CHEMICAL HYGIENE PLAN

Cameron University
Lawton, Oklahoma

Revised 6/2008

TABLE OF CONTENTS

INTRODUCTION

This document describes the Chemical Hygiene Plan for Cameron University as required by OSHA's Occupational Exposure to Hazardous Chemicals in Laboratories Standard, 29 CFR 1910.1450 (referred to as the Standard and included as Appendix B).

In order to comply with the Standard, Cameron University has established a plan to ensure that our university is capable of protecting employees from health hazards associated with hazardous chemicals in the laboratory and capable of keeping exposures below the permissible exposure limits as specified in 29 CFR part 1910, subpart Z. Questions regarding this plan should be directed to The Dean of the School of Science and Technology.

This plan is made readily available to the employees of Cameron University and employee representatives (if applicable), and upon request to the Assistant Secretary of the Occupational Safety and Health Administration.

A review and evaluation of the Chemical Hygiene Plan is conducted on an annual basis and this plan is updated as necessary.

The person responsible for implementation of the Plan on this campus is the Assistant Director, Physical Facilities.

The Chemical Hygiene Officer (CHO) for Cameron University is the Dean of the School of Science and Technology, Room 140A Science Complex (580) 581-2308.

GENERAL INFORMATION

In order for the Chemical Hygiene Plan (CHP) to be complete, each department and individual laboratories will have written standard operation procedures specific for their area.

Each department must designate a Departmental Chemical Hygiene Officer (DCHO) and notify the University Chemical Hygiene Officer (CHO) in writing of their choice. The DCHO must be a full-time employee of the University with adequate safety training.

A copy of the CHP must be placed in each individual laboratory or appropriate work area. When a "suite" of laboratories or work areas exist, under one supervisor, one copy may be sufficient, if all the required information is identical.

Each department will maintain records indicating that the appropriate personnel have read the CHP. An example of such a form is found in Appendix A (Form 1).

All employees should comply with procedures as outlined in the Chemical Hygiene Plan. Safety training will be made available to employees.

SECTION I - GENERAL SAFETY PROCEDURES

All work areas offer many possibilities for accidents to occur. Laboratories or work areas may compound the effect of a minor accident, due to the proximity of hazardous chemicals and equipment of different types. The following guidelines should be followed:

1. No running, jumping or horseplay is permitted in laboratories or work areas.

2. Spills shall be cleaned up immediately. If a hazardous material is spilled, consult Section IX - Emergency Response. Water spills may present a slipping hazard, and should be cleaned up immediately. Bench tops should be kept clean and dry to prevent accidental contamination of skin or clothing.

3. Ladders shall be in good condition and used in the manner for which intended. Wood ladders shall not be painted, so that defects may be immediately detected.

4. Wheeled stepstools shall be designed so that weight placed upon them locks the wheels, immobilizing the stepstool.

5. Lifting of heavy items shall be performed in the proper fashion, using the legs to lift, and not the back.

6. All electrical equipment shall be properly grounded.

7. All electrical equipment shall be U.L. listed and/or F.M. approved.

8. Extension cords shall not be used as a substitute for permanent wiring.

9. Sufficient room for work shall be present in the area of breaker boxes. All the circuit breakers shall be labeled to indicate whether they are in the "on" or "off" position. Fuses must be properly rated.

10. Electrical cords shall not be suspended unsupported across rooms or doorways. Do not route cords over emergency showers, overhead pipes, or metal structures. Do not run cords through walls or ceilings, doorways, or windows. Do not place cords under rugs, carpets or heavy objects. Avoid areas where a cord will be walked upon as this could cause damage to the insulation.

11. If working with a system under vacuum, be aware of implosion hazards. Apply vacuum only to glassware specifically designed for this purpose.

12. Never evacuate any glassware that shows any sign of damage, such as scratches, cracks, or etching.

13. Never allow water, solvents or corrosive gases to enter a building vacuum system.

14. Broken glass is a common cause of injuries in a laboratory or work area. Only use glass which is in good condition.

15. Do not store glassware near the edge of a shelf. Heavy glassware should be stored on lower shelves.

16. Do not attempt to catch glassware if it drops or is knocked over.

17. All broken glass shall be disposed in a rigid, puncture proof container, and clearly marked **"DANGER - broken glass".**

SECTION II - CHEMICAL PROCUREMENT, DISTRIBUTION, STORAGE AND USE

A. PROCUREMENT

When ordering chemicals, whether it is a small purchase order, direct to a laboratory or work area, or through the department stockroom, certain procedures should be followed.

1. Carefully estimate the quantity needed by reviewing the experimental procedure. Ordering bulk quantities does not save money if hazardous waste disposal is required for the leftover chemicals.

2. Insure that proper safety measures are available for the hazard associated with the chemicals ordered.

3. Contact the manufacturer for additional information before ordering new chemicals for which hazard information is unavailable.

4. Order chemicals in small lots to avoid the hazards associated with repackaging.

5. Obtain approval from the supervisor before ordering whenever:

    a. A new laboratory procedure or significant change in a previous procedure is to be conducted;

    b. It is likely that the Permissible Exposure Limit will be exceeded or an unusual hazard will be present.

6. Insure that receiving personnel are aware of hazard information on the chemical to be received.

7. Insure that proper storage, signs, and personal protective equipment are available for the hazard associated with the ordered chemicals.

B. RECEIPT AND DISTRIBUTION OF CHEMICALS

1. Do not accept any chemical that is not properly labeled.

2. Do not accept any chemical in a leaking or broken container.

3. Review and observe information on safe handling and storage of the chemical.

4. When transporting chemicals by hand, they should be packed in a carrying container or bucket.

5. When transporting chemicals by cart, insure that the cart is stable and has wheels large enough to negotiate any change in elevation or uneven surfaces.

6. Whenever possible, transport using freight elevators. Avoid congested areas and times between classes when students are likely to be in the hallways.

7. When transporting gas cylinders, use appropriate hand trucks with tie-downs and insure that the cylinders are capped.

C. STORAGE OF CHEMICALS

General procedures for the safe storage of chemicals are listed below. The Departmental Chemical Hygiene Officer will recommend specific storage plans for their department or area. Any specific questions may be addressed to the Departmental Chemical Hygiene Officer or the Chemical Hygiene Officer.

- All chemicals should be properly labeled and in good condition. Any deteriorating labels must be replaced. Any leaking containers must be repackaged into a suitable replacement container or disposed of through the Departmental Chemical Hygiene Officer.

- Chemicals should be stored by hazard class, (i.e., flammable, corrosive acid, corrosive base, reactive) **NOT** alphabetically. Within a specific class, chemicals may be alphabetized.

- All shelves should be secured to prevent tipping and have a front lip, if possible, to prevent bottles falling off the front of the shelf.

- Ensure that storage locations are properly vented, dry, and free from temperature extremes.

- If a stepstool must be used to obtain chemicals, it must have wheels that lock when a weight is applied to the stool.

- Use only explosion-proof refrigerators for storage of flammable liquids that must be refrigerated.

- Indicate the purchase date and date of opening on the label of any peroxide-forming chemicals.

- Dispose of any peroxide-formers within one year of purchase or six months of opening.

- Secure gas cylinders away from heat sources.

D. USE OF CHEMICALS

1. General Safe Chemical Use

a. Review the MSDS (Material Safety Data Sheet). Know and observe the safety precautions for each chemical that you are using.

b. Ensure that appropriate spill cleanup equipment, safety equipment and personal protective gear are available for each chemical in use.

c. Know the locations of safety showers, eyewash, fire extinguishers, telephone, and evacuation route in relation to the work area.

d. Avoid working alone in a laboratory or work area. If alone, arrange to have someone periodically check in.

e. Do not eat, drink, smoke, chew gum, chew tobacco, or apply cosmetics while working in a laboratory or work area with chemicals.

f. Do not store food items, beverages, or cosmetics in areas where chemicals are stored or are in use. Food items used for experiments should be clearly labeled as such.

g. Confine loose hair, clothing, and jewelry to prevent entanglement with equipment, contact with chemicals, or a source of ignition.

h. Wear shoes at all times. Avoid open-toed shoes, sandals, or shoes with woven uppers.

i. Wear personal protection appropriate to the chemicals in use.

j. Never smell or taste chemicals.

k. Never use mouth suction for pipetting or starting a siphon.

l. Always wash hands thoroughly after handling chemicals.

m. Keep the work area as clean and uncluttered as possible.

n. Do not leave potentially hazardous experiments or processes unattended.

2. Safe Use of Flammable and Combustible Chemicals

Flammable and combustible chemicals are those which can, under standard conditions, generate sufficient vapor to cause a fire in the presence of an ignition source. A material which can generate sufficient vapor to ignite at temperatures below 100 degrees F (38 degrees C) are classified as "flammables". Chemicals which can generate sufficient vapor to ignite, but require a temperature over 100 degrees F are classified as "combustible". The vapor trails from these chemicals can travel reaching removed sources of ignition, such as an electrical appliance, to cause fires. Fire can also result from the reactions between oxidizers or reactives, and flammable or combustible materials.

The following precautions should be observed when handling these chemicals:

a. Eliminate potential sources of ignition, such as open flames, smoking materials, electrical equipment in operation, and any source of sparks, in areas where these materials are used or stored. "No Smoking" signs should be conspicuously posted and observed.

b. Refrigerators and freezers used for the storage of flammable and combustible chemicals must be explosion-proof.

c. Store away from oxidizers.

d. Ensure that proper bonding and grounding procedures are used when pouring or transferring flammable liquid from a large container or drum.

e. Ensure that areas where flammable or combustible materials are used or stored have adequate sprinkler systems or fire extinguishers.

3. Safe Use of Corrosive Chemicals

A corrosive material chemically reacts at the point of contact to cause damage to tissue. Corrosive chemicals include acids and bases. When using corrosive materials, the following precautions should be observed:

a. Always add acid to water, not water to acid, to avoid a violent reaction and/or splashing of the acid.

b. Use appropriate personal protection equipment, such as gloves, rubber apron, eye protection and face shield, if appropriate.

c. **USE EXTREME CAUTION WHEN WORKING WITH HYDROFLUORIC ACID.** Hydrofluoric acid cannot be neutralized by standard neutralization procedures. In the event of skin or eye contact, seek medical attention immediately after flushing.

4. Safe Use of Reactives

Reactive materials react chemically with themselves or other chemicals to produce large quantities of energy. The energy produced may be sufficient to produce a detonation. When using the following categories of reactives certain precautions should be observed:

a. **Pyrophorics** (ignite spontaneously upon contact with air).

(1) Use and store in inert environments

Examples: metal alkyls, phosphorus, fine powders of magnesium, aluminum and zinc.

b. **Oxidizers** (react with organic materials or reducing agents to produce heat and oxygen; may result in a flash fire)

(1) Use minimum amounts for experiments.

(2) Store away from organic chemicals, flammables and reducing agents.

Examples: perchloric acid, fuming nitric acid, chromic acid.

c. **Peroxide-formers** (may react with oxygen to produce a peroxide capable of exploding with friction, impact, or heat).

(1) Date all peroxide-formers with purchase date, and date of opening.

(2) Dispose of all peroxide-formers within one year of purchase or six months of opening.

(3) Never open a container where crystals have formed around the lid. An old container with metal lid should not be opened, but disposed of through the Departmental Chemical Hygiene Officer.

Examples: ethyl ether, isopropyl ether, tetrahydrofuran, picric acid.

d. **Water-reactives** (may react with water to produce a flammable or toxic gas or other hazardous condition)

(1) Avoid contact with water sources. Do not store near sprinkler heads.

(2) Use dry sand to smother fires, and provide adequate ventilation.

Examples: metals such as lithium, sodium and potassium, acid anhydrides and acid chlorides.

5. Use of Select Carcinogens, Reproductive Toxins and Chemicals with High Acute Toxicity

Chemicals in this category include:

a. The OSHA listed carcinogens;

b. The National Toxicology Program (NTP) "known to be Carcinogens" List;

c. The International Agency for Research on Cancer (IARC) list of "Carcinogenic to Humans" - Group I;

d. The Reproductive Toxins List; and

e. The Environmental Protection Agency (EPA) Acute Hazardous Waste List.

In accordance with guidelines recommended by the American Chemical Society, quantities of 10 milligrams or less are exempt from the following special procedures:

a. Establish a designated area for the use of toxic materials, and identify the area by posting signs.

b. Use safety equipment and personal protection equipment recommended by the MSDS for each chemical.

c. Ensure appropriate, safe disposal of hazardous waste.

d. The areas in use should be decontaminated thoroughly on a regular basis.

e. Only personnel trained to work with these chemicals should be allowed to use them.

f. Chemicals should be stored in a safe and secure manner.

SECTION III - ENVIRONMENTAL MONITORING

Regular instrumental monitoring of air quality is not usually required or practical in a laboratory, but may be appropriate under certain conditions. If engineering controls are properly maintained and used, their design should prevent contamination of the air with chemicals. Testing may be considered appropriate when the ventilation system or hoods are being tested, redesigned, or of questionable efficiency. Testing may also be appropriate when highly toxic materials are being used regularly, such as three times a week.

If any laboratory or work area personnel have reason to believe that the airborne concentrations of hazardous materials are exceeding recommended limits, contact Physical Facilities for assistance.

SECTION IV - HOUSEKEEPING, MAINTENANCE AND INSPECTIONS

Good housekeeping practices are important to maintain a safe working environment. Aisles should be kept clear and unobstructed. Chemicals should be stored in the appropriate areas and not allowed to accumulate on benchtops. Floors should be kept clean of spilled chemicals and liquids to prevent slips and falls. Inspections should be accomplished on a regular basis to ensure that good housekeeping practices are in effect.

Any equipment not in appropriate working order should be reported to Physical Facilities, Cameron University, for maintenance, if part of the building facilities. Instrumentation is the responsibility of the individual departments.

Eyewash fountains should be inspected weekly. Inspection is the responsibility of the laboratory manager or delegated individual. If the eyewash is in a hall, inspection is the responsibility of the closest laboratory. After each inspection, the inspector shall complete the inspection sheet included in Appendix A (Form 2). Additional sheets should be duplicated prior to use.

Safety showers shall be inspected every week by the laboratory manager or designated individual. If the shower is located in a hall, inspection is the responsibility of the closest laboratory. After each inspection, the inspector shall complete the inspection sheet included in Appendix A (Form 3). Additional sheets should be duplicated prior to use.

Fume hoods will be inspected on an annual basis by a qualified member of Physical Facilities in conjunction with the Departmental Chemical Hygiene Officer. After inspection, the inspector will document the results on the inspection sheet included in Appendix A (Form 4). Additional sheets should be duplicated prior to use.

Completed inspection sheets should be maintained by the Departmental Chemical Hygiene Officer for three years.

SECTION V - MEDICAL PROGRAM

Cameron University provides all employees who work with hazardous chemicals an opportunity to receive medical attention, including any follow-up examinations which the examining physician determines to be necessary, for the following circumstances:

1. Whenever an employee develops signs or symptoms associated with a hazardous chemical to which the employee may have been exposed to in the laboratory, the employee is provided an opportunity to receive an appropriate medical examination.

2. Where exposure monitoring reveals an exposure routinely above the action level (or in the absence of an action level, the Permissible Exposure Level) for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements, medical surveillance is established for the affected employee as prescribed by the particular standard (i.e., 29 CFR 1910.1001 through 29 CFR 1910.1101).

3. Whenever an event takes place in the work area, such as a spill, leak, explosion or occurrence resulting in the likelihood of a hazardous exposure, the affected employee is provided the opportunity for a medical consultation. This consultation is for the purpose of determining the need for a medical examination. An appropriate medical examination is provided as necessary.

Medical examinations and consultations are performed by or under the direct supervision of a licensed physician designated by the University, are provided at no cost to the employee, without loss of pay, and at a reasonable time and place.

The physician is provided:

1. The identity of the hazardous chemical(s) to which the employee may have been exposed;

2. A description of the conditions under which the exposure occurred, including quantitative exposure data, if available; and

3. A description of the signs and symptoms of exposure that the employee is experiencing, if any.

A written opinion must be obtained from the examining physician for an examination or consultation which is required by the Standard. This opinion includes:

1. Any recommendation of further medical follow-up;

2. The results of the medical examination and any associated tests;

3. Any medical condition that may be revealed in the course of the examination which may place the employee at increased risk as a result of exposure to a hazardous chemical found in the workplace; and

4. A statement that the employee has been informed by the physician of the results of the consultation or examination and any medical condition that may require further examination or treatment.

This written opinion does not include any specific findings of diagnoses that are unrelated to occupational exposure.

If an employee believes that the risk of exposure to a hazardous chemical in the workplace exceeds acceptable levels, the employee should contact their direct supervisor, Departmental Chemical Hygiene Officer, or Chemical Hygiene Officer to evaluate potential hazards.

Should any tests be conducted in the workplace, such as air quality monitoring, the results will be furnished to the laboratory involved, and a copy of the results should be included in the department by the Departmental Chemical Hygiene Officer or designated representative in the department.

SECTION VI - PERSONAL PROTECTIVE EQUIPMENT AND SAFETY EQUIPMENT

A. PERSONAL PROTECTIVE EQUIPMENT

A variety of personal protective equipment is available for use in laboratories and work areas. For the equipment to perform correctly, however, the equipment must be used and maintained properly. Laboratory supervisors and the Departmental Chemical Hygiene Officer shall determine the need for such equipment, train the employees in proper use, monitor the effectiveness of the equipment, and monitor and enforce the proper use.

1. Eye Protection

Eye protection is mandatory in all areas where there is potential for such injury. This applies not only to persons working continuously, but to others who are in the area for a temporary period of time. All eye protection equipment shall comply with the requirements set forth in American National Standard for Occupational and Educational Eye and Face Protection, ANSI Z 87.1-1968.

a. The type of eye protection required depends upon the hazard. In most cases, safety glasses with side shields are adequate. Where there is a danger of splashing chemicals, safety goggles are required. More hazardous operations, such as mixing strong caustics or acids, require a face shield, or a combination of face shield with safety glasses or goggles.

b. Appropriate eye protection gear should be provided to employees.

c. For persons requiring corrective lenses, prescription safety glasses are available commercially. Wearing prescription safety glasses does not eliminate the need for goggles or face shields, if deemed necessary.

d. It is recommended that contact lenses not be worn in a laboratory. The reasons for this are as follows:

(1) If a corrosive liquid splashes into the eye, the natural reflex is to clamp the eye shut, making it difficult, if not impossible, to remove the lens before damage is done to the eye.

(2) The plastic used in contact lenses is permeable to some of the vapors found in a laboratory. These vapors can be trapped behind the lens and cause extensive irritation.

(3) The lenses can prevent tears from removing the irritant.

e. If the Departmental Chemical Hygiene Officer permits the wearing of contact lenses in the laboratory, they must be protected by goggles designed for use with contact lenses. If chemical vapors contact the eyes while wearing contact lenses, the following steps should be taken:

(1) Immediately remove the lenses,

(2) Continuously flush the eyes for at least 15 to 30 minutes, and

(3) Seek medical attention.

f. If an employee should experience chemical contact with the eyes, the employee should proceed immediately to the nearest eye-wash station (with assistance, if available) and flush the eyes with water for 15 to 30 minutes. During this time, a co-worker should notify the appropriate person, such as the Departmental Chemical Hygiene Officer, and call for medical attention (x2911).

g. Visitors should follow the same eye protection procedures as the employees. It is the laboratory's responsibility to provide eye protection for anyone entering the laboratory. It is the responsibility of the employee hosting the visitors to obtain appropriate eye protection. After use, visitor eye-wear should be cleaned, prior to use by another person.

2. Clothing

The following guidelines on clothing are offered from a safety standpoint:

a. Loose clothing should be avoided, unless covered by a lab coat, due to the possibility of ignition, absorption of chemicals, and entanglement in machinery. Torn clothing should be avoided for the same reason.

b. Unrestrained dangling jewelry and long hair present a safety risk for accidental ignition or entanglement, and should be avoided. Tight fitting rings and jewelry not easily removable may trap corrosive or irritating liquids next to the skin.

c. Lab coats are recommended to protect clothing and the wearer from accidental spills and contamination. Due to the possibility of absorption and accumulation of

chemicals, lab coats should not be worn in eating areas or outside the laboratory or work area.

d. Shoes shall be worn at all times in the laboratory and work area. Open-toed shoes, sandals, and shoes with woven uppers are not recommended due to the possibility of spilling corrosive or irritating liquids.

e. Long-sleeved shirts, long pants and other articles of clothing which protect bare skin from exposure are recommended.

Additional levels of protective wear may be necessary for specific chemicals. Consult the MSDS to determine the appropriate type of protective clothing required for each chemical.

3. Protective Aprons

Some laboratory or work area activities, such as washing glassware, require the handling of relatively large quantities of hazardous chemicals. To protect clothing, and the wearer, a rubber or plastic apron may be required, where a possibility of splashing liquids exists. Aprons are available in different materials, and in different styles, depending on the extent of protection required. Consult the MSDS to determine the compatibility of materials for individual chemicals.

4. Gloves

Gloves should be worn when handling chemicals. The possibility exists for burning, irritation, or absorption through the skin, whenever using chemicals. Glove materials may be permeable to specific chemicals. The MSDS should be consulted for appropriate glove material for specific chemicals. In the event a MSDS recommendation is not adequate, Physical Facilities may be contacted for additional specific information.

5. Respirators

Respirator use should be avoided if at all possible. Where possible, engineering controls should be used to minimize exposure. If respirators are to be worn because permissible exposure limits are being exceeded, or engineering controls are insufficient, contact the Departmental Chemical Hygiene Officer. Proper training in the use and fit of respirators is required to provide adequate safety for the wearer. The Departmental Chemical Hygiene Officer will provide evaluation and training on the proper respirator and use for individuals, upon request.

B. SAFETY EQUIPMENT

Employees in laboratories and work areas are surrounded by physical and chemical hazards. In an effort to prevent accident and injury, safety equipment in good working order is provided.

1. Fire Extinguishers

Physical Facilities is responsible for the placement and maintenance of all fire extinguishers on campus. Specific fire extinguishers are required according to the potential flammable material present.

a. **Class A** - ordinary combustibles such as wood, paper, cloth, rubber and many plastics.

b. **Class B** - flammable liquids, oils, greases, tars, oil-based paints, lacquers, and flammable gases.

c. **Class C** - fires involving electrical equipment, where the conductivity of the extinguishing medium is of importance.

d. **Class D** - Fires in combustible metals such as magnesium, titanium, zirconium, sodium, lithium and potassium.

e. **Halon** - designed to leave no residue which could damage instruments or computers. In the event of a Halon release, the area must be thoroughly ventilated before being reoccupied, since Halon gas is not designed for continued inhalation.

If the extinguisher present in the laboratory or work area is not adequate for the types of hazardous materials present, contact Physical Facilities for additional extinguishers.

Fire extinguishers should never be obstructed from view, or access blocked. If any employee observes a fire extinguisher that has been discharged, not fully charged, or has the pin removed, contact Physical Facilities.

2. Safety Showers

If all protective measures fail, and an employee receives a chemical splash on the body, a safety shower should be available for immediate and thorough washing of the body.

a. Employees should familiarize themselves with the location of the closest shower prior to beginning work in any laboratory.

b. Safety showers are designed to flood the entire body in an event of chemical contamination, or a clothing fire. The employee should stand underneath the shower head and activate with the handle. Flood the affected area for 15 to 30 minutes.

c. In the event of splashing with corrosive liquid, the employee should remove the affected clothing while under the shower.

d. Whenever a shower is utilized, the Departmental Chemical Hygiene Officer, or laboratory supervisor should be notified of its use and the circumstances.

3. Eyewash Fountains

If all protective measures fail, and an employee receives a chemical splash to the eyes, eyewash fountains are provided for immediate and thorough irrigation of the eyes.

a. Employees should familiarize themselves with the location of the closest eyewash fountain, before beginning work in the laboratory or work area.

b. Employees should be familiar with the operation of the eyewash.

c. Always flood the eye for **at least** 15 to 30 minutes to be sure that there is no liquid remaining in the eye. Always flush from the inner part of the eye outward.

d. After thorough washing, the employee should seek medical attention to determine if any damage occurred to the eye.

e. Whenever an eyewash is used, the Departmental Chemical Hygiene Officer or the laboratory supervisor should be notified of its use and the circumstances.

4. First Aid Kits

First aid kits should be available in conspicuous and well marked places in the laboratory or work area, and are to be used to treat minor injuries not requiring medical attention. In the event of a minor injury requiring use of the first aid kit, the circumstances must be reported to the Departmental Chemical Hygiene Officer or laboratory supervisor for two reasons:

a. A minor injury may result from a hazardous situation which, if uncorrected, may result in further injuries, and

b. It is important to document an injury as "work related" for the purpose of obtaining Worker's Compensation, should the injury lead to further complications, such as a cut becoming infected.

First Aid Kits should be inspected each semester.

5. Explosion-proof Refrigerators

If there are flammable substances requiring refrigeration, an explosion-proof refrigerator must be used. These refrigerators are designed such that flammable vapors in the refrigerator are not in contact with any light switch, thermostat, or other potential source of ignition.

These refrigerators must be marked as explosion-proof, and not used to store food or beverages.

6. Fume Hoods

Work that involves chemicals that are toxic, odoriferous, volatile or harmful, shall be conducted within a fume hood. The primary purpose of a fume hood is to keep toxic or irritating vapors out of the general laboratory or work area. A secondary purpose is to act as a shield between the worker and the equipment being used, when there is the possibility of an explosive reaction. This is accomplished by lowering the sash, which is made of impact resistant material.

a. Hood ventilation systems are designed to have an airflow of not less than 60 ft/min (linear) across the face of the hood, 100 ft/min (linear) if slightly more hazardous materials are in use, and 125 ft/min (linear) if toxic materials are involved. Flow rates of more than 125 ft/min can cause turbulence and are not recommended. Many hoods will have a mark on the side, indicating the appropriate level for the sash to achieve the desired air velocity.

b. Avoid creation of drafts due to open doors and windows, air conditioning or heating vents, and personnel movement. These will decrease the efficiency of the hood and may result in the backdraft of vapors into the laboratory.

c. Do not adjust the baffles. These have been preset for maximum efficiency. If ventilation problems develop, contact Physical Facilities to have the hood inspected.

d. When not in use, the hood sash should remain closed. While in use, the sash should be kept at the height designated to provide minimum face velocity.

e. Work should be done as deep in the hood as safely possible without blocking the rear air vents.

f. Only the items necessary to perform the experiment should be present in the hood. Each additional object present increases turbulence and decreases efficiency.

g. The hood is not to be used as storage for chemicals. It is not to be used as a means of disposal for chemicals through vaporization. If large quantities of a chemical vaporize during an experiment, then a means of recapture, through distillation or scrubbing, should be considered.

h. Some hoods are designated as perchloric acid hoods and are stainless steel. These are, therefore, used primarily for perchloric acid digestion. These hoods have a wash-down feature which should be used after each use of the hood, and every two weeks when the hood is not in use. Perchloric acid is an oxidizer, which is capable of generating a fire or explosion when it contacts organic matter. Perchloric acid should never be evaporated in any hood not specifically designed for its use. Conversely, organic chemicals should not be permitted to vaporize in a hood used for perchloric acid, because of the possibility of condensation in the exhaust and subsequent reaction with perchloric acid fumes.

i. Radioactive materials may not be used in hoods without prior permission from the Departmental Chemical Hygiene Officer.

j. **ALWAYS ASSURE THAT THE HOOD IS FULLY OPERATIONAL BEFORE BEGINNING AN EXPERIMENT.**

k. Hood inspections are performed on an annual basis by Physical Facilities.

7. Biological Safety Cabinets

Biological safety cabinets are among the most common and most effective means of safe containment when working with potentially infectious agents.

Class I and Class II biological safety cabinets are certified and tested any time that the cabinet is moved, and at least annually thereafter. Certification at locations other than the laboratory of use does not preclude the need for testing after installation. Certification is accomplished by a contract agency, and further information may be obtained from Physical Facilities.

As with any other piece of equipment, the biological safety cabinet must be used properly in order to provide protection. Repeated insertion and withdrawal of workers arms, opening and closing doors of the lab and the isolation chamber, improper placement of equipment inside, and even activity outside the cabinet, may disrupt the inward directional airflow, and allow the escape of aerosols from the chamber. Always decontaminate the hood at the end of the day, using established laboratory procedures.

A biological hood is not to be used for chemical storage, or as a replacement for a chemical fume hood.

8. Flammable and Corrosive Liquid Storage Cabinets

Cabinets designed for the storage of flammable and corrosive liquids should be properly used and maintained. Read and follow the manufacturers information, if provided, and follow the following guidelines:

a. Store only compatible materials inside a cabinet.

b. Do not store paper, cardboard packing material, or other combustibles inside a flammable storage cabinet.

c. There are manufacturer established quantity limits on the amount of liquid to be stored. Do not overload the cabinet.

9. Safety Shields

In the event that shielding is needed to provide protection against splashing or explosion, and a chemical hood is inappropriate, a portable shield may be used, within limitations.

Portable shields have several drawbacks. They may topple towards the worker when there is a blast allowing, or even causing injury. They do not provide any protection to the back of the equipment. They should be used only where the hazard is very small.

SECTION VII - RECORDS AND REPORTS

A. ACCIDENT REPORTS

In the event of an accident, the Injury and Illnesses Incident Report (OSHA Form 301) should be filled out. (See Appendix A, Form 5, for the location of this form.) The original accident report must be forwarded immediately to the Personnel Office, ATTN: Insurance Programs, even if no claim is anticipated. One copy should be kept in the department and another copy should be forwarded to Physical Facilities. In case of an accident involving a student, the accident report should indicate if the student was working in their capacity as an employee of the university.

B. CHEMICAL HYGIENE PLAN

The Chemical Hygiene Plan should be maintained in an accessible place within each laboratory or work area. In addition, specific standard operating procedures for each individual laboratory or work area should be accessible. The information and guidelines for facilities and precautions are compatible with current knowledge and current state and federal regulations.

C. CHEMICAL INVENTORY LIST

Federal regulations require that a Chemical Inventory List be maintained and updated annually. This list documents the location and quantity of chemicals located on the campus. In the event of an emergency, such as a fire, knowledge of what chemicals are contained in each area provides essential information for emergency responders. Each department will be responsible for the chemical inventory list for their areas. A copy of this list should be provided to the appropriate Dean's office by August 1. The Deans' offices will provide a copy of the list to Physical Facilities.

D. TRAINING REPORTS

Training which is accomplished at the department level must be documented with one copy of the documentation maintained in the departmental office and another copy sent to Physical Facilities.

E. MEDICAL REPORTS

Medical records will be maintained by the University in accordance with state and federal regulations.

F. RECORDS OF EXPOSURE

In the event of employee exposure to a hazardous chemical in a manner believed to exceed recommended exposure limits, a record of exposure (Report of Accident/Occupational Disease) must be filled out by the employee's supervisor. A copy must be sent to the Personnel Office and one copy forwarded to Physical Facilities.

SECTION VIII - SIGNS AND LABELS

A. SIGNS

Cameron University has developed a Uniform Laboratory Hazard Signs program. The purpose of the program is to communicate the chemical and physical hazards of rooms and building areas to University personnel, emergency response personnel, and others who may have access to these areas.

Signs should be reviewed annually. Whenever hazard conditions within the area change, appropriate sign changes should be made. A sign should be posted on each entrance to a work area or laboratory containing chemicals.

Location signs should be prominently posted showing the location of safety showers, eyewash stations, exits, fire extinguishers, first aid supplies, and areas where food and beverage consumption and storage are permitted.

B. LABELS

All containers should be labeled at all times, showing the contents and the hazards associated. Waste containers should be labeled showing the waste which can be safely added, and a record of what waste is currently contained in the container.

SECTION IX - EMERGENCY RESPONSE

During the course of normal laboratory operations, there is always the potential for an emergency to occur. These emergencies may be a result of a chemical spill, a fire, or a medical emergency. In the event of an emergency, an emergency response plan should be implemented. This plan should include evacuation of the facility if deemed necessary. Each room must have posted, near the doorway, a map showing the safe evacuation route from the room and building. This map should be reviewed by the occupants of the room prior to an emergency occurring. It is necessary that all employees know how to act and react to an emergency in advance of its occurrence. To accomplish this, an Emergency Response Plan is included in this Chemical Hygiene Plan. All accidents, regardless of severity, should be reported to the laboratory or work area supervisor.

A. CHEMICAL SPILLS

1. Spill Prevention

The most effective way to handle a chemical spill is to prevent or reduce its occurrence. Spills can occur through (1) the rupture of chemical containers, (2) inadequate shelving, (3) inadequate shelving integrity, (4) lack of guards on shelves, and (5) inappropriate handling. The following paragraphs offer some suggestions to eliminate or minimize chemical spills.

a. Many spills can be controlled by the use of trays, fume hoods and absorbent paper.

b. Caps and covers for containers should be securely in place whenever the container is not in immediate use.

c. Use a suitable container for chemicals and wastes collected in other than the original container. In cases of corrosive waste, or halogenated solvents, a metal container may not be suitable, even if the material was originally shipped in metal. Consult the Material Safety Data Sheet (MSDS) for specific information.

d. Containers should be inspected on a monthly basis for rust, ruptures, deformation and any sign of chemical leakage.

e. Limit the quantity of chemicals stored in the laboratory. Large drums or multiple bottles should be kept in the stockroom until needed.

f. Use proper techniques when transporting chemicals. Special padded bottle carriers or pails can be used to prevent breakage by striking against walls or benches, and to contain the chemical in the event of breakage. Carts used should be stable under loads, and have wheels large enough to negotiate uneven surfaces without tipping or stopping suddenly. Freight

elevators should be used whenever possible to avoid exposure to students and other employees.

g. Chemicals should never be stored on the floor. Containers should be kept on shelves as low as possible to avoid accidents when lifting a bottle down. The shelves should have a lip on the front to prevent slipping off the edge. If chemicals are stored on high shelves, a stair must be provided, which will securely lock in place when weight is applied. Shelf units should be secured to the wall or floor and the weight limit not be exceeded by the weight of the chemicals.

h. Large bottles should never be picked up by the lid, or the molded glass ring. Use two hands, one under the bottle, and the other around the neck.

2. Departmental Responsibilities

Responsibility for controls, actions, etc. regarding hazardous materials spills lies with the individual department responsible for the materials involved. This includes, but is not limited to, provision of cleanup personnel and equipment. Where the extent of the spill is beyond the capability of the individual department to promptly and safely clean up, the department shall contact Cameron Office of Public Safety at x2911 and Physical Facilities.

3. Physical Facilities Responsibilities

Physical Facilities will assist in the cleanup of a hazardous material spill, where conditions indicate that the cleanup would present a safety or health hazard to other than specially trained personnel, or in any other conditions specified in this section. Physical Facilities personnel present at the site of a cleanup shall assume charge of all cleanup operations. The involved department shall provide personnel and materials to assist as requested by Physical Facilities personnel.

4. Conditions Requiring Assistance

Cameron Office of Public Safety at x2911 shall be contacted when a chemical spill occurs that:

a. Causes personal injury or chemical exposure that requires medical attention;

b. Causes a fire hazard or uncontrollable volatility;

c. Requires respiratory protection in a degree, where equipment and trained personnel are not available;

d. Involves or contaminates a public area;

e. Causes airborne contamination requiring local or building evacuation;

f. Causes a spill that cannot be isolated or controlled by laboratory personnel;

g. Causes damage to university property which will require repairs;

h. Cannot be handled safely and effectively by department personnel;

i. Requires overnight or prolonged cleanup;

j. Involves an unknown substance;

k. Enters the land or water, including the sanitary sewer system.

5. Spill Cleanup

Spills involving hazardous chemicals should be cleaned up as quickly and as safely as possible. Only trained and properly equipped personnel should be involved in hazardous chemicals cleanup. Custodial personnel should not be requested or expected to assist, as they have not been properly trained in hazardous chemical cleanup methods.

A chemical is considered hazardous if: a) it is flammable or explosive; b) it generates harmful vapor or dust which can affect the eyes or lungs; c) it is corrosive and attacks skin, clothing, equipment, furniture or facilities; or 4) it is harmful by ingestion or absorption.

a. **Emergency Spills**

Although these steps are listed in priority of response, each situation is different. Isolation of the area, evacuation, and contacting Cameron Office of Public Safety may occur simultaneously. The most important priority in any emergency is the immediate protection of the life and health of the individual.

i. Remain calm.

ii. Notify nearby persons; if necessary, evacuate the area and contact Cameron Office of Public Safety at x2911 for Physical Facilities assistance. Include the location, the identification of the spilled chemical, if known, and if medical attention may be necessary.

iii. Control/restrict entry to the spill area.

iv. Protect yourself, then remove any injured personnel to a safe place, if possible.

v. Remove contaminated clothing. Flush eye/skin with water for at least 15 minutes (30 minutes is recommended); use soap for intermediate and final cleaning of the skin.

vi. If possible, send assistance outside the building to direct response personnel to the spill site.

vii. General information

(a) Where the spill does not pose an immediate personal danger, try to control the volume or spread of the spill. This may include uprighting an overturned bottle, creating a dike with absorbent material, moving equipment to prevent contamination, opening a sash on a fume hood to accelerate vapor removal, or shutting a door.

(b) If the spilled chemical is an unknown, Physical Facilities should be contacted for Haz-Mat response.

(c) If flammable vapors are involved, do not operate electrical switches unless it is to turn off motorized equipment. Try to turn off or remove heat sources and open flames, if safe to do so.

(d) **NEVER** assume that vapors or gases do not exist or are harmless because of lack of odor.

b. **Non-emergency Spills**

The following general procedures should be used for all non-emergency spills:

i. Attend to any personnel who may have been contaminated. (If these personnel require medical attention, this is an Emergency Spill.)

ii. Notify personnel in the immediate area of the spill.

iii. Evacuate all non-essential personnel from the spill area.

iv. If the spilled material is flammable, turn off all ignition sources.

v. Avoid breathing vapors of the spilled chemical. If respiratory protection is required beyond the capability of cleanup personnel, this is an Emergency Spill.

vi. Leave on or turn on ventilation for exhaust, such as fume hoods, if it is safe to do so.

vii. Consult Material Safety Data Sheet for any special precautions. If MSDS is not immediately available, call Physical Facilities for information.

viii. Secure appropriate materials for cleanup.

ix. Don appropriate personal protective equipment. **NEVER TOUCH SPILLED MATERIAL WITHOUT APPROPRIATE PROTECTIVE CLOTHING AND GLOVES.**

x. Spilled liquids:

(a) Confine to the smallest area possible.

(b) For an inorganic acid or base, an appropriate neutralizing agent may be used. If neutralization is not an alternative, absorb the liquid using large quantities of a non-reactive material, such as vermiculite, clay, dry sand, or towels.

(c) Clean anything which may have been contaminated with towels or a suitable substitute.

xi. Spilled solids:

Solids may be swept into a dustpan and placed into a suitable container for disposal.

xii. Disposal of the chemical may be regulated and may include any cleanup materials used in the cleanup procedure. Contact Physical Facilities for information on the disposal of specific materials.

c. **Radioactive Spills**

i. Protect yourself, and remove any injured personnel from the area. If medical attention is required, contact Cameron Office of Public Safety at x2911. Advise of the presence of radioactive material.

ii. Monitor personnel and initiate minor decontamination. Skin decontamination should be "mild".

iii. Control entry to the contaminated area. Post notices of contaminated areas or rooms.

iv. Contact Physical Facilities.

v. Decontamination procedures:

(a) Assemble supplies.

(b) Don protective clothing and gloves.

(c) Assess area by monitors or smears.

(d) Proceed from outside to highest level of contamination.

NOTE: If spill is volatile, try to neutralize if it can be done while holding breath - evacuate room. Keep <u>all</u> solutions of iodine BASIC.

B. FIRES

Fires have the potential of being one of the most common emergencies in the laboratory. This is due largely to the many flammable materials, particularly liquids, in use in a laboratory. When working in any laboratory, be aware of the location of the closest fire extinguisher and the type of fire it will extinguish.

In the event of a fire, the following guidelines should be followed:

1. Assist any person in immediate danger to safety, if it can be accomplished without risk to yourself.

2. Immediately activate the building alarm system. This will automatically notify Cameron Office of Public Safety and Physical Facilities. It is preferable to have emergency personnel respond, and not be needed, than to delay notification and lose lives or property unnecessarily.

3. If the fire is small enough, use a nearby fire extinguisher to control and extinguish the fire. Do not attempt to extinguish the fire if:

a. The fire is too large or out of control.

b. The atmosphere is potentially toxic due to gas or oxygen deficiency.

4. If first attempts to put out the fire do not succeed, evacuate the building immediately.

5. The last person to leave should close windows and doors, if it is safe to do so.

6. When opening closed doors to exit, feel the door and handle first, for warmth from fire on the other side. If door or handle is hot, do not open the door. Proceed to an alternate exit, if available .

7. Do not use elevators. Use stairwells.

8. After evacuating the building, proceed to the designated meeting area, and verify that all personnel have exited the building.

9. No personnel will be permitted to re-enter the building without the permission of the fire department or Cameron Office of Public Safety.

10. All fires will be investigated by Cameron Office of Public Safety.

C. MEDICAL EMERGENCIES

Personal injuries are not uncommon in laboratories. These injuries may range from minor scrapes and bruises to severe injuries from electrical shock and heart attacks.

In an accident, the initial responsibility for first aid lies with the person to arrive first at the scene. This person should respond quickly, but in a calm and assuring manner. Immediately summon medical help, if necessary, by calling Public Safety at x2911. Be explicit in reporting the location, the type of injury, and the type of assistance required. Do not move the injured person unless they are in danger of further injury.

All injuries must be reported to the supervisor, even if medical attention is not required. Minor injuries may lead to more serious complications at a future date. Liability and insurance matters may be handled more effectively if documentation exists.

Accidents may be investigated by the Chemical Hygiene Office with any additional personnel deemed necessary to determine the immediate cause of the accident. The purpose of this is not to "blame" any individual, but to prevent the same accident from happening again, or to correct a

situation which may lead to more serious accidents. For further information on reporting accidents, see Section VII on "Records and Reports".

Any time an employee develops signs or symptoms associated with a hazardous chemical exposure, the affected employee should immediately contact his/her supervisor to initiate procedures for a medical examination. At any time a chemical exposure occurs, a Record of Exposure should be completed. See Section VII on "Records and Reports" and Section V on "Medical Program" for further information.

SECTION X - INFORMATION AND TRAINING

Federal and State laws require that laboratories provide various health and safety training for all employees. Training must be documented, with details on attendance, content, and performance, if applicable. Training participation must be recorded at the department level.

The University is responsible for providing employees with information and training on hazardous chemicals in the work area at time of initial assignment, prior to assignment involving new exposure situations, and annual refresher training. This is to ensure that the employees are apprised of hazards of chemicals present in their work area.

The types and content of training is mandated by law; however, the manner of instruction is not specified. The Departmental Chemical Hygiene Officer may provide laboratory safety training to employees. Training in the use of fire extinguishers may be scheduled by calling the Physical Facilities.

A. HAZARD COMMUNICATION

The following information must be conveyed to employees:

1. The contents of the Occupational Exposure to Hazardous Chemicals in Laboratories Standard 29 CFR 1910.1450 and its appendices (OSHA Lab Standard). These are included in Appendix B.

2. The location, availability, and content of the Chemical Hygiene Plan.

3. The permissible exposure limits (PELs) for OSHA regulated substances or recommended exposure limits for other hazardous chemicals where there is no available OSHA standard.

4. The signs and symptoms associated with exposures to hazardous chemicals in the laboratory.

5. 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 received from the chemical supplier.

Employees must be trained in the following areas:

1. Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area, such as monitoring methods, visual appearances and odors.

2. The physical and health hazards of chemicals used in the work area.

3. The measures that employees can use to protect themselves from these hazards, including specific procedures such as appropriate work practices, personal protective equipment, and emergency procedures.

4. The contents of the Chemical Hygiene Plan.

B. FIRST AID/CPR TRAINING

This training shall include the following:

1. The availability and location of first aid equipment.

2. The names of individuals in the area who are trained in First Aid/CPR. It is desirable for several individuals to be certified in these areas. Details on training availability may be obtained from the American Red Cross.

3. The emergency number for medical assistance (x2911).

4. The information contained in Section IX - Emergency Response, of the Chemical Hygiene Plan.

C. FIRE EXTINGUISHER TRAINING

Training of employees in the use of fire extinguishers is required by OSHA 29 CFR 1910.157(G), "where the employer has provided portable fire extinguishers for employee use in the workplace..." This training must be conducted at time of initial assignment, and annually thereafter. For information on fire extinguisher training, contact Physical Facilities.

D. SPILL RESPONSE TRAINING

All employees shall be trained in the proper methods for spill response, as outline in Section IX - Emergency Response, of the Chemical Hygiene Plan.

E. RESPIRATORY PROTECTION TRAINING

If respirators are required to provide the health of the employee, training to insure correct and safe use of the respirators shall be conducted prior to use. Training is conducted by Physical Facilities.

SECTION XI - WASTE DISPOSAL

Waste and unused chemicals must be disposed of in an environmentally safe and legal manner. Many chemicals are regulated by the Environmental Protection Agency as hazardous materials, and must be disposed of by a licensed disposal company. Other restrictions are placed upon chemicals released into the sewer system by the Lawton Wastewater Treatment Plant, based upon the capabilities for treatment.

Waste chemicals are typically generated from sample preparations, extraction, and analytical processes. Other waste chemicals may be generated through cleaning out of unused laboratories, change of methods, off-specification chemicals, and completions of a project. Chemicals with potential use will enter the Surplus System for reuse.

Waste chemicals should be disposed of on a periodic basis to reduce the hazard potential of storage and to minimize inventory tracking and updating. Physical Facilities will handle disposal of all waste chemicals. This service is provided at no cost to academic units.

A system shall be developed in each laboratory to collect and segregate chemical waste during daily operations. Typical segregation of waste would be:

- Waste Oil
- PCB Wastes
- Acids
- Bases
- Halogenated Solvents
- Non-halogenated Solvents
- Mercury waste
- Reactives
- Heavy Metal contaminated solvents

These should be collected in separate containers, and stored separately to prevent chemical reactions in the event of spills or leaks. Mineral acids and bases should be neutralized by the generating laboratory.

Physical Facilities is responsible for coordinating the pickup of surplus and waste chemicals. To assure compliance with all applicable federal and state regulations, and to insure the safety of all personnel involved, Physical Facilities has established the following standards applicable to the collection, storage, labeling, packaging and manifesting of waste for pickup by Physical Facilities.

A. GENERAL GUIDELINES

1. Department personnel shall not accept any chemicals, hazardous substances, or items containing hazardous substances as gifts or donations without notifying Physical Facilities prior to the acceptance. A gift may ultimately cost the University many dollars to dispose of as hazardous waste.

2. Department personnel shall not give or sell university property, including hazardous substances deemed waste or surplus, to any person or organization outside the university without following the established procedures of the Purchasing Department.

3. Under no circumstance is any person to dispose of a chemical down the drain or into the trash without full knowledge of the applicable regulations and policies and procedures of the disposal of the substance. If the appropriate status is unknown, contact Physical Facilities for information.

4. Physical Facilities will not accept or handle surplus or waste chemicals which are not labeled, manifested and packed in accordance with the procedures set forth in this section.

5. Physical Facilities will determine whether any chemical submitted for disposal is deemed waste or surplus.

6. Physical Facilities does not have immediate capabilities for identification of unknowns, and will not accept unknowns at this time. Any unknowns should have a notation available giving origin, principal investigator, and any information as to the generating process.

B. BASIC PROCEDURES

1. Collect substances in original or other suitable container (see subsection C. "Containers").

2. Properly label containers as to contents and hazards (see subsection D. "Labeling").

3. Safely transport chemicals to the Waste Storage room (SC 111).

4. When the amount collected exceeds safe storage capacity, call Physical Facilities to schedule hazardous materials pickup, or contact the Chemical Hygiene Officer to arrange pickup.

5. The generator or departmental representative shall label each individual container (see subsection D. "Labeling") and place an entry on the appropriate Hazardous Materials Control Sheet (see Form 6 or 7).

6. Individual containers shall be packed together to the extent safely practical (see subsection F. on "Packing"), for transportation by Physical Facilities.

C. CONTAINERS

Containers refer to any of the following that serve as a primary container or as an outer or secondary package over a primary container:

- Any steel, plastic or fibrepack drum
- Metal cans or pails
- Plastic carboys
- Steel cylinders and tanks
- Paper bags
- Plastic baggies
- Glass and plastic bottles, jars and vials
- Wooden kegs, barrels and boxes
- Cardboard boxes
- Mercury flasks

1. Containers must not be damaged or leaking. If a container is leaking, the chemical must be repacked in a compatible container.

2. Containers must be properly secured with a cap or other means of closure. Acceptable means of closure include the original cap or method provided by the manufacturer, or a substitute of equal or higher quality. Corks are not acceptable unless provided as the means of closure by the manufacturer. Rags stuffed into the neck of the bottle are not acceptable.

3. Container composition must be chemically compatible with the substances to be contained.

4. Materials should kept in their original containers if at all safely possible.

5. Plastic bags, if used as a container, must be without punctures or tears, tightly sealed, and placed in a secondary container, such as a box.

6. Glass containers shall not exceed one gallon (4 liters) in size, and shall not be filled into the neck of the fill/pour spout.

7. Metal or plastic containers shall not exceed 5 gallons (20 liters) and shall not be filled into the neck of the fill/pour spout. In containers with flat tops, the liquid level shall be at least one inch from the top. The use of any containers over 5 gallon size for waste collection must be coordinated in advance with Physical Facilities.

D. LABELING

1. Each container must be clearly labeled with the chemical or common name of each substance comprising 1% or more of the total mixture.

2. Indicate the strength or concentration if it is a dilute substance.

3. Do not use formulas, chemical equations or structures, without the addition of the chemical name.

4. Indicate any known hazards, such as "Flammable," or "Carcinogen."

5. Remove or obliterate completely any names not related to the current contents.

6. When container is to be picked up by Physical Facilities, each container must have clearly affixed, or written on the label the manifest information. This includes the date, department and container number associated with the manifest that accompanies the container.

7. File labels, original labels, and any other adhesive label is acceptable, as long as it is firmly attached to the container. Post-it type notes are unacceptable.

8. Keep containers labeled correctly and securely at all times, to prevent the generation of "unknowns" through the loss of a label.

E. HAZARDOUS MATERIALS CONTROL SHEET

An entry on the Hazardous Materials Control Sheet must be completed for each chemical that is to be picked up by Physical Facilities. The form is found in Appendix A (Form 6 or 7) and may be reproduced for use. The following information must be included for each container to be picked up for surplus or disposal.

1. **Department** — The name of the department generating the hazardous material.

2. **Contact** — The name of the individual responsible for manifesting the materials and coordinating the pick-up.

3. **Page _ of _** — Number pages to reflect the page number, and the page total.

4. **6-Digit Date** — The date matching the 6-digit container date on each chemical. This does not need to change if chemicals are added to the list over several days. August 7, 1991 would be entered as 080791.

5. **Tag Number** — The number assigned to each container, beginning with number B1 or P1 (Biological Sciences or Physical Sciences respectfully), and continuing until pickup of chemicals. After pickup, begin numbering sequence at B1 or P1.

6. **Location** — Location of chemical (shelf 1, shelf 2, etc.)

7. **Physical State** — List the physical state of the material at the time of the manifest, using one of the following codes:

   S: Solid
   L: Liquid
   G: Gas
   M: Sludge mixture

8. **Hazard Code** List the appropriate hazard for the material, if known, according to the following codes:

F: Flammable
C: Corrosive
O: Oxidizer
T: Toxic
Cb: Combustible
R: Reactive
Exp: Explosive
Ca: Carcinogen

Definitions of these codes are included in the Appendix.

9. **Volume or Weight** The approximate volume or weight of material contained. Do not use the original volume or weight, unless the contents have not changed.

10. **Source of Waste**

C: Classroom
U: Undergraduate Research
R: Research
S: Stock Room
O: Other

11. **Initials of Depositor**

12. **Description of Contents:** Give the common or chemical name of the contents of the container. Do not use formulas or draw structures. Give the approximate percentage of each component of a mixture, or the strength of a dilute solution. More than one line may be used if necessary.

F. PACKING

All bottles and containers of less than five gallon size must be packed for transportation according to the following guidelines:

1. Do not pack incompatible substances in the same box, for instance, an oxidizer and an organic substance.

2. Boxes must be sturdy and capable of carrying the weight contained without the sides or bottom bending.

3. Do not pack more than four (4) one gallon or four liter bottles into one box. The original shipping boxes are recommended for reuse.

4. The weight of the box should not exceed 45 pounds.

5. The containers must be secured with the original cap, or a replacement of equal or superior quality.

6. The containers must be surrounded by an absorbent material, such as vermiculite, to absorb leakage, or a spill.

7. All containers must be individually labeled according to the labeling section.

8. Metal pails are acceptable packing containers; however, vermiculite must still be used.

G. CHEMICAL SURPLUS PROGRAM

Chemicals may be retained and stored by the Departmental Chemical Hygiene Officer, if they are determined to be of value. This may include excess purchases, unopened, and quantities of opened materials, appearing to be in good condition. These chemicals are available to authorized personnel, free of charge, for their use. This benefits the department by eliminating the purchase cost, and benefits the University by reducing the charges for hazardous waste disposal.

A Surplus Chemical List is available by calling the Departmental Chemical Hygiene Officer. Requests may also be made directly by consulting Physical Facilities for the availability of a specific substance. If a chemical is available, delivery will be made by the Departmental Chemical Hygiene Officer to the requesting person, usually within three working days.

GLOSSARY

OSHA - Occupational Safety and Health Administration

DOL - Department of Labor

MSDS - Material Safety Data Sheet

CHO - Chemical Hygiene Officer

DCHO - Departmental Chemical Hygiene Officer

OPS - Office of Public Safety at Cameron University

PEL - Permissible Exposure Limit

PF - Physical Facilities

EPA - Environmental Protection Agency

CFR - Code of Federal Regulations

CHP - Chemical Hygiene Plan

HAZARD CODE DEFINITIONS

C - Corrosive

Any gas, liquid, or solid that causes destruction of human tissue, or a liquid that has a severe corrosion rate on steel.

Ca - Carcinogen

A material that either causes cancer in humans, or, because it causes cancer in animals, is considered capable of causing cancer in humans.

Cb - Combustible

Any liquid which does not meet the definition of any of the above hazard classes, and has a flashpoint at or above 100 degrees F. and below 200 degrees F.

EXP - Explosive

A substance that may detonate as a result of heat or shock.

F - Flammable

Any compressed gas, liquid, or any solid material, (other than an explosive), that is liable to cause fires through friction, absorption of moisture, spontaneous chemical changes, retained heat from processing, or which can be ignited readily, and when ignited burns so vigorously and persistently as to create a serious transportation hazard.

O - Oxidizer

A substance such as a nitrate, chlorate or permanganate that yields oxygen readily to stimulate the combustion or organic matter.

R - Reactive

Substances that are unstable, form toxic gases, and react violently when in contact with water or other common substances and environmental conditions. Reactives include organic peroxides, pyrophorics, flammable solids, peroxide formers, and substances that readily polymerize.

T - Toxics

Substances such as carcinogens, irritants or poisons which are irritating to or affect the health of humans.

APPENDIX A: FORMS

Form 1

CHEMICAL HYGIENE PLAN VERIFICATION FORM

I have received the Chemical Hygiene Plan and Safety Manual for Cameron University. I have read the manual, understand the contents, and agree to follow the procedures and practices. I am aware of the location of the Material Safety Data Sheets, and I know how to request one.

EMPLOYEE SIGNATURE	CAMERON ID NUMBER	DATE

Form 2

EYEWASH FOUNTAIN INSPECTIONS (WEEKLY)				
Date Due	Date Completed	Name and Signature of Person Testing	Passed/Failed	Comments

Note: Completed forms should be kept on file for 3 years after completion.

Form 3

SAFETY SHOWER INSPECTIONS (WEEKLY)				
Date Due	Date Completed	Name and Signature of Person Testing	Passed/Failed	Comments

Note: Completed forms should be kept on file for 3 years after completion.

Form 4

FUME HOOD INSPECTIONS (ANNUALLY)				
Date Due	Date Completed	Name and Signature of Person Testing	Passed/Failed	Comments

Note: Completed forms should be kept on file for 3 years after completion.

Form 5

For Form 5, see http://www.osha.gov/pls/publications/pubindex.list#300
2004 and beyond

For Respiratory Protection 1910.134, see
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=12716&p_text_version=FALSE#1910.134(d)

or
http://www.osha.gov/pls/oshaweb
Search
Respirator

e-tools
Respirator Users

A copy of Form 5 as well as instructions for filling out the form are also available from the office of the Dean of the School of Science and Technology at x2308