



Chemical Hygiene Program Guideline\ Culture of Safety

With the promulgation of the Occupational Safety and Health Administration (OSHA) Laboratory standard (29 CFR 1910.1450), a culture of safety consciousness, accountability, organization, and education has developed in academic laboratories. Safety has been implemented to promote the safe handling of chemicals from ordering to disposal. Training programs have been implemented to train laboratory personnel and students in safe practices. Laboratory personnel must realize that the welfare and safety of each individual depends on clearly defined attitudes of teamwork and personal responsibility. Learning to participate in a culture of habitual risk assessment considering the health, physical, and environmental hazards of the chemicals they plan to use, experiment planning, and consideration of worst-case possibilities is as much part of a scientific education as learning the theoretical background of experiments or the step-by-step protocols for doing them in a professional manner. A crucial component of chemical education for all is to nurture basic attitudes and habits of prudent behavior so that safety is a valued and inseparable part of all laboratory activities throughout their career.

However, the ability to accurately identify and assess laboratory hazards must be taught and encouraged through training and ongoing organizational support. This training must be at the core of every good health and safety program. For management to lead, personnel to assess worksite hazards, and hazards to be eliminated or controlled, everyone involved must be trained.

The purpose of this document is to provide guidance in the development of a comprehensive chemical hygiene program. Please use it as a guide and ensure that campus specific facilities and program procedures are included in your final document.

Institute a Chemical Hygiene Program

A comprehensive chemical hygiene program ~~should be~~ is designed to minimize exposures, injuries, illnesses and incidents. ~~It needs to~~ There should be a regular, continuing effort that includes program oversight, safe facilities, chemical hygiene planning, training, emergency preparedness, and chemical security. The chemical hygiene program must be reviewed annually and updated as necessary whenever new processes, chemicals, or equipment is implemented. Its requirements ~~will~~ recommendations should

Threshold Limit Values (TLVs) should also not be exceeded.

Responsibilities

Persons responsible for chemical hygiene include, but are not limited to, the following:

Vice President of Academic Affairs Upper Level Administration (President, Provost, Vice Presidents, Executive Team Members):

- (a) Ultimate responsibility for chemical hygiene within the institution ~~and~~
- (b) Promote the importance of safety in all activities
- (c) Promote the same attitude among all levels of employment at the institution
- (d) Support broad-based laboratory safety/chemical hygiene program that will protect laboratory employees from health effects associated with hazardous chemicals, physical or biological agents
- (e) Ensure that deans, directors and department heads provide adequate time and recognition for employees who are given laboratory safety responsibilities.
- ~~(f) With other administrators, provide continuing support for institutional chemical hygiene~~

Facilities Director:

- (a) Primary responsibility of maintenance of the campus facility and laboratories

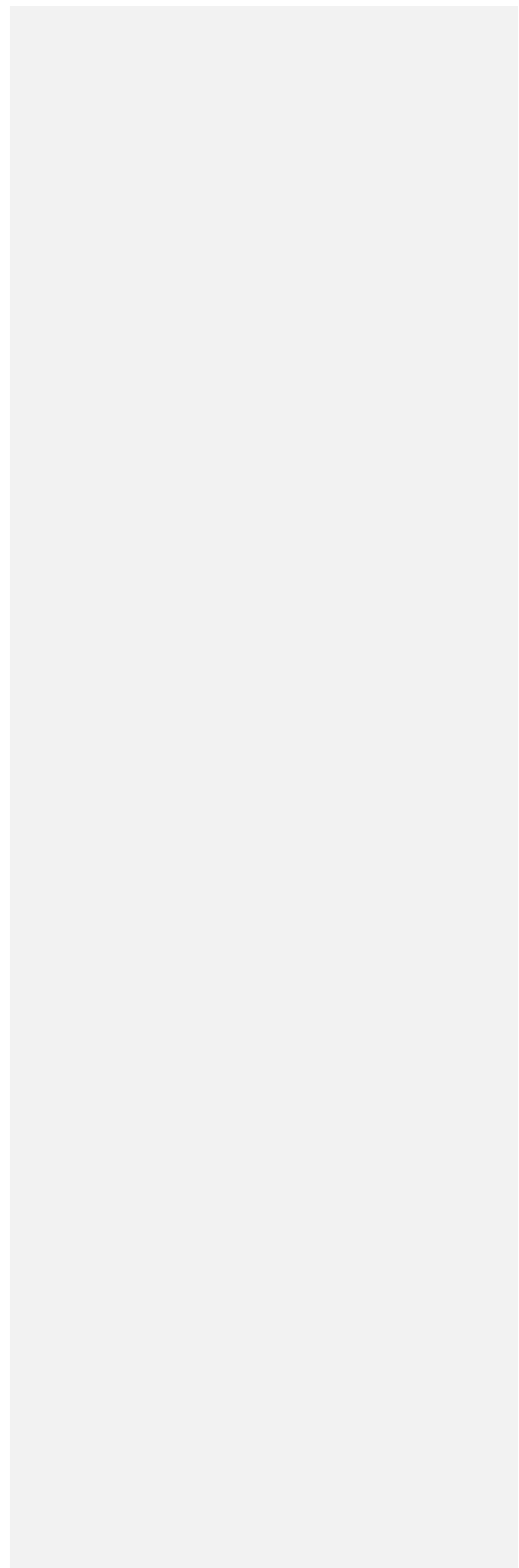
Dean of Sciences:

- (a) Is responsible to support safety in laboratories and help provide the resources as needed to ensure the faculty, staff and student safety
- (b) Ensure timely actions are taken to address safety concerns in laboratories and protect personnel and facilities
- (c) Ensure the Science Department remains in compliance with all applicable codes and regulations
- (d) Provide budgetary arrangement to ensure the health and safety of departmental personnel, students and visitors in the laboratories
- (e) Ensure that employees are provided adequate time and recognition for employees who are given laboratory safety responsibilities.
- (f) Take appropriate measures to assure that department activities comply with Institution and OSHA safety policies.
- (g) Identify Department Chairperson
- (h) Identify and assign the role of Chemical Hygiene Officer to a qualified individual.
- (i) Assist CHO in choosing qualified individuals to serve on the Chemical Hygiene Committee, this will include, at least, the CHO and the department Chairpersons.
- ~~(j)~~ (j) Ensure that adequate time and resources are provided for the proper training of all employees.

Campus Safety Director:

- (a) Responsible to work with Facilities Director, Dean of Sciences, Chemical Safety Officer, and Faculty in promoting safety throughout the facility and all laboratories
- (b) Responsible for the safety of the institution by ensuring regulatory compliance and making appropriate recommendations to ALL personnel
- (c) Ensure that there is a written and implemented Chemical Hygiene Plan (CHP) for the facility
- (d) Ensure that the CHP is reviewed annually and updates are made as needed

DRAFT 2: 9-



Laboratory Personnel/Users:

- (a) Read, understand, and follow all safety rules and regulations that apply to the work area
- (b) Plan and conduct each operation in accordance with the chemical hygiene safe lab practices
- (c) Promote good personal housekeeping and chemical hygiene practices
- (d) Notify the supervisor of any hazardous conditions or unsafe work practices in the work area
- (e) Use PPE as appropriate for each lab operation that involves hazardous chemicals
- (f) Complete all applicable annual safety training

Everyone is responsible for understanding and following all safety rules and regulations that apply to the work area.

If at any time an unsafe condition, practice, or incident is identified all efforts will be made to correct it. In the event that it either cannot or will not be immediately corrected, ANYONE has the authority to stop activities until the issue has been addressed. In the event that activities are suspended the CHO, the CHC, and the appropriate Dean will be contacted and the reason will be investigated.

No one stopping work in good faith will be reprimanded.

Chemical Hygiene Plan (CHP)

the employer which sets forth procedures, equipment, personal protective equipment and work practices that are capable of protecting employees from the health hazards presented by hazardous

efined by this standard are used in the workplace,

CFR 1910.1450(e) (1). The CHP is the foundation of the laboratory safety program and must be reviewed and updated, as needed, and at least on an annual basis to reflect changes in policies and personnel. A CHP should be facility specific and can assist in promoting a culture of safety to protect workers from exposure to hazardous materials. The plan should be written so that users clearly know how, by who, where, and when specific tasks will be accomplished.

be readily available to employees ensure that employees know where/how to access the plan. Ensure that the plan is capable of protecting lab users from health hazards and minimizing exposure. Include the following topics in the CHP:

- (a) Individual chemical hygiene responsibilities
- (b) Standard operating procedures
- (c) Personal protective equipment, engineering controls and apparel
- (d) Laboratory equipment
- (e) Safety equipment
- (f) Chemical management

DRAFT 2: 9-18-15

- (g) Housekeeping
- (h) Emergency procedures for accidents and spills
- (i) Chemical waste
- (j) Training
- (k) Safety rules and regulations
- (l) Laboratory design and ventilation
- (m) Exposure monitoring
- (n) Compressed gas safety
- (o) Medical consultation and examination

***It should be noted that the nature of laboratory work may necessitate addressing biological safety, radiation safety and security issues.

2. Chemical Procurement, Distribution, and Storage

Chemical Procurement:

- (a) Information on proper handling, storage, and disposal should be known to those who will be involved before a substance is received
- (b) Only containers with adequate identifying labels should be accepted
- (c) Ideally, a central location should be used for receiving all chemical shipments
- (d) Shipments with breakage or leakage ~~will~~should be refused ~~or opened in a chemical hood~~
- (e) Only the minimum amount of the chemical needed to perform the planned work should be ordered
- (f) Purchases of high risk chemicals ~~should~~must be reviewed and approved by the CHCØ
- (g) Proper protective equipment and handling and storage procedures should be in place before receiving a shipment

Chemical Storage:

- (a) Chemicals should be separated and stored according to hazard category and compatibility
- (b) SDS and label information should be followed for storage requirements
- (c) Maintain existing labels on incoming containers of chemicals and other materials
- (d) Labels on containers used for storing hazardous chemicals must include the chemical identification and appropriate hazard warnings
- (e) The contents of all other chemical containers and transfer vessels, including, but not limited to, beakers, flasks, reaction vessels, and process equipment, ~~will~~should be properly identified
- (f) Chemical shipments should be dated upon receipt and stock rotated
- (g) Peroxide formers ~~will~~should be dated upon receipt, again dated upon opening, and stored away from heat and light with tightfitting, nonmetal lids. Once open they need to be periodically tested with peroxide test strips.
- (h) Open shelves used for chemical storage should be secured to the wall and contain 3/4-inch lips. Secondary containment devices should be used as necessary
- (i) Consult the SDS and keep incompatibles separate during transport, storage, use, and disposal
- (j) Oxidizers, reducing agents, and fuels should be stored separately to prevent contact in the event of an accident
- (k) Chemicals ~~may~~should not be stored in the chemical hood, on the floor, in areas of egress, on the benchtop, or in areas near heat or in direct sunlighaccident

DRAFT 2: 9-18-15

- (l) Laboratory-grade, flammable-rated refrigerators and freezers should be used to store sealed chemical containers of flammable liquids that require cool storage. These refrigerators and
~~Do not store food or beverages in the laboratory refrigerator~~
- (m) Highly hazardous chemicals should be stored in a well-ventilated and secure area designated for that purpose
- (n) Flammable chemicals should be stored in a spark-free environment and in approved flammable-liquid containers and storage cabinets. Grounding and bonding should be used to prevent static charge buildups when dispensing solvents
- (o) Chemical storage and handling rooms ~~will~~should be controlled-access areas. They should have proper ventilation, appropriate signage, diked floors, and fire suppression systems

Chemical Handling:

- (a) As described above, a risk assessment should be conducted prior to beginning work with any hazardous chemical for the first time
- (b) All SDS and label information should be read before using a chemical for the first time
- (c) Trained laboratory users should ensure that proper engineering controls (ventilation) and PPE are in place

Chemical Inventory:

- (a) Prudent management of chemicals in any laboratory is greatly facilitated by keeping an accurate inventory of the chemicals stored
- (b) Unneeded items should be discarded or returned to the storeroom

Transporting Chemicals:

- (a)

DRAFT 2: 9-18-15

- (b) Reuse surplus materials. Only the amount of material necessary for an experiment should be purchased, and, if possible, materials should be reused
- (c) Recycle waste. If waste cannot be prevented or minimized, the organization should consider recycling chemicals that can be safely recovered or used as fuel
- (d) Dispose of waste properly. Sink disposal may not be appropriate. Proper waste disposal

environmental health and safety (EHS) office should be consulted in determining which methods are appropriate for different types of waste

Collection and Storage of Waste:

- (a) Chemical waste should be accumulated at or near the point of generation, under the control of laboratory supervisors
- (b) Each waste type should be stored in a compatible container pending transfer or disposal. Waste containers ~~must~~ be clearly labeled and kept sealed when not being actively filled in use
- (c) Incompatible waste types ~~must~~ be kept separate to ensure that heat generation, gas evolution, or another reaction does not occur
- (d) Waste containers should be segregated by how they will be managed. Waste containers should be stored in a designated location that does not interfere with normal laboratory operations. Ventilated storage and secondary containment may be appropriate for certain waste types
- (e) Waste containers ~~must~~ be clearly labeled and kept sealed when not being actively filled in use. Labels should include the accumulation start date and hazard warnings as appropriate
- (f) Non-explosive electrical systems, grounding and bonding between floors and containers, and non-sparking conductive floors and containers should be used in the central waste accumulation area to minimize fire and explosion hazards. Fire suppression systems, specialized ventilation systems, and dikes should be installed in the central waste accumulation area
- (g) Waste management workers ~~will~~ be trained in proper waste handling procedures as

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DRAFT 2: 9-18-15

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- (3) Communications during an emergency what to expect, how to report, where to call or look for information
- (4) How and when to use a fire extinguisher
- (5) Security issues unauthorized access
- (6) Protocol for absences or illness
- (7) Safe practices for power outage
- (8) Shelter in place when it is appropriate
- (9) Handling suspicious mail or phone calls
- (10) Laboratory-specific protocols relating to emergency planning and response
- (11) Handling violent behavior in the workplace
- (12) First-aid and CPR training, including automated external defibrillator training if available.

It is prudent that laboratory personnel are also trained in how to respond to short-term, long-term and large-scale emergencies. Laboratory security can play a role in reducing the likelihood of some emergencies and assisting in preparation and response for others. Every institution, department, and individual laboratory should consider having an emergency preparedness plan. The level of detail of the plan will vary depending on the function of the group and institutional planning efforts already in place.

Emergency planning is a dynamic process. As personnel, operations, and events change, plans will need to be updated and modified. To determine the type and level of emergency planning needed, laboratory personnel need to perform a vulnerability assessment. Periodic drills to assist in training and evaluation of the emergency plan are recommended as part of the training program.

