contrasting color background shall be conspicuously posted in all spraying areas and paint storage rooms. 1910.107(g)(7)

### **Stairs, Fixed Industrial**

Every flight of stairs having four or more risers shall be provided with a standard railing on all open sides. Handrails shall be provided on at least one side of closed stairways, preferable on the right-side descending. 1901.23(d)(1) & 24(h)

Stairs shall be constructed so the rise height and tread width are uniform throughout. 1910.24(e)

Fixed stairways shall have a minimum width of 22 inches (55 centimeters). 1910.24(d)

Fixed stairways shall be provided for access from one structure to another where operations necessitate regular travel between levels, and for access to operating platforms at any equipment which requires attention routinely during operations. Fixed stairs shall also be provided where access to elevations is daily or at each shift where such work may expose employees to harmful substances, or for which purposes the carrying of tools or equipment by hand is normally required. Spiral stairways shall not be permitted except for special limited usage and secondary access situations where it is not practical to provide a conventional stairway. 1910.24(b)

### **Storage**

All stored materials stacked in tiers shall be stacked, blocked, interlocked, and limited in height so that they are secure against sliding or collapse. 1910.176(b)

Storage areas shall be kept free from accumulation of materials that constitute hazards from tripping, fire, explosion or pest harborage. Vegetation control will be exercised when necessary. 1910.176(c)

Where mechanical handling equipment is used, sufficient safe clearance shall be allowed for aisles, at loading docks, through doorways, and whenever turns or passage must be made. 1910.176(a)

### **Tanks, Open-Surface**

Where ventilation is used to control potential exposure to employees, it shall be adequate to reduce the concentration of the air contaminant to the degree that a hazard to employees does not exist. 1910.94(d)(3)

Whenever there is a danger of splashing, the employees shall be required to wear either tight-fitting chemical goggles or an effective face shield. 1910.94(d)(9)(v)

There shall be a supply of clean cold water near each tank containing liquid that may be harmful to the skin if splashed upon the worker's body. The water pipe shall be provided with a quick opening valve and at least 48 inches (1.2 meters) of hose not smaller than 3/4 inch (1.8 centimeters). Alternatively, deluge shower and eye flushes shall be provided. 1910.94(d)(9)(vii)

All employees working in and around open-surface tank operations must be instructed as to the hazards of their respective jobs and in the personal protection and first-aid procedures applicable to these hazards. 1910.94(d)(9)(i)

## **Toeboards**

Railings protecting floor openings, platforms, and scaffolds shall be equipped with toeboards whenever persons can pass beneath the open side, wherever there is equipment with which falling material could cause a hazard. *1910.23(c)(1)*

A standard toeboard shall be at least 4 inches (10 centimeters) in height and may be of any substantial material, either solid or open, with openings not to exceed 1 inch (2.5 centimeters) in greatest dimension. *1910.23(e)(4)*

## **Toilets**

Water closets shall be provided according to the following: 1-15 persons, one facility; 16-35 persons, two facilities; 36-55 persons, three facilities; 56-80 persons, four facilities; 81-110 persons, five facilities; 111-150 persons, six facilities; over 150 persons, one for each additional 40 persons. Where toilet rooms will be occupied by no more than one person at a time, can be locked from the inside, separate rooms for each sex need not be provided. *1910.141(c)(1)(i)*

Each water closet shall occupy a separate compartment with a door and walls or partitions between fixtures sufficiently high to ensure privacy. *1910.141(c)(2)*

Wash basins (lavatories) shall be provided in every place of employment. *1910.141(d)*

Lavatories shall have hot, cold or tepid running water, hand soap or equivalent, and hand towels, blowers or equivalent. *1910.141(d)(2)(ii) & (iv)*

The above requirements do not apply to mobile crews or normally unattended locations, as long as employees working at these locations have transportation immediately available to nearby toilet facilities. *1910.141(c)(1)(ii)*

## **Welding-General (See Welding in Confined Spaces)**

Arc welding cables with damaged insulation or exposed bare conductors shall be replaced. *1910.254(d)(9)(iii)*

Refer to 29 CFR 1910.252(c)(5) through (10) for special considerations when welding operations require fluxes, coverings, coatings, or alloys involving fluorine compounds, zinc, lead, beryllium, cadmium, or mercury.

Mechanical ventilation shall be provided when welding or cutting:

where there is less than 10,000 cubic feet (300 cubic meters) per welder; where the overhead height is less than 16 feet (4.8 meters). *1910.252(c)(2)(i)(A) & (B)*

Proper shielding and eye protection to prevent exposure of personnel from welding hazards shall be provided. *1910.252(b)(2)(i)(B) through (D) & (F) through (H)*

Workers or other persons adjacent to the welding areas shall be protected from the welding rays by noncombustible or flameproof screens or shields or shall be required to wear appropriate

goggles. The screens shall be so arranged that no serious restriction of ventilation exists. 1910.252(b)(2)(iii) & 1910(c)(1)(iii)

### **Woodworking Machinery**

All woodworking machinery---such as table saws, swing saws, radial saws, band saws, jointers, tenoning machines, boring and mortising machines, shapers, planers, lathes, sanders, veneer cutters, and other miscellaneous woodworking machinery---shall be enclosed or guarded, except that part of the blade doing the actual cutting, to protect the operator and other employees from hazards inherent to the operation. 1910.213(c) through (r)

Power controls and operating controls should be located within easy reach of the operator while at his/her regular work location, making it unnecessary for the operator to reach over the cutter to make adjustments. This does not apply to constant pressure controls used only for setup purposes. 1910.213(b)(3) & (4)

Re-starts. In operations where injury to the operator might result if motors were to restart after power failures, provision shall be made to prevent machines from automatically restarting upon restoration of power. 1910.213(b)(3)

Band saw blades shall be enclosed or guarded except for the working portion of the blade between the bottom of the guide rolls and the table. Band saw wheels shall be fully encased. The outside periphery of the enclosure shall be solid. The front and back shall be either solid or wire mesh or perforated metal. 1910.213(i)(1)

Circular table saws shall have a hood over the portion of the saw above the table mounted so that the hood will automatically adjust itself to the thickness of and remain in contact with the material being cut. 1910.213(c), (d)(1) & (e)(1)

Circular table saws shall have a spreader aligned with the blade, spaced no more than 1/2 inch (8 millimeters) behind the largest blade mounted in the saw. The provision of a spreader in connection with grooving, dadoing, or rabbeting is not required. 1910.213(c)(2), (d)(2) & (e)(2)

Circular table saws used for ripping shall have nonkickback fingers or dogs. 1910.213(c)(3) & (f)(2)

Inverted swing or sliding cut-off saws shall be provided with a hood that will cover the part of the saw that protrudes above the top of the table or material being cut. 1910.213(g)(4)

Radial saws shall have an upper guard that completely encloses the upper half of the saw blade. The sides of the lower exposed portion of the blade shall be guarded by a device that will automatically adjust to the thickness of and remain in contact with the material being cut. 1910.213(h)(1)

Radial saws used for ripping shall have nonkickback fingers or dogs. 1910.213(h)(2)

Radial saws shall have an adjustable stop to prevent the forward travel of the blade beyond the position necessary to complete the cut in repetitive operations. 1910.213(h)(3)

Radial saws shall be installed so that the cutting head will return to the starting position when released by the operator. 1910.213(h)(4)

Rip saws shall have a spreader aligned with the blade and shall be no thinner than the blade. The provision of a spreader in connection with grooving, dadoing, or rabbeting is not required. 1910.213(c)(3) & (f)(2)

Rip saws shall have nonkickback fingers or dogs. 1910.213(c)(3) & (f)(2)

Self-feed circular saws' feed rolls and blades shall be protected by a hood or guard to prevent the hand of the operator from coming into contact with the in-running rolls at any point. 1910.213(f)(1)

Swing or sliding cut-off saws shall be provided with a hood that will completely enclose the upper half of the saw. 1910.213(g)(1)

Swing or sliding cut-off saws shall be provided with limit stops to prevent the saws from extending beyond the front or back edges of the table. 1910.213(g)(3)

Swing or sliding cut-off saws shall be provided with an effective device to return the saw automatically to the back of the table when released at any point of its travel. 1910.213(g)(2)

## APPENDIX D

### MTSU Occupational Safety and Health Plan August 17, 2016

#### I. Purpose

The Middle Tennessee State University Safety, Fire, and Environmental Health Program is established to provide and maintain an effective, comprehensive, and continuing effort that is within accordance of the administration of the University.

The primary goal of the program is designed to establish, promote, implement, and maintain good safety, fire, and health procedures, policies, and practices by the student body, the faculty, and the staff.

#### II. Objectives of the Plan

- A. To provide the MTSU faculty and employees with the greatest possible protection against safety and health hazards in the work environment.
- B. To establish the procedures and criteria which must be complied with in order to meet the regulations as required by MTSU's governing board under THEC, the Tennessee Department of Labor and the Tennessee Department of Public Health.
- C. Continual revision and updating of the MTSU Campus Safety Handbook. The manual will include policies, rules, regulations, standards, etc., that will ensure the University's compliance with State and Federal laws.
- D. Developing and maintaining effective Safety and Environmental Health committees for purposes of assuring a safe campus, conducting semi-annual inspections, assuring compliance with standards, and maintaining sound working relationships with the Safety Section.
- E. Development, implementation, and continuing efforts to assure effective and beneficial training programs for the purpose of assuring safety, fire, and environmental health awareness attitudes.
- F. Development, implementation, and maintaining Safety, Fire and Environmental Health records in an accurate and timely manner.
- G. Assisting in technical problem-solving activities to assure compliance with State and Federal regulations. Also, to act as a consultant on all matters concerning safety awareness of the Safety Program.
- H. Coordination of safety and fire protection provision by assisting in the planning of building remodeling and/or alterations to assure maximum safety features and to review architectural drawings and specifications of new construction projects from adherence to Safety, Fire, and Environmental Health principles.
- I. Progress reports to determine and/or measure the effectiveness of the program.

The above-mentioned objectives will be reviewed, updated, and submitted as required.

### **III. Standards to be Enforced**

The Occupational Safety and Health standards for the State of Tennessee have been adopted by Middle Tennessee State University as the minimum safety and health standards to be enforced. These standards are identical to the Federal standards.

### **IV. Designation of Responsible Safety Officials**

A. The Safety Section is designated as the authority to administer an effective Environmental Health and Safety Program with the delegated officials of the Environmental Health and Safety Services Group to perform duties and/or to exercise powers assigned to administer the Environmental Health and Safety Program as adopted by Middle Tennessee State University. The Environmental Health and Safety Services Group will have full cooperation of University officials to fulfill the requirements of the Environmental Health and Safety Program as defined by State and Federal laws.

B. 1. Appropriate Environmental Health and Safety Services Officials will review accident experiences and allied safety problems that arise on, or are connected with, Middle Tennessee State University property, and will review reports of serious accidents and fires. They will submit recommendations to correct hazardous conditions and to increase safety efficiency. The appropriate Environmental Health and Safety Services Officials have the responsibility to recommend essential changes in existing policies to improve safety efficiency; to recommend physical or structural alterations required to eliminate control hazards; to recommend and provide programs designed to create and maintain interest in safety; and to enforce regulations and policies established by the University.

2. Environmental Health and Safety Services conducts a campus wide safety-health promotion and publicity program. It makes use of campus news media to publicize the various aspects of safety and health. The facilities of Environmental Health and Safety Services will be available to the administrative divisions and departments in publicizing the Safety and Environmental Health Program. There will be periodic publications concerning campus safety distributed to the faculty and staff.

3. Environmental Health and Safety Services will assist administrative divisions and departments in determining the need for specific types of safety guards, apparel, storage containers, or any other safety equipment and on request, provide source and standards information.

4. Environmental Health and Safety Services maintains a current, up-to-date library of safety publications, and has access to safety libraries of such organizations as the National Safety Council, the National Fire Protection Association, Tennessee Department of Labor, etc.

5. Environmental Health and Safety Services will provide on request qualified instructional personnel to assist all departments in training personnel in fire prevention and minor firefighting, accident prevention, environmental health, and sanitation, personal first aid, and other related subjects.

6. Environmental Health and Safety Services will from time to time publish safety fact sheets and statistics in order that department heads may have the current indicators of trends, hazardous areas, and deficiencies in the safety and health program. In addition, Environmental Health and

Safety Services will prepare charts, graphs, posters, training aids, and other related items as necessary to further the safety and health goals of the University.

7. Environmental Health and Safety Services is responsible for assisting the Human Resources Department in maintaining accurate files and coordinating all accident-injury reporting procedures. Detailed information relative to accident reporting is contained in Section X, Record Keeping Requirements. Environmental Health and Safety Services will perform an analysis of each accident and provide information to the department head. In addition, Environmental Health and Safety Services will conduct, or cause to be conducted, safety and sanitation inspections of all facilities of the University. As a minimum, each facility owned by the University will be inspected semi-annually. Complete details and inspection procedures of the safety and sanitation inspection program is outlined in the section pertaining to Safety and Health Inspections.

8. Environmental Health and Safety Services is responsible for updating and publication of the MTSU Campus Safety Handbook. It is extremely important that the manual be always kept current. The MTSU Campus Safety Handbook is prepared with the intention of providing general rules of safety and health and establishing basic procedures that should be implemented to further the ultimate goal of the University's Safety Program. Environmental Health and Safety Services will be available to assist formulating specific policies and procedures. It is the responsibility of the department head to enforce the procedures within his areas and to recognize safety and health hazards.

## **V. The Rights and Duties of Middle Tennessee State University**

A. The University shall furnish to the student body, the faculty, and the staff a campus free from recognized hazards that are causing, or likely to cause death, serious injury, or harm.

B. The University shall comply with Occupational Safety and Health regulations and/or standards.

C. The University shall refrain from any unreasonable restraint on the right of the Commissioner of Labor or the Commissioner of Public Health to monitor the employer's place of business. The University will supply information as required.

D. The Middle Tennessee State University is entitled to participate in the development of standards by submission of comments on proposed standards, participation in hearings on proposed standards, or by requesting the development of standards pertaining to a given issue.

E. Environmental Health and Safety Services shall inspect, or cause to be inspected, all buildings, departments, offices, job sites, etc., to ensure the provisions of the program are complied with and carried out.

F. The University is entitled to seek an order granting a variance from an Occupational Safety or Health standard.

G. The University shall acquire, maintain, and require the use of safety equipment, personal protective equipment, and devices reasonably necessary to protect employees.

H. The University shall make, keep, preserve, and make available to the Commissioner of Labor, or his designated representative of persons within the agency to whom such responsibilities have been delegated, adequate records of all occupational accidents and personal injuries for proper evaluation and necessary corrective action.



I. The University shall consult with the Commissioner of Labor regarding the adequacy of the form and content of records.

J. The University will notify and inform any employee who has been or is being, exposed to harmful material and will inform all University employees of their rights and duties under the Occupational Safety and Health Act.

The University shall prescribe the use of labels or other appropriate forms of warning to the extent necessary to ensure that employees are informed of any significant hazards to which they are exposed, relevant symptoms, and proper conditions for safe use or exposure. Where appropriate, the University may also prescribe suitable protective equipment, but not as a substitute for appropriate control techniques, as well as control or technological procedures to be used in connection with such hazards. Where appropriate, the University shall require the monitoring or measuring of employee exposure at such locations and intervals, and in such manner as may be necessary for the protection of the employees. Any employee who has been or is being exposed in a biologically significant manner to harmful agents or material in excess of the applicable standard shall be promptly notified by his employer and informed of corrective action being taken. Where appropriate, the University shall prescribe the type and frequency of medical examinations or other tests which shall be made available by the employer at his cost to employees exposed to such hazards to more effectively determine whether the health of such employee is adversely affected by such exposure.

K. The University shall provide reasonable opportunity for the participation of employees in the effectuation of the objective of this section, including the opportunity to make anonymous complaints concerning conditions or practices injurious to employee safety and health.

L. The University shall initiate a vehicle safety program utilizing the expertise available in the Tennessee Department of Safety. This program shall set standards for:

1. Vehicles safety equipment, conditions and maintenance of vehicles, and vehicle replacement.
2. Driver training and physical and mental fitness determination.

## **VI. The Rights and Duties of Employees**

A. It is the duty of all employees to cooperate with the president of the institution and the individual responsible for safety and health in furthering the objective of the Tennessee Occupational Safety and Health Act.

B. Any employee who fails to wear or use safety or health equipment prescribed by M.T.S.U. or fails to perform his tasks in such a manner that he does not present a hazard to himself, his fellow workers, or the general public or performs his duties in such a manner after warning by the University, that equipment and property may be damaged is subject to dismissal by the president. Any employee dismissed for any of the reasons may submit an appeal from this action to the Board of Regents in accordance with the Board of Regents personnel policies and procedures.

C. The following is the procedure by which University employees may submit complaints concerning conditions or practices which may be injurious to the employee's safety or health.

1. Purpose

To provide reasonable opportunity for employees to make suggestions/complaints concerning conditions or practices injurious to employee safety and health.

2. Procedure

a. University employees shall submit suggestions/complaints regarding Safety and Environmental Health to Environmental Health and Safety Services in writing either signed or unsigned. Forms will be available in Environmental Health and Safety Services for use by employees wishing to submit suggestions. Suggestions regarding Safety and Environmental Health that represent an imminent danger situation will be accepted by phone. Subsequently, the phone suggestions must be submitted by the employee to Environmental Health and Safety Services in writing.

b. Environmental Health and Safety Services will screen each suggestion/complaint and assign an appropriate priority number as follows:

Imminent Danger	priority 1
Serious	priority 2
Non-Serious	priority 3
De Minimis	priority 4

*Imminent Danger* -- For a condition or practice to constitute an imminent danger situation, it must be determined that there is a reasonable certainty that such conditions or practices could result in death or serious physical harm immediately or within a short period of time.

*Serious* -- If the probable result of an alleged condition or practice is death or serious physical harm, then a serious condition relating to Safety or Environmental Health exists.

*Non-Serious* -- If the more likely consequence of an alleged condition or practice is something less than death or physical harm, then the condition or practice will be considered non-serious.

*De Minimis* -- If the alleged condition or practice has no immediate or direct relationship to Safety or Environmental Health, then the condition or practice will be considered De Minimis. For example, lack of partitions in sanitary toilet facilities.

c. Suggestions that receive a priority number will be answered by Environmental Health and Safety Services by corresponding directly with the employee if the complaint was signed or through Raider Resources if unsigned. Suggestions that are received and are not considered a safety and health violation will not be answered in any manner.

d. Answers to legitimate suggestions will include a statement of the condition and disposition made by Environmental Health and Safety Services to persons responsible for corrective action. If not included in the first communication, when a plan for correcting the condition is received by Environmental Health and Safety Services from the individuals responsible for

abating the condition, or when the condition has been corrected, a follow-up response will be made by Environmental Health and Safety Services.

e. If after submitting suggestions to Environmental Health and Safety Services, Environmental Health and Safety Services fails to give consideration to the employee's complaint or if there is a disagreement between the Safety Section and the employee regarding the nature and severity of the hazard, the employee may petition the Chancellor for consideration.

D. Each employee of the University shall comply with Occupational Safety and Health standards and all rules, regulations, and orders issued pursuant to the Occupational Safety and Health Act which are applicable to his own actions and conduct.

E. Each employee associated with Middle Tennessee State University shall be notified by his employer of any application for a temporary order granting the employer a variance from any provision of the Act or standard or regulation promulgated pursuant to this Act.

F. Each employee of the University shall be given the opportunity to participate in any hearing which concerns an application by his employer for a variance from a standard.

G. Any employee who may be adversely affected by a standard or variance issued pursuant to the Occupational Safety and Health Act may file a petition with Environmental Health and Safety Services.

H. Subject to regulations issued pursuant to this Act, any employee or authorized representative of employees shall be given the right to request an inspection.

I. No employee shall be discharged or discriminated against because such employee has filed a complaint or instituted or caused to be instituted a proceeding or inspection under or related to this Act.

J. Any employee who believes that he has been discriminated against or discharged in violation of these sections may, within thirty (30) days after such violation occurs, have an opportunity to appear before the Vice President of Administration.

K. Nothing in this or any other provision of this program shall be deemed to authorize or require medical examinations, immunization, or treatment for those who object thereto on religious grounds, except where such is necessary for the protection of the health or safety of others.

## **VII. Technical Services**

When necessary, M.T.S.U. Environmental Health and Safety Services will request that the Tennessee Department of Labor and the Tennessee Department of Public Health provide needed consultation, training, and technical services.

## **VIII. Inspection and Checklist Systems**

All work sites regardless of potential hazard will be inspected at least semi-annually.

A. The primary purpose of the inspection checklist system is to assure uniformity of inspections. There are various inspections that will be conducted at regularly scheduled intervals. The Safety

Section will conduct or cause to be conducted a semi-annual general safety inspection of all University buildings.

In the addition to semi-annual general safety inspection, Environmental Health and Safety Services will conduct or cause to be conducted the following required inspections:

1. Emergency lighting systems
2. Fire extinguishers
3. Fire alarm systems
4. Automatic sprinkler systems
5. Fire Hydrants
6. Standpipes
7. On campus housing
8. Swimming pools
9. Scaffolding
10. Power-platforms
11. Ionizing radiation
12. Respiratory protection
13. Welding, cutting, and brazing
14. University Laboratories

Department Heads will be furnished copies of inspections concerning areas under their operational control. The Director of Building Services and Manager of Grounds will be furnished copies of reports which contain recommendations as to physical structure modification. Upon receipt of inspection reports, the individual exercising operational control is expected to review the report and initiate corrective measures where applicable. Environmental Health and Safety Services will be responsible for conducting follow-up inspections to ensure that corrections are being properly handled. The inspector or responsible individual will have the necessary instruments for checking items, such as noise levels, grounding, foot candles, and the like.

B. University employees will be given the opportunity to accompany the Compliance Inspector when inspecting the establishment. When no employee representative accompanies the inspector, the Compliance Inspector will consult with a reasonable number of employees concerning Safety and Health conditions in the workplace.

## IX. Violations

**A. Imminent Danger.** The Act defines imminent danger as "Any condition or practice in any place of employment which are such that a danger exists which could reasonably be expected to cause death or serious physical harm immediately or before the imminence of such danger can be eliminated through the enforcement procedures otherwise provided in the Act." Therefore, for a condition or practice to constitute an imminent danger situation, it must be determined that there is a reasonable certainty that immediately or within a short period of time such condition or practice could result in death or serious physical harm. Normally, a health hazard would not constitute an imminent danger except in extreme situations, such as the presence of potentially lethal concentrations of airborne toxic substances that are an immediate threat to the lives or health of employees. If, during the course of inspection, the inspector determines that the existing set of conditions appears to constitute an imminent danger, he will attempt to have the danger corrected immediately through any means at his disposal. Also, if the employees appear to be in imminent danger, they will be advised that such a danger exists, and their supervisor will be

requested to remove them from the area of the imminent danger. The University will be deemed to have abated the imminent danger if it eliminates the imminence of the danger by (a) removing the employees from the danger area, or (b) eliminating the conditions or practices which result in the imminent danger.

**B. Serious.** To determine if a violation is serious, the inspector must decide:

1. Is there a substantial probability that death or serious physical harm could result? And if so,
2. Did the University know, or with the exercise of reasonable diligence, should it have known of the hazard?

If the answer to both questions is "yes", then a serious violation exists.

Serious physical harm includes impairment of the body where:

1. A part of the body would be permanently removed or rendered functionally useless or substantially reduce efficiency on or off the job; or
2. A part of an internal bodily system would be inhibited in its normal performance to such a degree as to shorten life or cause reduction in physical or mental efficiency.

It is obvious that the inspector must make an evaluation as to the *likelihood* that death or serious physical harm could result from a condition which is an alleged violation. If the more probable result of the condition is death or serious physical harm and the University knew, or with the exercise of reasonable diligence, should have known of the hazard, then a serious violation exists. For example, a violation involving an inadequate guard rail at a substantial height would normally be a serious violation since the result of such a condition could be death or serious physical harm. Note that the emphasis in deciding whether or not a condition represents a serious violation is based on the *seriousness* or *severity* of the most likely injury that would arise out of the potential accident rather than on the *probability* that the accident will occur as a result of the violation. In all cases, the decision in determining whether a violation is serious or not will require professional judgment.

**C. Non-Serious.** If the more likely consequence of a violation is something less than death or physical harm, or the University did not know of the hazard, then the violation will be considered a non-serious violation. For example, a violation of housekeeping standards that might result in a tripping hazard would be classified as a non-serious violation since the more probable consequence of such a condition would be strains or contusions which are not classified as serious physical harm.

**D. De Minimis.** De Minimis violations are those that have no immediate or direct relationship to safety or health. For example, lack of partitions in sanitary toilet facilities

**APPENDIX E**  
**PRINCIPAL FACULTY/SPONSOR RESPONSIBILITIES**  
**FOR MINORS IN RESEARCH LABORATORIES**

- Review the MTSU Policy (I:01:07) on Programs Involving Minors.
- Discuss with the minor's parent/guardian all potential risks associated with proposed activities.
- Ensure the minor is adequately trained in safe work practices for all proposed experiments.
- Provide lab minor(s) with written protocols describing potential hazards and necessary precautions.
- Instruct and train the minor(s) in practices and techniques required to ensure safety, and procedures for dealing with accidents. All minors must be directly always supervised by a qualified sponsor.
- Supervise the minor(s) to ensure that the required safety practices and techniques are employed.
- Correct work errors or conditions that may result in the release of hazardous materials.
- Ensure the integrity of physical containment (e.g., biological safety cabinet, chemical fume hood).
- Provide personal protective equipment (PPE) required to prevent exposure to hazardous materials.
- Adhere to University emergency plans for handling accidental spills and personnel contamination.
- Verify lab minor(s) have completed the required trainings before starting work in the laboratory (e.g., Laboratory Safety, General Biological Safety, Hazardous Waste).

**Responsibilities While Conducting Experiments Involving Minors**

- Submit any subsequent experimental changes to the Department Chair and all other applicable representatives, departments or divisions for review and approval or disapproval.
- Remain in communication with all parties involved in the project review and approval throughout the duration of the project (e.g., notify all parties if the designated project timeline must be amended).
- Report any significant problems pertaining to the operation and implementation of practices and procedures, violations of safety or compliance requirements, or any significant research-related accident or illness to the EHS Laboratory Safety Manager (via email) with 48 hours of the incident.

---

By signing below, I agree to fulfill all the Principal Faculty/Sponsor's responsibilities as stated above, and I assume complete responsibility for the safety and oversight of minor(s) in my lab.

---

Principal Faculty/Sponsor Name (Print)      Principal Faculty/Sponsor Signature      Date



### Appendix F: Fire Drill Evaluation Report

Annual fire drills will be conducted in all campus academic buildings per State and Federal regulations.

Building Name:	
Date/Time of Drill:	
Fire Drill Coordinator:	
	Name Phone Email
Drill Building Runner(s): <small>*Building runners will assist the coordinator with the evaluation questions listed below.</small>	
	Name Phone Email
Time to Evacuate:	
Important Phone Numbers:	University Police: (615) 898-2424 Murfreesboro Fire and Rescue Dept. 615-893-1311

- |  | YES                      | NO                       |
|--|--------------------------|--------------------------|
| • Did occupants immediately begin to evacuate the building when the alarm sounded? | <input type="checkbox"/> | <input type="checkbox"/> |
| • Did the occupants use the stairs in lieu of elevators?                           | <input type="checkbox"/> | <input type="checkbox"/> |
| • Was assistance provided to disabled students?                                    | <input type="checkbox"/> | <input type="checkbox"/> |
| • Were doors closed to contain the fire/smoke?                                     | <input type="checkbox"/> | <input type="checkbox"/> |
| • Did everyone evacuate the building?  | <input type="checkbox"/> | <input type="checkbox"/> |
| • Did everyone wait outside the building and wait for further instructions?        | <input type="checkbox"/> | <input type="checkbox"/> |
| • Was the drill conducted in an orderly manner?                                    | <input type="checkbox"/> | <input type="checkbox"/> |
| • Were streets and emergency vehicle access points maintained clear and open?      | <input type="checkbox"/> | <input type="checkbox"/> |

Comments: \_\_\_\_\_

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