

CHAPTER 7.0 - ADMINISTRATIVE

The intent of a laboratory safety program is to provide guidance and training to all laboratory workers who use hazardous substances or engage in potentially hazardous laboratory operations. Experience in industry has shown that the laboratory can be a safe workplace, however, this achievement was accomplished ONLY by the implementation of vigorous safety planning and training sessions.

Educational activities shall be provided for all persons who may be exposed to potential hazards in connection with laboratory operations including faculty members, students, lab supervisors, lab workers, maintenance workers, janitorial and storeroom personnel. If other non-lab related offices are nearby, consideration should be given to providing these workers with the necessary knowledge to protect them (which might be as simple as telling them which door to use in case of an emergency). This training process shall be a part of new employee indoctrination or reassignment.

Institutional safety education programs shall be a regular continuous activity and not once-a-year presentations provided for groups of new students or employees.

The following sections are intended as resource documents for administrative benefit.

SECTION 7.1 - TRAINING

Federal and State Legislation now require laboratories to provide health and safety training programs for their employees. Attendance at these training courses is mandatory and shall be documented.

While this section deals with only mandated Federal and State training, it is strongly advised that laboratories provide training to laboratory workers on chemical safety, glassware handling and general laboratory safety.

Employees shall also be instructed in how to respond to unsafe conditions or practices and communicate safety concerns to the appropriate individuals.

A formal session in a classroom setting is not necessary to impart information or to train a group of employees, though it is often desirable for this purpose. Informal group or individual discussions with a supervisor, posted notices, or handout booklets can be effective. Commercially prepared programs can also be effective, especially if supplemented with details that pertain specifically to local conditions.

OSHA does not mandate the details of the instructional method to be used. OSHA requires that, if asked by an OSHA inspector, the employees must be able to answer to the issues. Hence, whatever technique or combination of techniques are used to impart information and to train, the effectiveness of the instruction should be evaluated prior to an OSHA inspection.

The OSU Environmental Health Services Department will conduct regular training for the Departmental Chemical Hygiene Officers who are then, in turn, responsible for training their employees.

A. Hazard Communication Training

1. The individual Departmental Chemical Hygiene Officers are responsible for providing departmental laboratory employees with information and training to ensure that they are informed of the hazards of chemicals present in their work area.
2. Such information and training shall be provided at the time of an employee's initial assignment to a work area where hazardous chemicals are present and prior to assignments involving new exposure situations. Refresher information and training shall be provided on at least an annual basis.
3. Departmental Chemical Hygiene Officers shall document performance, content and attendance of their training programs.
4. Employee Information:
 - a. The contents and requirements of the OSHA Laboratory Standard.
 - b. The content, location, and availability of the laboratory's Chemical Hygiene Plan.
 - c. The PEL's, action levels, and other recommended exposure limits for hazardous chemical used in their laboratories.
 - d. Signs and symptoms associated with exposures to the hazardous chemicals used in their laboratories.
 - e. The location and availability of known reference material on the hazards, safe handling, storage and disposal of hazardous chemicals found in the laboratory including, but not limited to, Material Safety Data Sheets.

5. Employee training shall include:
 - a. The methods and observations that may be used to detect the presence or release of a hazardous chemical.
 - b. The physical and health hazards of chemicals used in the work area.
 - c. The measures employees can use to protect themselves from these hazards, including specific procedures such as appropriate work practices, personal protective equipment to be used, and emergency procedures.
 - d. The OSU Laboratory Safety Manual.

B. First Aid/CPR Training

This training shall include the following items:

1. The availability and location of First Aid equipment.
2. The names of individuals in the area who are trained in first aid and/or CPR. It is desirable that several individuals in each area be trained in basic first aid and cardiopulmonary resuscitation. The American Red Cross offers courses in Standard First Aid and CPR.
3. How to access Emergency Medical Services (EMS). For medical emergencies on- and off-campus, call **911**.
4. Someone knowledgeable about the accident should always accompany the injured person to the medical facility with a copy of the appropriate MSDS.
5. Notify the Departmental Chemical Hygiene Officer and Environmental Health Services of any chemical accident requiring first aid.
6. Consult a licensed physician qualified to handle chemical emergencies to determine if further examination and treatment is necessary following any first aid or emergency medical treatment for chemical exposure..
7. Post the location and phone number of a licensed physician qualified to handle chemical emergency cases in an obvious place.

C. Bloodborne Pathogens Training

All employees with occupational exposure to blood or other potentially infectious material must receive training at the time of assignment to tasks where occupational exposure may take place, within 90 days after the effective date of the standard, at least annually thereafter, and additional training must be provided and documented when changes affect employees' occupational exposure. This training must be documented.

The minimum training program must include:

1. a copy of the regulatory text,
2. a general explanation of epidemiology of and symptoms of bloodborne diseases,

3. modes of transmission of bloodborne pathogens,
4. an explanation of the Exposure Control Plan and how to get a copy of the plan,
5. appropriate methods for recognizing tasks and other activities that may involve exposure to blood and other potentially infectious materials,
6. use and limitations of engineering controls, work practices, and PPE,
7. selection of PPE,
8. information of hepatitis B vaccine, including efficacy, safety, etc.,
9. appropriate actions in emergencies with blood or other potentially infectious materials,
10. the procedure to follow if an exposure incident occurs,
11. post-exposure evaluation information,
12. signs and labels required, and
13. questions and answer with instructor.

D. Fire Extinguisher Training

Training of employees in the use of fire extinguisher is required by OSHA 29 CFR 1910.157 (g) "where the employer has provided portable fire extinguisher for employee use in the work place." Such training shall be conducted at initial employment and annually thereafter.

E. Spill Response Training

All employees shall be trained in the proper methods for spill response. (See Section 1.1 - "Chemical Spills")

F. Respiratory Protection Training

Respirators shall be provided when such equipment is necessary to protect the health of the employee. If respirators are provided, a detailed, written "Respiratory Protection Program" as required by the Respiratory Protection Standard 29 CFR 1910.134, shall be in place and made available to employees.

Employees shall trained be to use respiratory protection in accordance with the written "Respiratory Protection Program".

For assistance with the development of a written "Respiratory Protection Program", contact Environmental Health Services.

SECTION 7.2 - AUDITS

A. Safety Audits

The safety audit or safety review is an evaluation of a laboratory's total safety program and is to cover everything from management philosophy and attitude toward safety to the seemingly insignificant details of laboratory housekeeping. The purpose of the audit is to rate a safety program, identify its strengths and weaknesses, know where improvements are needed, and obtain commitments and target dates for correcting problems from the managers involved. The audit should not be regarded as fault-finding or placing-the-blame process, but a positive experience for everyone involved in the laboratory organization.

1. Benefits of an audit:
 - a. Provide management with a way to assess the effectiveness of their laboratory's safety program;
 - b. Provide recommendations for improvement;
 - c. Monitor changes on safety performance;
 - d. Build and maintain awareness of interest in the program by employees;
 - e. Indicate to the employee that management is serious about safety; and
 - f. Audit recommendations that are implemented can lead to lower accident and injury rates, which in turn, lowers cost of operations and increases morale.
2. Conducting the Audit

Audits shall be conducted on at least an annual basis.

The audit shall be conducted by either the Departmental Chemical Hygiene Officer (DCHO) or by a Safety Committee made up of the DCHO, employees, and supervisors. The audit is to make sure that each laboratory area or department conforms to the established Laboratory Chemical Safety Policy. When the audit is performed, detailed notes of the observations shall be made. One way to do this is for the leader to record the observations and then later have them transcribed for review. This also eliminates the need for the committee team to wait around while notes are being taken.

Once the audit is complete, it shall be written up and copies sent to the supervisor or department head responsible for the areas that were audited. The report should be discussed with the supervisor, and time set aside to correct any problem that might have been uncovered during the audit. A completion date shall be set for correcting each problem that was found and a person shall be assigned the responsibility for correcting each problem uncovered. If nothing is done, review the situation with the next University administrative level of management.

3. An audit should answer questions such as:
 - a. Is there a safety committee that is achieving results?
 - b. Are there safety monitors in each major job area of the laboratory?

- c. Are productive safety meetings being held at regular intervals?
- d. Are the safety rules being enforced?
- e. Disaster plan, fire escape plan, etc.?
- f. Hazardous waste and proper disposal program?
- g. Is a noise control program needed?
- h. Is an effort being made to comply with OSHA regulations affecting health, safety, and training of laboratory personnel?
- i. Are accidents reported and investigated? Do investigations include recommendations to avoid or prevent future occurrences?
- j. Does supervisory staff receive training in safety, HazCom, HazMat, first aid, CPR, fire extinguisher, chemical disposal, etc.?
- k. Do all employees receive hazard communication training?
- l. Is there a safety bulletin board?
- m. Are the fire protection measures uncompromised?
 - 1. Are sprinkler heads clear of stored materials?
 - 2. Are fire extinguishers readily accessible and not obstructed?
 - 3. Is the location of the nearest fire alarm pull-box known?
- n. Is there adequate personal protective equipment available? Do supervisors ensure that employees wear personal protective equipment when needed?
- o. Is there adequate lighting in the work area?
- p. Is housekeeping satisfactory? Is it emphasized?
 - 1. Is the area kept as clean as work allows?
 - 2. Is the floor clean and dry?
 - 3. Is the floor free from litter and obstructions?
- q. Is there any loose or protruding shelving or edging that could cause a safety problem?
- r. Is there a noise control program, if needed?
- s. Is glassware that is chipped or broken in use?
- t. Are compressed gas cylinders handled properly?
 - 1. Are valve caps in place on all gas cylinders that are not in use?
 - 2. Are all cylinder movements made with a dolly?
- u. Is there a program that addresses the concerns of the employee regarding health and safety in the laboratory?

- v. Do Standard Operating Procedures address proper storage and handling of chemicals?
- w. Is the Laboratory Safety Manual available, current, and reviewed regularly?

B. Safety Surveys

Safety surveys are similar to safety audits except they do not evaluate management, attitudes, nor do they ensure that safety programs are in place.

Safety surveys should be considered as walk-throughs of the physical areas of the laboratory and related areas, with the goal of identifying safety hazards and concerns. The surveys shall be conducted on a monthly basis by the laboratory supervisor. These personnel are to note problem areas, write reports, present the report to management, offer recommendations, set completion dates and follow-up to ensure action has taken place. These personnel should concentrate on working conditions, working practices, housekeeping, process controls, hazard exposure, and other similar concerns.

Please see Appendix H for a copy of the Safety Survey conducted on an annual basis by the OSU Environmental Health & Safety Department.

SECTION 7.3 - FACILITY DESIGN

While Safety procedures recommended for use to protect building occupants from specific hazardous materials are presented elsewhere in this manual, there are a number of general environmental and procedural factors often overlooked in the design and operation of laboratory facilities. These factors can have a considerable effect on the safety of the work area. This section discusses several factors relevant to the laboratory and recommends certain procedures related to each.

Appropriate design and traffic flow of the laboratory facility is critical in assuring a safe work environment for laboratory employees. In the following section, several considerations for facility design are discussed with regard to their contribution in helping to reduce the potential of accidental chemical exposure and accidental injury in the laboratory. This information is of use to those designing a new laboratory or to those renovating or updating an existing one.

A. Lighting

Adequate, glare-free lighting is necessary throughout the laboratory facility. Unshielded lighting, the presence of harsh shadows and annoying reflections, and insufficient illumination are to be avoided in the design of the laboratory. Shielded fluorescent lights are particularly effective in providing sufficient lighting without direct glare. Placement of work stations facing windows or reflective walls tend to produce visual fatigue.

The Illuminating Engineering Society recommends illumination levels for different types of work. For regular office work, (including chemist or lab technician offices) plus most typical lab work, 70-100 foot candles of illumination is recommended. For more intensive visual applications such as drafting, designing, and some accounting activities, 150-200 foot-candles is recommended.

B. Emergency Lighting

Each laboratory facility shall anticipate the need for emergency lighting. The use of a backup generator or similar system is often necessary to provide safe occupant exit and to provide lighting for any emergency repairs or procedures. It is especially important that the exit doors be clearly marked in accordance with NFPA 101. The Manager of OSU Environmental Health & Safety is the authority having jurisdiction over all formal interpretations of NFPA Codes.

C. Floors, Stairways, and Aisles

The following specifics are recommended for ensuring a floor plan that is efficient, convenient and safe:

1. Should be durable and maintenance free as possible.
2. Finishes shall be anti-slip.
3. Carpeting is not recommended for lab areas.
4. Stairs and passageways shall be sufficiently illuminated.
5. All open sides of stairwells shall have railings, as a minimum. Stairs less than 44 inches wide shall have railings on at least one side, with wider stairs having railings on both sides. Stairs over 88 inches wide shall have a center railing as well.
6. Passageways/aisles shall be a minimum of six feet wide.

7. File drawers or other storage doors shall not open into narrow aisles.
8. Doors should not open directly into passageways.

D. Egress

The following procedures are required either by OSHA, NFPA 101, BOCA, and/or other building codes:

1. Both regular exits and emergency exits shall be clearly marked.
2. Locations of emergency exits should be identified in each work area, such as in a posted floor plan.
3. Fire doors shall be unobstructed, and swing in the direction of the escape.
4. Non-exit doors and storage rooms shall be marked as such to avoid confusion with exits in the event of an emergency.
5. If possible, there should be two exits for each laboratory area.

E. Electrical

The typical laboratory requires a large quantity of electrical power. Consequently, the likelihood of electrically related problems and hazards is increased. One must address both the electrical shock hazard to the facility occupants and the fire hazard potential. The following requirements are basic to a sound electrical safety program in the laboratory.

1. Electrical standards shall be as set forth in NFPA 70 - NATIONAL ELECTRICAL CODE.
2. All electrical equipment shall be U.L. listed or F.M. approved.

F. Ventilation, Indoor Air Quality, Heating, and Cooling

While specific sources of laboratory related emissions are generally controlled, with fume hoods and local exhaust ventilation, general room and building ventilation has a considerable effect on the air quality in the laboratory and its associated offices. A facility ventilation system which provides even circulation and sufficient indoor/outdoor air exchange serves the comfort and safety of the occupants by reducing indoor air contaminant levels. Variable volume air systems should be avoided so that air contaminant levels may be precisely controlled.

The American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Standard 62-1999 "Ventilation for Acceptable Indoor Air Quality" addresses ventilation rates of buildings by offering recommendations for maximum indoor air contaminant concentrations as well as volumes of fresh air expected to provide air test results lower than those concentrations.

In design of the ventilation system, air intakes and exhausts should be located so as to avoid re-entrainment of contaminated air. Also, additional general ventilation may be required for stockroom and storerooms in the facility.

Closely related to the ventilation requirements is the need for proper heating and cooling of room air in the laboratory. ASHRAE Standard 55-1981 "Thermal Environmental Conditions for Human Occupancy" addresses this subject.

Separate systems may be required for the specific requirements of certain types of analytical equipment and computer operations.

G. Ventilation Hoods

1. Laboratory Hoods

An efficient hood system is a requirement for all laboratories. Work that involves hazardous and/or noxious materials which are toxic, irritating, volatile or harmful shall be conducted within a laboratory hood.

The primary purpose of a laboratory hood is to keep toxic or irritating vapors and fumes out of the general laboratory working area. A secondary purpose is to serve as a shield between the worker and equipment being used, when there is the possibility of an explosive reaction.

- a. Hood air velocity and velocity profile evaluations should be made at least annually and when ventilation changes, construction, maintenance, or normal wear and tear causes a change in the system. Contact OSU Environmental Health Services to perform this service.
- b. Hood ventilation systems are best designed to have an airflow of not less than 60 ft/min (linear) across the face of the hood, 100 ft/min (linear) for slightly hazardous materials, and 125 ft/min (linear) if toxic materials are involved. Flow rates of higher than 125 ft/min can cause turbulence problems and are not recommended. A mark or label shall be placed on the hood so the sash can be drawn to a point where 100 ft/min can be achieved. Guidelines for designing fume hood systems may be found in Industrial Ventilation, a Manual of Recommended Practice published by the American Conference of Governmental Industrial Hygienists.
- c. Avoid creation of strong cross drafts (100 fpm) caused by open doors and windows, air conditioning/heating vents, or personnel movement. Drafts will pull contaminants from the hood into the laboratory.

100 FPM is generally not perceptible (100 fpm is approximately 3 mph, a normal walking pace). Air conditioning and heating vents plus personnel traffic all create airflows in excess of 200 FPM, often much higher. Therefore, care should be taken in fume hood placement and laboratory traffic pattern design to minimize activity near the hood in use.
- d. Hoods should be provided with audible/visual alarm to indicate when minimum or maximum face air velocities are not maintained or exceeded. A sign should be placed on the hood to indicate who to call should the alarm sound.
- e. Tempered makeup air should be supplied to rooms and/or to hoods to replace the quantity of air exhausted through the hoods.
- f. Incompatible exhausts should be ventilated separately with the exhaust being terminated a safe distance from the building.
- g. Exhaust fans should be spark-proof if exhausting flammable vapors and corrosive resistant if handling corrosive fumes.

- h. Controls for all services should be located at the front of the hood and should be operable when the hood door is closed.
- i. All laboratory rooms should have the air changed at a rate depending on the materials being handled and consistent with ASHRAE standards.
- j. Fresh outdoor air shall be supplied as outlined in ASHRAE standard 62-1999.

2. Biological Safety Cabinets

Biological Safety cabinets are among the most effective, as well as the most commonly used, primary containment devices in laboratories working with bio-hazardous agents. The National Sanitation Foundation has developed standards for the design, construction and performance of vertical laminar flow biological safety cabinets (Class II). Utilization of this standard and list should be the first step in selection and procurement of a biological safety cabinet.

Class I and II biological safety cabinets, when used in conjunction with good microbiological techniques, provide an effective partial containment system for safe manipulation of moderate and high-risk microorganisms. Both Class I and II biological safety cabinets have comparable inward face velocities (75 linear fpm) and provide comparable levels of containment in protecting the laboratory worker and the immediate laboratory environment from infectious aerosols generated within the cabinet. However, it has been recently shown that this 75 fpm face velocity may not adequately provide protection where laboratory activity and ventilation disturbance may significantly affect cabinet performance. Therefore, a minimum inward face velocity of 100 fpm is highly recommended.

It is imperative that Class I and II biological safety cabinets are tested and certified in situ at the time of installation within the laboratory, at any time the cabinet is moved, and at least annually thereafter. Certification at locations other than the final site may attest to the performance capability of the individual cabinet or model but does not supersede the critical certification prior to use in the laboratory.

HHS Publication No. (NIH) 99-8395, titled "BIOSAFETY IN MICROBIOLOGICAL AND BIOMEDICAL LABORATORIES", published by the Centers for Disease Control and National Institutes of Health, shall be consulted for classification, specifications, and laboratory design of biological safety cabinets and Microbiological and Biomedical laboratories.

3. Specialized Local Ventilation

Some instruments such as atomic absorption spectrophotometers (AA's) or inductively coupled argon spectrometers (ICP's) emit small quantities of hazardous substances during use. To prevent excessive accumulations of these materials, each of these instruments should be provided with an individual ventilation duct placed directly over the exhaust of the instrument. Manufacturer's recommendations should be consulted for cubic foot per minute requirements for each instrument.

H. Chemical Storage

The storage of chemicals within laboratories and storage areas must incorporate a number of considerations, including the following:

1. OSHA requirements (Federal and State)
2. NFPA, State, and University Fire Code Requirements
3. Facility layout and limitations
4. Chemical use patterns and locations (location and quantities in which specific chemicals are used)

It is anticipated that laboratories may use relatively large quantities (bulk drums) of certain solvents or acids (which are stored in storage areas) with a majority of chemicals being stored and used in four liter or smaller containers.

The principle concerns in achieving proper storage is to maximize employee safety with regard to chemical compatibility, spill control, fire/explosion control, to provide security and identification and to provide a "user friendly" system with respect to point-of-use.

Certain storage guidelines apply to central storage locations:

- Storage must be physically secure.
- Adequate containment for spills and accidental releases must be provided.
- Flammable chemicals shall be stored in accordance with NFPA, OSHA, and University fire codes. Metal drums used for storage and dispensing require grounding.
- NFPA labeling must appear on cabinet and room doors at approximately waist level or lower to allow adequate visualization in dense smoke conditions.
- Chemicals shall be stored in accordance with compatibility and hazard classes. Generally, these chemicals will be segregated as flammables, acids, bases, reactives, oxidizers, and toxins.

Storage rooms or cages must be equipped with spill control/containment typically adequate for 10% of the storage capacity or the volume of the largest container. Cabinets designed for flammable or corrosive chemical storage provide a specific design capacity for containment.

Storage must conform to compatibility restrictions as described in Appendix B. Typically, solvents, acids, bases, reactives, oxidizers, and toxins will be stored separately. Separation basically refers to physical separation of containers and isolation of potential spills and releases with the goal of preventing chemical reactions. Ideally, separate cabinets or isolated areas within a central storage area should be utilized for segregated storage of incompatibles.

Small quantities of chemicals can be held at individual work stations if this quantity is to be promptly used in a test or set of tests and does not compromise acceptable ambient organic vapor levels or procedures for spill control and fire safety.

Chemicals should be stored as close as feasible to the point of use in order to minimize transport distance. Chemical storage should be limited only to areas in which the particular chemical is

used. Storage locations must be identified on an emergency floor plan posted in each work area and must be equipped with a fire extinguisher, spill kit, eye wash, first aid kit, and telephone.

I. Biohazard Facility Design

The facility design is important as it not only provides barrier protection to those working within the laboratory, but also provides protection for those outside the laboratory. Three facility designs are described below, in ascending order by level of containment:

1. ***The basic laboratory:*** This laboratory provides general space in which work is done with viable agents which are not associated with disease in healthy adults. Basic laboratories include those described in Bio-safety Levels 1 and 2 facilities.

This laboratory is also appropriate for work with infectious agents or potentially infectious materials when the hazard levels are low and laboratory personnel can be adequately protected by standard laboratory practice. While work is commonly conducted on the open bench, certain operations are confined to biological safety cabinets. Conventional laboratory designs are adequate. Areas known to be sources of general contamination such as animal rooms and waste staging areas, should not be adjacent to patient care activities. Public areas and general offices to which non-laboratory staff require frequent access should be separated from spaces which primarily support laboratory functions.

2. ***The containment laboratory:*** This laboratory has special engineering features that make it possible for laboratory workers to handle hazardous substances without endangering themselves, the community, or the environment. The containment laboratory is described as a Bio-Safety Level 3 facility. The unique features that distinguish this laboratory from the basic laboratory are the provisions for access control and a specialized ventilation system. The containment laboratory may be an entire building or a single module or complex of modules within a building. In all cases, the laboratory is separated by a controlled access zone from areas open to the public.

3. ***The maximum containment laboratory:*** This laboratory has special engineering and containment features that allow activities to be conducted safely that involve infectious agents which are extremely hazardous to the laboratory worker or may cause outbreaks of serious epidemic disease. Although the maximum containment laboratory is generally a separate building, it can be constructed as an isolated area within a building. The laboratory's distinguishing characteristic is that it has secondary barriers to prevent hazardous materials or infectious agents from escaping into the environment. Such barriers include sealed openings into the laboratory, air locks or liquid disinfectant barriers, a clothing change and shower room contiguous to the laboratory, a double-door autoclave, a bio-waste treatment system, a separate ventilation system, and a treatment system to decontaminate exhaust dust.

J. Safety Showers and Eyewash Fountains

Safety Showers and Eyewash fountains shall be installed, maintained and tested in accordance with ANSI Standard for Emergency Eyewash and Safety Shower Equipment (Z358.1-1990).

K. Sinks

The water supply for laboratory sinks should be separate from that used for toilets, drinking water and emergency showers or eye washes. This is necessary to prevent possible contamination of the potable water supply. Back siphoning or back pressure can suck sink water into the potable water system through hoses or other apparatus. Building codes require a check valve system

that must be tested periodically. It is advantageous to separate laboratory sink drainage from the sanitary drainage (see Appendix "D").

L. Sanitation Facilities, Lunch and Break Areas

Due to the use of various hazardous materials in laboratories, it is especially critical that sanitation facilities, such as rest rooms, as well as lunch or break rooms be distinctly separate from the main laboratory areas. This is best accomplished by isolation of these areas from the laboratory sections. Any lab coats, respirators, or other protective gear must be left in the lab areas upon leaving, and therefore should be provided with a designated storage area by the laboratory exit. Employees are, as a matter of routine, responsible for washing, cleaning, and any other decontamination required when passing between the lab and the other areas. Therefore, it may be advantageous to provide the necessary decontamination facilities by the laboratory exit.

M. Telephones

An emergency telephone or unrestricted access telephone capable of dialing 911 shall be readily available near any laboratory area. Emergency telephone numbers or instructions shall be posted by each such telephone.

N. Fire Protection

Oklahoma State University policy and Oklahoma state law require that all new construction and major remodeling projects provide certain levels of fire protection. All laboratories shall meet the requirements of NFPA - 45 "Standard on Fire Protection for Laboratories Using Chemicals." Contact the OSU Environmental Health Services Department for other specific requirements.

O. Operations

In planning the location of various laboratory operations, one should evaluate the various chemicals, equipment, storage, and potential accidents related to the operation. For example:

1. Are flammable materials used or stored?
2. Are compressed gases used or stored?
3. Is there an open flame used in the operation?
4. Are special air quality, heating, or air conditioning requirements needed for equipment used?
5. Will the presence of untrained persons in the area constitute a potential hazard, i.e., office or administration?
6. If flammable liquids are utilized, is proper vented storage available? (Consult NFPA 45 for quantities of flammable liquids allowed in a laboratory area.)

SECTION 7.4 - FACILITY TESTING AND MAINTENANCE

A. Chemical Fume Hoods

Fume Hoods shall be tested annually by Physical Plant Environmental Health Services in accordance with the requirements of NFPA 45 and OSHA 1910.1450 (Lab Standard). The results of these tests shall be available to the respective Departmental Chemical Hygiene Officers for their files. In addition a copy of each test result for each fume hood shall be posted on that hood.

B. Electrical Equipment

All electrical testing and maintenance shall be performed by the OSU Physical Plant Electrical Department in accordance with NFPA 70 - National Electrical Code.

C. Eyewash Fountains

Eyewash fountains shall be tested annually by the OSU Environmental Health Services Department for proper operation. The results of these tests shall be submitted to the respective Departmental Chemical Hygiene Officers for their files. Eyewash fountains shall be maintained and tested in accordance with ANSI Standard for Emergency Eyewash and Safety Shower Equipment (Z358.1-1990).

D. Fire Protection Equipment

Fire protection equipment shall be tested and maintained by the OSU Environmental Health Services Department in accordance with the applicable National Fire Protection Association (NFPA) Standards.

E. First Aid Kits

The Departmental Chemical Hygiene Officer shall be responsible for monitoring and maintaining the first aid kits in the Department. The location of first aid kits should also be plainly marked.

F. Safety Showers

Safety showers shall be tested annually by the OSU Environmental Health Services Department for proper operation. The results of these tests shall be submitted to the respective Departmental Chemical Hygiene Officers for their files. Safety Showers are maintained and tested in accordance with ANSI Standard for Emergency Eyewash and Safety Shower Equipment (Z358.1-1990).