2018 Chemical Hygiene Plan

UCA Department of Chemistry

Safety Policy Statement: It is the responsibility of the UCA Chemistry Department and its employees to ensure that our programs and laboratory activities protect and promote the health and safety of our students, our employees, and the environment.

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I. Introduction

A. Description of the Plan

This Chemical Hygiene Plan is a written program developed and implemented by the UCA Department of Chemistry. The plan describes procedures, equipment, personal protective equipment, and work practices that are capable of protecting employees from the health hazards presented by hazardous chemicals. This document has been developed to meet OSHA guidelines and Arkansas Department of Labor regulations. Documentation related to the implementation of this plan will be found in appendices at the end of this document.

B. Chemical Hygiene Officer

The Chemical Hygiene Officer (CHO) is charged with the development and implementation (documented in Appendix A) of this plan. The Department Chair will serve as the interim CHO until a dedicated staff or faculty member is hired to fill this role.

C. Material Safety Data Sheets and Amounts of Chemicals

Safety Data Sheets (SDS) are available in paper form in the stockroom. Each lab will have a posted explanation of SDS information, a statement that they are available upon request in either paper or electronic form, and a listing of websites for access to SDS information. The department has no hazardous chemical in excess of 55 gallons or 500 pounds.

II. Standard Operating Procedures and Procedures for Handling Hazardous Chemicals

A. General Housekeeping Rules

1. Keep all work areas free of clutter. Items that are not in use are to be returned to their storage sites.

2. Chemicals are to be returned to their assigned storage areas when laboratory work with them is completed. A card system will be used when a chemical is taken from the stockroom. The card will include the person's name, chemical name, and date the chemical is removed. This will enable us to make sure the chemical is placed in the correct location upon return and will inform others of the chemical's location. If the chemical is completely used before its return, the person will turn the card into the CHO to inform them that it should be restocked or removed from the inventory list.

3. Chemicals must not be stored on the floor, aisles, hallways, or stairs.

4. Chemicals that have been used as teaching laboratory unknowns are to be identified as to their composition before storage.

5. Chemicals designated as waste for disposal must have the identities and amounts labeled on the containers.

6. Spills are to be cleaned up and spill control items are to be replenished promptly.

B. Personal Hygiene

1. Experiments will be designed to minimize exposure to large quantities of hazardous chemicals.

2. Do not eat, drink, smoke, or apply cosmetics in the laboratory.

3. Wash well with soap and water before leaving the laboratory.

4. Wash promptly whenever a chemical has contacted the skin.

5. Do not use mouth suction to pipet anything.

6. Avoid contact with irritating vapors. If it is necessary to check the contents of a container by smell, gently waft the vapor toward your nose.

C. Personal Protection

1. Eye protection must be worn by all persons in a lab at any time a chemical or piece of glassware is being handled. Eye protection must meet American National Standards Institute ANSI Z.87 standards. If there is the likelihood of expulsion of hot or corrosive material or spattering, additional protection such as a face shield or desk shield must be used.

2. Working alone in a lab is prohibited unless another person is notified of the activity.

3. Gloves should be worn when appropriate. Remove gloves prior to leaving the laboratory.

4. Low-heeled shoes with fully-covered uppers must be worn. Shoes constructed of porous materials are not allowed in the lab.

5. A ventilation hood must be used whenever exposure to fumes is likely to cause irritation or respiratory distress or to exceed the threshold limits as set in the SDS.

6. Long legged clothing, or similar length apron or laboratory coat, must be worn to prevent direct exposure to skin when handling glassware or chemicals.

D. Purchasing Chemicals

1. Chemicals should be purchased in small quantities as needed for use in the laboratory in order to minimize storage and disposal problems.

2. Containers must be marked with the date of purchase date in order to minimize disposal problems.

3. An annual inventory of all chemicals must be conducted. The inventory will include lot number, chemical supplier, quantity, hazards, CAS number, specialized storage conditions, purchase date, destruction date, and link to a digital SDS.

E. Labeling of Chemicals

1. All chemical containers must be labeled with the identity of the contents and their associated hazards.

2. Chemicals transferred to other containers (including solutions that are prepared) must be labeled according to the identity and hazard and must be marked with the date of preparation.

F. Location and Storage of Chemicals

1. The principal storage area for chemicals is the main stockroom. Small quantities of chemicals required for laboratory activities may be stored in laboratory preparation rooms.

2. Laboratories and chemical storerooms must have controlled access and their use is limited to authorized personnel. Access to labs and storerooms must be checked at the end of each semester and people no longer authorized to have access to the storeroom will be removed at that time.

3. Sufficient secure wooden shelving must be available for un-crowded storage of chemicals. Shelves must have stops installed to prevent chemicals from falling off the shelves. Large shelves must be affixed to each other to prevent spillage of chemicals during an earthquake. Adequate lighting, ventilation, and protection from freezing and overheating must be provided in storage areas.

4. Exits must be easily accessible and walk space must be free from clutter.

5. Incompatible chemicals must not be stored adjacent to each other. Concentrated acids must be stored separately from concentrated bases and are not to be stored near metal items. Oxidants are to be stored separately from fuels.

6. A map of the storage plan for the main storeroom must be posted for easy reference. Copies of this map are to be provided to the UCA Police Department and the Conway Fire Department.

7. Entrances to chemical storage areas are to be marked with signs indicating any restriction to access and responsible parties to contact in case of emergency.

8. Containers of sufficient integrity (free of leaks and flaws) are to be used to store chemicals.

9. Ignition sources must be removed from areas designated for storage of flammable chemicals. Quantities of highly flammable chemicals in excess of one liter must be stored in plastic or metal containers. Areas for storage of flammables must be well-labeled and fire control equipment is to be

located within 50 feet of such areas. The two areas for storage of flammables are in the bomb room in the main storeroom and the preparation room for the organic laboratory.

10. Chemicals stored in research labs should also follow safe storage guidelines, should be labeled properly, inventoried annually, and should be kept in small quantities.

G. Transporting and Chemicals

Chemicals must be transported so that personal safety and the integrity of chemical containers are insured. Larger glass containers must be carried in shatter-proof buckets.

H. Disposal of Chemicals

1. Before using a chemical, the employee is to determine an appropriate method for disposal.

2. Disposal of sharp objects such as syringe needles, glass disposable pipets, razor blades and broken glass will be done in a way to avoid endangering the janitorial staff.

3. Disposal of chemicals must not create a health hazard. After consulting appropriate references, the most effective means of disposal should be used.

III. Procedures for Handling Hazardous Materials

A. Identification of Hazard

1. Before beginning work with a specific chemical, hazardous properties must be determined by checking with appropriate safety references, e.g. SDS.

2. Employees are expected to draw upon previous experience in working with chemicals in determining proper precautions and procedures. Special precautions are to be taken when information reveals the chemical to be particularly hazardous, e.g. corrosive, toxic, irritant, pyrophoric, oxidative, flammable, reactive, explosive or sensitizer.

3. Dilute concentrated acids or bases by adding portions of the acid or base to larger quantities of water and flushing affected areas promptly with water in the event of contact with these chemicals.

4. Laboratory operations using flammable chemicals must be carried out away from sources of ignition and should be conducted with the smallest appropriate amounts.

5. Before working with severely hazardous chemicals, such as highly toxic, reactive, explosive, or carcinogenic substances, specific safety and disposal procedures must be developed when used in the teaching and research labs.

IV. Emergency Situations

A. Immediate Response

In the event of an emergency, follow the steps suggested by the acronym ACE. A is for alert those who may be endangered, C is for confine the hazard, and E is for evacuate if exposure or danger is unreasonable.

B. Spill Control

In dealing with a chemical spill, the employee is to consider the properties of the chemical and use those clean-up methods that avoid unreasonable risk. Should adequate personal protective devices not be available or should the employee not be knowledgeable in their use, the employee is to contact another member of the department or a qualified professional (e.g. , the Conway Fire Department).

C. Evacuation

If evacuation is necessary, a route that avoids the hazard and leads to the outside is to be used. Utilities should be shut off before leaving if doing so involved unreasonable risk. Proper authorities are to be notified when personal safety is secured.

D. Documentation

Records of the circumstances of emergency situations are to be included in Appendix A of this document.

V. Equipment for Personal Protection and Emergencies

A. Equipment List

1. The following safety-related materials are to be found within each lab:

a. fire control equipment

b. safety shower

c. ventilation hood

d. spill control items (absorbent material, hand broom, dust pan, and a pair of sturdy rubber gloves)

Labs using flammable solvents will also be equipped with fire blankets.

B. Equipment Performance Evaluation

1. Eyewash stations, safety showers, and fire blankets must be located within 30 feet of any point in the laboratory.

2. The functioning of eyewash stations, fume hoods, and safety showers must be checked once per month (Appendix B). Checks will also be made whenever there is any evidence of malfunction. Access to eyewash stations and safety showers must not be restricted or blocked.

VI. Training of Employees

A. Persons to be Trained and Frequency of Training

Act 1172 of the 1991 Arkansas Legislature and the associated Safety Code No. 12 of the Arkansas Department of Labor indicate that there is no requirement for training faculty members in chemistry. However, annual training will be required of the laboratory coordinator, undergraduate teaching assistants, and undergraduate research students. Participation in annual training is based upon the start of the academic year. Also, undergraduate research students will abide by the following requirement of the American Chemical Society: "A student using research to meet the ACS certification requirements must prepare a well-written, comprehensive, and well-documented research report including safety considerations."

B. Information to be Provided

1. The location, availability and content of this Chemical Hygiene Plan are to be provided.

2. A general description of the physical and health hazards of chemicals in the work area.

3. Methods that may be used to detect the presence of hazardous chemicals in the laboratory.

4. Personal protective equipment and procedures for handling emergencies will be covered.

5. The location of references for safe handling of chemicals, particularly SDS.

6. An explanation of the labeling system and means of identifying hazards will be communicated.

7. Procedures to follow in the event of exposure to hazardous chemicals.

8. Handling, cleanup, and disposal procedures.

9. Records to be kept to document implementation of this plan.

C. Safety Instruction in the Teaching Labs

Each faculty member will review, and each student will be asked to sign, a laboratory safety agreement, attached as Appendix C, at the beginning of each semester in our teaching laboratories.

VII. Exposure Assessments, Medical Consultations, and Examinations

A. Suspected Exposures to Toxic Substances

1. All employee-related incidents in which there may have been an overexposure to a hazardous substance will be investigated promptly. If the circumstances indicate a reasonable suspicion of overexposure, the employee is entitled to a more thorough medical examination.

2. Events or circumstances that might reasonably constitute overexposure include:

a) a spill or leak of a hazardous chemical

b) direct eye or skin contact with a hazardous chemical

c) symptoms such as headache, rash, nausea, coughing, tearing, eye irritation, dizziness, loss of dexterity or judgment

d) some or all of the symptoms disappear with the person is taken away from the exposure areas and then reappear when the person returns to the work area

e) two or more persons in the same lab have similar complaints

B. Documentation

All complaints are to be documented (Appendix A). If no further assessment of the event is deemed necessary, the reason for that decision will be included.

C. Assessment of Exposure

The Chemical Hygiene Officer or other individual chosen by the university may be asked to gather information to assist the physician in the assessment of the need for a medical exam or treatment. In cases of emergency, exposure assessments may be conducted after the person has been treated. The purpose of the assessment is to determine whether there was exposure that might have caused harm to one or more employees. An exposure assessment may include interviews, the chemical, symptoms, SDS information, and control measures such as personal protective equipment and ventilation hoods.

D. Medical Consultation and Examination

Medical consultations and examinations are determined by a licensed physician at no cost to the employee. The university is to receive a written opinion from the physician that includes any recommendation for further follow-up, the results of the medical examination and associated tests, and any medical condition that might put the employee at risk as a result of exposure to a hazardous chemical in the workplace. The physician's report is also to include a statement that the employee has been informed by the physician of the results of the examination and any medical treatment that may

require further examination or treatment. The written opinion shall not reveal specific findings of diagnoses unrelated to occupational exposure.

E. Rights of Employees

The university shall not penalize an employee who has requested information or filed a complaint under the provisions of this plan.

Appendix A. Documentation of Implementation of Plan

1. Record of Inspection of Safety Equipment: Eyewash Stations, Safety Showers, and Fume Hoods

UCA Chemistry Department Safety Devices

Test Date:

Safety showers and eye wash stations

Room Number	Safety Shower	Eye Wash Station
102	N/A	
104	N/A	
200		
202		
204		
206		
208		
302		
304		
305		
306		
308	N/A	
402		
Prince 135		
Prince 136		
Prince 201		

Hoods

Hoods	Cfm sash closed	Cfm sash opened
202 West		
202 East		
204 North		
204 South		
206 West		
206 East		
302 West		
302 East		
304 North		
304 South		
305		
305A		
306 Northwest		
306 Northeast		
306 Southwest		
306 Southeast		
402 North		
402 South		
Prince 201 #1		
Prince 201 #2		

2. Lab Coordinator Training

Title of Training:

Date of Training:

3. Training for Teaching Assistants and Research Students

Title of Training:

Date of Training:

Appendix B. Record of Emergencies, Complaints, and Investigations

General Information

Place of accident: _____

Date and time of accident: _____

☐ **TEACHING LAB INCIDENT** ☐ **RESEARCH LAB INCIDENT** ☐ **Other** _____

If teaching lab incident:

Course: _____ **Section:** _____ **Professor:** _____ **TA:** _____

Experiment:

_____

Incident Type (check/circle all that apply)

☐ **INJURY**: Cut Chemical Burn Burn Chemical Exposure Other: _____

☐ **FIRE**: Electrical Fire Solvent Metal Paper/Wood Other: _____

☐ **CHEMICAL EXPOSURE/SPILL**:

Spill Container Break Leak Vapor Liquid Solid

Other: _____

☐ **ILLNESS** (symptoms): Fainting Nausea Dizziness Other: _____

☐ **OTHER**

Materials/chemicals involved in the incident:

Personal Injury/Illness

Name of injured/ill person: _____

Nature of injury/illness:

First aid given by: _____

Treatment of injury/illness:

Was person sent to the health center? ____ Was person sent to emergency room? ____

Was person hospitalized? _____ If yes to any of the above, accompanied by: _____

Fire

Source of fire: _____

Fire Dept. called? ___

If fire extinguishers were used,

Name(s) of person(s) involved: _____

Number of extinguishers used: _____ Type of extinguisher used: _____

Extinguishers used were from: _____

Chemical Exposure/Spill/Other

Chemical(s) involved: _____

Amount(s) involved: _____

Spill kit used: _____ Type of spill kit used: _____

Cause of incident:

Extent of damage:

___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

Filled out by (print): _____ Date: _____

Signature:

Department Head (print): _____ Date: _____

Signature:

CHO (print): _____ Date: _____

Signature:

Reviewed by Safety Committee (date): _____

Appendix C. Laboratory Safety Agreement

As a student at the University of Central Arkansas, I understand the importance of and agree to follow the following safety guidelines while in the chemistry laboratory:

1. I will wear ANSI Z87-approved safety glasses or goggles at all times while in the lab except during pre-lab lecture or when my lab instructor informs me that it is safe to remove them.
2. I will know where safety equipment is located and how to use it, including the fume hoods, safety showers, eyewash stations, exits, fire blankets, and fire extinguishers.
3. I will read and understand the lab before I come to class. I will complete any assigned pre-lab exercises before I come to lab.
4. I will not work by myself in the lab.
5. I will not perform unauthorized experiments.
6. I will wear clothing that is conducive to lab work, making sure to wear shoes that cover my feet, to not wear loose sleeves, to tie back any long hair, and wear long-legged clothing.
7. I will follow all waste disposal procedures as outlined by my lab instructor. When in doubt about how to dispose of a particular chemical, I will ask my lab instructor.
8. I will wash my hands thoroughly before leaving the lab.
9. I will immediately report any injury, physical or chemical, to my lab instructor, no matter how minor it might seem at the time.
10. I will report any chemical spills to my instructor immediately.
11. I will avoid touching hot objects and will label hot objects as such to notify others.
12. I will make sure to read labels on reagent containers before I use them. Also, I will label all containers that I use while in the lab.
13. Generally, I will avoid inhaling fumes. I will use the fume hood when directed to do so. When I am directed to smell a gas, I will waft vapors toward me.
14. I will not eat or drink while in the lab.
15. I will not use tobacco products while in the lab.
16. I will inform my instructor prior to the first lab session if I have any particular allergy to a chemical or if I have a medical condition that might need to be considered while in the lab.
17. I will report any glassware that is cracked or chipped to my instructor.
18. I will not taste any chemical while in the laboratory.
19. I will strive to maintain a clean lab, cleaning up any spills of liquids or solids, returning equipment and chemicals, and keeping common work areas (such as the balances and hoods) clean.
20. I will ask questions when I have them so as not to perform an unsafe experiment.
21. I will make sure that gas jets are turned off when I am finished with them.
22. I will dispose of broken glass in broken glass containers.
23. I will not put solids in the sink.
24. I will keep the laboratory bench free of purses, backpacks, etc.

Name:_____ Date:_____