

COMPREHENSIVE SAFETY
PLAN



4. CHEMICAL HYGIENE PLAN

CHEMICAL HYGIENE PLAN

TABLE OF CONTENTS

- I. BASIS.
- II. GENERAL.
- III. WRITTEN PLAN.
- VI. APPLICABILITY.
- V. POLICY STATEMENT.
- VI. PLAN RESPONSIBILITY.

CONTENTS

- 1. STANDARD SAFETY PRECAUTIONS.
- 2. CHEMICAL INVENTORY.
- 3. MATERIAL SAFETY DATA SHEETS
- 4. CHEMICAL STORAGE.
- 5. LABELING REQUIREMENTS.
- 6. ENGINEERING CONTROLS.
- 7. AIR POLLUTION CONTROL PERMITS.
- 8. WATER POLLUTION CONTROL PERMITS.
- 9. PERSONAL PROTECTIVE EQUIPMENT.
- 10. CONTAMINATED WASTE REMOVAL/DISPOSAL.
- 11. ADMINISTRATIVE CONTROLS.
- 12. MEDICAL REQUIREMENTS.
- 13. CHEMICAL HYGIENE COMMITTEE.
- 14. GENERAL CHEMICAL HYGIENE RESPONSIBILITIES.
- 15. TRAINING.
- 16. HOUSEKEEPING (Custodial services).
- 17. HOUSEKEEPING (Employee responsibilities).
- 18. PROCUREMENT OF CHEMICAL MATERIALS.
- 19. LABORATORY EQUIPMENT AND GLASSWARE.
- 20. CHEMICAL SPILLS, RELEASES AND ACCIDENTS.
- 21. GLOSSARY

EMBRY-RIDDLE AERONAUTICAL UNIVERSITY
CHEMICAL HYGIENE PLAN

SUBJECT: Chemical Hygiene Plan

REGULATORY STATUTE: OSHA - 29 CFR 1910.1450
NFPA - 45, Laboratory Fire Protection

BASIS: Laboratory workers are routinely exposed to hazardous chemicals such as acetone and carbon monoxide. Many accidents and injuries occur annually in laboratories, resulting in chemical-related illnesses ranging from skin and eye irritation to fatal pulmonary edema. This Plan establishes uniform requirements to ensure that the hazards associated with our laboratory are evaluated, safety procedures implemented, and that the proper hazard information is transmitted to all affected personnel.

GENERAL: Embry-Riddle Aeronautical University will ensure that all potential hazards within this laboratory are evaluated. This Plan is intended to address comprehensively the issues of evaluating and identifying potential hazards; evaluating engineering controls, work practices, administrative controls, medical management, training, and disposal; and establishing appropriate procedures.

WRITTEN PLAN. Embry-Riddle Aeronautical University will review and evaluate this Plan on an annual basis, or when the following conditions are met:

1. When regulatory changes occur that prompt revision of this Plan.
2. Anytime there are questions concerning the validity of this Plan.

APPLICABILITY: The Laboratory Standard applies to all employees engaged in the laboratory use of hazardous chemicals. Laboratory use of hazardous chemicals is defined as the use or handling of chemicals in which all of the following conditions are met:

1. Chemical work is carried out on a laboratory scale.
3. Protective laboratory practices and equipment are used.

EMBRY-RIDDLE AERONAUTICAL UNIVERSITY
CHEMICAL HYGIENE PLAN

University Policy Statement

The Occupational Safety and Health Act of 1970 clearly states our common goal of safe and healthful working conditions. The safety and health of our employees and students continues to be the first consideration in the operation of this laboratory.

Safety and health in our business must be a part of every operation. Without question it is every employee's responsibility at all levels.

It is the intent of the University to comply with all laws. To do this we must constantly be aware of conditions in all work areas that can produce injuries. No employee is required to work at a job he or she knows is not safe or healthful. Cooperation in detecting hazards and, in turn, controlling them is a condition of employment. Supervisors should be advised immediately of any situation that needs to be corrected.

The prevention of occupationally induced injuries, illnesses, and chemical exposure is of such consequence that it will be given precedence over operating productivity whenever necessary. To the greatest degree possible, management will provide all mechanical and physical facilities required for personal safety and health in keeping with the highest standards.

We will maintain a safety and health Plan conforming to the best management practices of laboratories of this type. To be successful, such a Plan must embody the proper attitudes toward injury, illness, and chemical exposure prevention not only on the part of supervisors and employees, but also between each employee and his or her co-workers. Only through such a cooperative effort can a chemical hygiene plan in the best interest of all be established and preserved.

Our objective is a chemical hygiene plan that will reduce the number of chemical exposures, injuries, and illnesses to an absolute minimum, not merely in keeping with, but surpassing, the best experience of laboratories similar to ours. Our goal is nothing less than zero exposures, accidents, and injuries.

George H. Ebbs

University

CHEMICAL HYGIENE PLAN

PLAN RESPONSIBILITY

PLAN RESPONSIBILITY: The president of the university, the chief academic officer, and the chancellors, have the primary responsibility for safety. **The Laboratory Chemical Hygiene Officer for the Prescott Campus Chemical Laboratory is Dr. Nordstrom and for Daytona Beach Chemical Laboratory is Marlene Coslow. He/she is solely responsible for all facets of this Plan and has full authority to make necessary decisions to ensure success of the Plan.** The Chemical Hygiene Officers working with the University Safety Officer are authorized to amend these instructions and is authorized to halt any operation of the university where there is danger of serious personal injury.

SPECIFIC DUTIES: Specific duties of the Embry-Riddle Aeronautical University Laboratory Chemical Hygiene Officer include, but are not necessarily limited to the following:

1. Coordinating Plan requirements with administrators and other employees to develop and implement appropriate chemical hygiene policies and practices.
2. Monitoring procurement and use of chemicals in the lab, including determining that facilities and training levels are adequate for the chemicals in use.
3. Performing regular formal chemical hygiene and housekeeping inspections including inspections of emergency equipment.
4. Assisting project directors in developing precautions and adequate facilities.
5. Maintaining current knowledge concerning the legal requirements of regulated substances in the laboratory.
6. Reviewing and implementing improvements to the Chemical Hygiene Plan on an annual basis.
7. Maintaining overall responsibility for the laboratory operation.
8. Ensuring that staff and students know and follow the chemical hygiene rules.
9. Determining the proper level of personnel protective equipment (PPE) required and ensuring it is available and in working order.

10. Ensuring that appropriated training has been provided to employees.

11. Monitoring the waste disposal Plan.

1. STANDARD SAFETY PRECAUTIONS: Because few laboratory chemicals are without hazards, the following general precautions for handling all laboratory chemicals will be adopted by employees of this facility to minimize exposure and operate under the assumption that any mixture of hazardous chemicals is more toxic than the most toxic component. The following procedures are to be used when working with chemicals:

1.1 Accidents and spills. The laboratory instructor is not required to administer first aid.

1.1.1 Eye contact: Promptly flush eyes with water for a prolonged period (15 minutes) and seek medical attention.

1.1.2 Ingestion: Encourage the victim to drink large amounts of water if that is the measure prescribed by the MSDS, seek medical attention, and review MSDS.

1.1.3 Skin contact: Promptly flush the affected area with water and remove any contaminated clothing; use a safety shower when contact is extensive. If symptoms persist after washing, seek medical attention.

1.1.4 Clean-up: Promptly clean up spills, using appropriate protective apparel and equipment and proper disposal.

1.2 Avoid unnecessary exposure to chemicals (contamination avoidance).

1.2.1 Do not [smell or] taste chemicals. Apparatus that can discharge toxic chemicals (vacuum pumps, distillation columns, etc.) should be vented into local exhaust devices. If the chemical must be identified by its smell, place open container on the table and wave fumes toward your face.

1.2.2 Inspect gloves and test glove boxes before use.

1.2.3 Do not allow release of toxic substances in cold rooms and warm rooms, since these have contained re-circulated atmospheres.

1.2.4 Use only those chemicals for which the quality of the available ventilation system is appropriate.

- 1.2.5 Avoid eating, drinking, smoking, gum chewing, or applying cosmetics or lip balm in areas where laboratory chemicals are present. Wash hands before conducting these activities.
- 1.2.6 Avoid storing, handling, or consuming food or beverages in storage areas, refrigerators, glassware, or utensils that are also used for laboratory operation.
- 1.2.7 Handle and store laboratory glassware with care to avoid damage; do not use damaged glassware. Use extra care with flasks and other evacuated glass apparatus; shield or wrap them to contain chemicals and fragments should implosion occur. Use equipment only for its designed purpose.
- 1.2.8 Wash areas of exposed skin thoroughly before leaving the laboratory.
- 1.2.9 Avoid practical jokes or other behavior that might confuse, startle, or distract another worker.
- 1.2.10 Do not use mouth suction for starting a siphon.
- 1.2.11 Confine long hair and loose clothing.
- 1.2.12 Wear shoes at all times in the laboratory, but do not wear sandals, perforated shoes, sneakers, or any shoes made of canvas.
- 1.2.13 Keep the work area clean and uncluttered, with chemicals and equipment properly labeled and stored; clean up the work area on completion of an operation or at the end of each day.
- 1.2.14 Ensure that appropriate eye protection, where necessary, is worn by all persons, including visitors, in areas where chemicals are stored or handled.
- 1.2.15 Wear appropriate gloves when the potential for contact with toxic materials exists; inspect the gloves before each use, wash them before removal, and replace them periodically.
- 1.2.16 Use appropriate respiratory equipment when air contaminant concentrations are not sufficiently restricted by engineering controls. Inspect the respirator before each use.
- 1.2.17 Use any other protective and emergency apparel and equipment as appropriate.

- 1.2.18 Avoid use of contact lenses in the laboratory unless necessary. If they are used, inform supervisor so special precautions can be taken.
- 1.2.19 Remove laboratory coats immediately upon significant contamination.
- 1.2.20 Seek information and advice about hazards, plan appropriate protective procedures, and plan positioning of equipment before beginning any new operation.
- 1.2.21 Leave lights on, place an appropriate sign on the door, and provide for containment of toxic substances in the event of failure of a utility service (such as cooling water) in an unattended operation.
- 1.2.22 Use a hood for operations that might result in release of toxic chemical vapors or dust. As a rule of thumb, use a hood or other local ventilation device when working with any appreciably volatile substance with a threshold limit value (TLV) of less than 50 ppm.

WARNING

- Confirm adequate hood performance before use.
- Keep hood closed at all times except when making adjustments.
- Keep materials stored in hoods to a minimum.
- Do not allow materials to block vents or airflow.
- Leave the hood "on" when it is not in active use if toxic substances are stored in it or if it is uncertain whether adequate general laboratory ventilation will be maintained when it is "off."

1.2.23 Be aware of unsafe conditions and see that they are corrected when detected. TAKE STEPS TO CORRECT THEM.

- 2. **CHEMICAL INVENTORY:** A chemical inventory will be performed on an annual basis. The inventory will compile a listing of all hazardous chemicals in the laboratory. Chemicals listed are those classified as hazardous by the Department of Transportation (DOT), the Environmental Protection Agency (EPA), or displaying a 2 or greater number in any section of the National Fire Protection Association (NFPA) diamond (DOT and EPA classifications are in Appendices A and B).
- 3. **MATERIAL SAFETY DATA SHEETS:** Upon completion of the annual chemical inventory, request letters will be sent to manufacturers if MSDS are missing from the file.
 - 3.1 Availability: MSDS must be available in each laboratory section in a three-ring binder. The MSDS will be filed in alphabetical order along with a chemical inventory of the section. The laboratory relies on the chemical manufacturer's information to ascertain whether the chemical is hazardous.

3.2 Master MSDS file: The MSDS Master File for each chemical is located in the office of University Safety Officer.

4. **CHEMICAL STORAGE:** Storage of laboratory chemicals presents an ongoing safety problem. Attention to the hazards associated with a specific chemical must be understood and the reactivity of the chemical itself must be considered.

4.1 General requirements.

4.1.1 Received chemicals. Received chemicals will be immediately moved to the designated storage area.

4.1.2 Ventilation and illumination. The storage area will be well ventilated and illuminated.

4.1.3 Accessibility. All material will be stored at or below eye level. Material will be arranged so that larger items, particularly in breakable containers, are situated closer to the floor.

4.1.4 Storage classification. Materials will be segregated by their hazard characteristics, classification, and compatibility. The area will be well defined and labeled with appropriate markings and labels.

4.1.5 Preparation or repackaging. The storage area will not be used as a preparation or repackaging area.

4.1.6 Accessibility. The storage area will be accessible during normal working hours.

4.1.7 Hand transport. When hazardous materials are transported by hand they will be transported in a leak-proof container such as a bucket.

4.1.8 Use minimization. Storage of materials at the point of use will be limited to those amounts necessary for one operation or shift. The container will be properly labeled and of a minimum size to make it convenient for use. Materials will never be unduly exposed to light or heat.

4.2 Inventory minimization. Chemical storage should be kept as small as practical. Storage on bench tops and in hoods may cause potential exposure to fire and spills. Ventilated cabinets and specially monitored refrigerators are used for chemical storage only. No food is permitted in these refrigerators. Flammable liquids will be stored in flammable storage cabinets with self-closing doors and proper ventilation according to NFPA standards. Safety cans with a spring loaded spout will be used for transporting flammable liquids.

- 4.3 Inventory inspection. Periodic inventories of materials outside the storage area will be conducted by the Chemical Hygiene Officer. Unneeded items shall be properly discarded or returned to the storage area.
 - 4.4 Toxic chemicals. Toxic chemicals, including carcinogens, will be stored in ventilated storage areas in unbreakable chemical resistant secondary containers. These containers will be labeled "CAUTION: HIGH CHRONIC TOXICITY OR CANCER-SUSPECT AGENT." A separate inventory list of carcinogens and suspected carcinogens is maintained by the Chemical Hygiene Officer according to federal and state regulations.
 - 4.5 Mineral acid storage. Mineral acids will be separated from flammable and combustible materials. Separation is defined by NFPA 49 as storage within the same fire area but separated by as much space as practicable or by intervening storage from incompatible materials. Acid resistant trays shall be placed under bottles of mineral acids.
 - 4.6 Acid-sensitive materials. Acid sensitive material such as cyanides and sulfides will be separated from acids or protected from contact with acids.
 - 4.7 Compressed gas. Cylinders of compressed gases will be strapped (above the midpoint) or chained to a wall or bench top and will be capped when not in use. They will be stored on a clean, dry surface. No ignition sources will be allowed in the vicinity of compressed gas cylinders. The area will maintained free of combustible debris.
5. **LABELING REQUIREMENTS:** 29 CFR 1910.1450 contains specific labeling requirements. Labels must be affixed to all hazardous chemical containers that are shipped and used in the workplace. Labels must not be removed or defaced.
- 5.1 Containers being shipped: Containers containing hazardous chemicals leaving this workplace will be labeled, tagged, or marked with the following information:
 - 5.1.1 Identity of the hazardous chemical.
 - 5.1.2 Appropriate hazard warnings.
 - 5.1.3 Name and address of the manufacturer.
 - 5.1.4 MSDS will also be included.
6. **ENGINEERING CONTROLS:** The engineering controls installed in this laboratory are intended to minimize employee exposure to chemical and physical hazards in the workplace. All employees are responsible for notifying management of deficiencies in the proper operation of such controls. If at any time any employee does not understand the operation of an exposure control mechanism, he or she should contact the Chemical Hygiene Officer without delay.

6.1 Hoods. General. Hoods will be used for all chemical procedures that might result in release of hazardous vapors, fumes, or dusts. As a general rule, hoods will be used for all procedures involving substances that are appreciably volatile and have a permissible exposure limit (PEL) less than 50 ppm. The hood face velocity will be maintained between 75 and 125 feet per minute. Any hood not passing inspection will be "locked-out" of service immediately and not used until the hood has passed inspection. It is the responsibility of this University to purchase the parts and to maintain the unit in a timely fashion so as not to endanger the health and well-being of an employee or place the facility at risk.

6.1.1 Work practices. The following work practices will be apply to the use of hoods.

- No employee will use any hood without first receiving training on the use of the hood.
- Confirm adequate ventilation in accordance with the manufacturer's or installer's specifications or by holding a strip of paper at the face of the hood and observing the movement of the paper.
- Keep the sash of the hood closed at all times except when adjustments within the hood are being made. At these times, maintain the sash height as low as possible.
- Employees will confirm adequate hood ventilation performance prior to opening chemical containers inside the hood.
- Storage of chemicals and equipment inside the hood will be kept to a minimum.
- Interference with the inward flow of air in the hood will be minimized at all times.
- The hood will be left operating when it is not in active use if hazardous chemicals are contained inside the hood or if it is uncertain whether adequate general laboratory ventilation will be maintained when the hood is non-operational.
- Under no circumstances will the hood be used as a means to dispose of volatile chemicals.
- Prior to the introduction of new chemicals, the adequacy of hood ventilation will be verified by the Chemical Hygiene Officer.

6.1.2 Eyewash fountains. Eyewash fountains should be inspected at intervals of not less than three months as per CFR 1910.1450.

6.2 Safety showers. Safety showers will be inspected, tested, and flushed annually.

6.3 Fire extinguishers. Fire extinguishers will be inspected annually by an agency contracted at each respected campus.

- 6.4 Stockrooms/storerooms. All chemical stockrooms/storerooms will be maintained in an orderly fashion and will be well ventilated.
- 6.5 Storage cabinets. Ventilated storage cabinets for chemicals will be provided as needed and have a separate exhaust duct.
- 6.6 Ventilation sampling. Air flow through the laboratory should be relatively uniform and should be exhausted to the exterior of the building.
- 7. **PERSONAL PROTECTIVE EQUIPMENT.** Employees are required to wear gloves when the employee has the potential for direct skin contact with blood, hazardous chemicals, or infectious materials.
 - 7.1 Aprons. In areas where there is a reasonable probability that chemical splashes could occur (e.g., histology), an impervious apron appropriate for the task will be worn.
 - 7.2 PPE removal. All personal protective equipment will be removed immediately upon leaving the work area (or as soon as possible).
 - 7.3 Eye/face protection. Masks and eye protection or chin-length face shields meeting ANSI Z87.1 standards will be worn to prevent splashes or sprays of blood, infectious materials, or hazardous chemicals if there is a potential for eye, nose, or mouth contamination
 - 7.4 Respiratory protection. Where the use of respirators is necessary to maintain exposure below permissible exposure limits, this University will provide, at no cost to the employee, the proper respiratory equipment.
 - 7.5 Foot protection. Sandals, perforated shoes, and bare feet are prohibited.
 - 7.6 Hand protection.
 - 7.6.1 Chemical-resistant gloves. Chemical-resistant gloves will be worn as appropriate. The MSDS and chemical manufacturer will be consulted to provide the appropriate type of glove for a given chemical. Gloves will be washed prior to being removed from the hands.
 - 7.6.2 Thermal-resistant gloves. Thermal-resistant gloves will be worn as appropriate for operations involving hot materials and materials contained in exothermic reaction vessels. The type of glove used will be made of a non-asbestos material replaced when damaged or deteriorated.

8. RESERVED

9. RESERVED

10. CONTAMINATED WASTE REMOVAL/DISPOSAL. To ensure that minimal harm to people, other organisms, and the environment will result from the disposal of waste laboratory chemicals, chemicals that need to be disposed of will be removed by an official agency qualified in the proper removal and disposition of such material. Each campus will be responsible for the removal of chemical wastes in a timely manner.

10.1 Generator status. This laboratory is considered a small quantity generator according to the EPA.

10.2 Disposal of material in drains. Certain chemicals are permissible for drain disposal. Only those chemicals reasonably soluble in water are suitable for drain disposal. A compound is considered water soluble if it dissolves to the extent of at least 3%. Certain conditions should be considered. Solutions of 1 part per million [.001g/ml] of most substances will be regarded as safe for disposal down the drain. Some exceptions should be noted:

10.2.1 Organic chemicals with boiling points less than 50 Celsius.

10.2.2 Those hydrocarbons, halogenated hydrocarbons, nitro compounds, mercaptans, and most oxygenated compounds that contain more than five carbon atoms (e.g., freon).

10.2.3 Organic chemicals that are explosives, such as azides and peroxides .

10.2.4 Concentrated acids or bases .

10.2.5 Highly toxic malodorous or lachrymatory substances and substances with a TLV of less than 1 part per million.

10.3 Disposal options. Incineration in an environmentally acceptable manner is the most practical disposal method for combustible laboratory waste. Disposal of solid wastes in local landfills must meet local requirements. Solids with a solubility constant of 0.000001 mole/liter or less over pH range 4-9 is usually considered suitable for disposal in a landfill. Hoods are not to be used as a means of disposal for volatile chemicals. Disposal by recycling or chemical decontamination is used when possible.

11. ADMINISTRATIVE CONTROLS. The laboratory manager is responsible for the safe operation of the area. All activities and procedures require approval by the chemical hygiene officer before implementation.

11.2 Spill containment. Spill containment kits are located in each lab. Chemical spills will be contained using the Think C.L.E.A.N.E.R. principle:

- Contain the spill.
- Leave the area.
- Emergency Decontamination: Eyewash, shower, medical care.
- Access MSDS for follow-up emergency procedures.
- Notify supervisory staff of incident.
- Emergency response notification is *911 for Daytona, and 0 for Prescott.

Minor Spill: A minor spill is one that involves the release of five gallons or less of a material other than water that does not go into any drain system.

Major Spill: A major spill is one that involves the release of over five gallons of a material, other than water.

11.3 Risk Assessment Determination: Assessment of significant risk of all operations will be made by the Laboratory Manager or Chemical Hygiene Officer. Chemical hygiene and safety policies will be established for each task performed and engineering controls or personal protective equipment assigned. The attached list identifies each workstation/task in the laboratory and the required controls and equipment.

12. MEDICAL REQUIREMENTS.

12.1 Examinations and consultations. All medical examinations and consultations will be performed by or under the direct supervision of a licensed physician without cost to the employee, without loss of pay, and at a reasonable time and place. A board-certified physician in occupational medicine will be used whenever possible.

12.1.1 Factors routinely contributing to or corroborating overexposure incidents:

- Poor work habits.
- Poor engineering controls.
- Poor administrative controls.
- Historical data from similar operations.
- Use of significant quantities of a chemical.
- Use of a chemical over an extended period of time.

12.2 Medical evaluations. All employees will be sent for a medical evaluation:

12.2.1 Whenever signs and symptoms associated with a hazardous chemical develop.

12.2.2 When environmental monitoring reveals an exposure level routinely above the action level.

12.2.3 Whenever an event takes place in the work area, such as a spill, leak, or explosion resulting in hazardous chemical exposure.

- 12.3 Information provided to the physician. This University will provide the following information to the physician:
 - 12.3.1 Identity of the hazardous chemical(s) to which the employee may have been exposed.
 - 12.3.2 A description of the conditions under which the exposure occurred, including quantitative exposure data (if available).
 - 12.3.3 A description of the signs and symptoms of exposure.
 - 12.3.4 A copy of the MSDS for the chemical(s) involved.
- 12.4 Physician's written opinion. This laboratory will request that the physician provide a written opinion that will not reveal specific finding of diagnosis unrelated to the exposure but will include:
 - 12.4.1 Recommendation for further medical follow-up.
 - 12.4.2 Results of the medical examination and any associated tests.
 - 12.4.3 Any medical conditions that may be revealed in the course of the examination that may place the employee at increased risk as a result of exposure to a hazardous chemical found in the workplace.
 - 12.4.4 A statement by the physician that the employee has been informed of the consultation/examination results and any medical condition that may require further examination or treatment.
- 12.5 Exposure monitoring. The University shall measure the employee's exposure to any substance regulated by a standard which requires monitoring if there is reason to believe that exposure levels for that substance routinely exceed the action level.

13. GENERAL CHEMICAL HYGIENE RESPONSIBILITIES.

- 13.1 Upper Management will: Support the Chemical Hygiene Plan to the fullest extent possible.
- 13.2 The Chemical Hygiene Officer will:
 - 13.2.1 Work with administrators and other employees to develop and implement appropriate chemical hygiene policies and practices.
 - 13.2.2 Certify the performance of protective equipment.

13.2.3 Monitor procurement, use, and disposal of chemicals used in the lab.

13.2.4 See that appropriate audits are maintained.

13.2.5 Help Project Directors develop precautions and adequate facilities

13.2.6 Seek ways to improve the chemical hygiene Plan.

13.3 The immediate supervisor has responsibility to:

13.3.1 Ensure that workers know and follow the chemical hygiene rules that protective equipment is available and in working order, and that appropriate training has been provided.

13.3.2 Provide regular, formal chemical hygiene and housekeeping inspections including routine inspections of emergency equipment

13.3.3 Know the current legal requirements concerning regulated substances.

13.3.4 Determine the required levels of protective apparel and equipment.

13.3.5 Ensure that facilities and training for use of any material being ordered are adequate.

13.4 The laboratory employee and student is responsible for:

13.4.1 Planning and conducting each operation in accordance with the institutional chemical hygiene procedures

13.4.2 Developing good personal chemical hygiene habits.

14. RESERVED

15. TRAINING: This University shall provide employees with information and training to ensure that they are apprised of the hazards of chemicals present in their work area.

15.1 Initial training. Chemical hazard information shall be provided at the time of an employee's initial assignment to a work area where hazardous chemicals are present and prior to assignments involving new exposure situations.

15.2 Additional retraining shall also be conducted whenever a periodic inspection reveals, or whenever this University has reason to believe, that there are deviations from or inadequacies in the employee's knowledge of proper lab safety practices or procedures.

15.3 Content of training. Information is to be presented in initial and refresher training. As a minimum, employees shall be informed of:

- 15.3.1 The contents of 29 CFR 1910.1450. The standard and its appendices shall be made available to employees.
- 15.3.2 The contents of the Chemical Hygiene Plan shall be made available to employees.
- 15.3.3 The location and availability of this University's Chemical Hygiene Plan.
- 15.3.4 The permissible exposure limits for OSHA regulated substances or recommended exposure limits for other hazardous chemicals where there is no applicable OSHA standard.
- 15.3.5 Signs and symptoms associated with exposure to hazardous chemicals used in the laboratory.
- 15.3.6 The location and availability of 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.
- 15.3.7 Methods and observations that may be used to detect the presence or release of a hazardous chemical.
- 15.3.8 Types, visual appearance, or odors of routinely used hazardous chemicals when being released.

16. HOUSEKEEPING (Custodial services).

16.1 Floors will be cleaned regularly by housekeeping. All employees of the housekeeping department will be formally trained in the risks associated with working in the laboratory.

17. HOUSEKEEPING (Employee responsibilities).

17.1 Responsibility. Each employee is responsible for the cleanliness and orderliness of their work area, and jointly responsible for common areas within this facility. Supervisors will maintain the highest standards for housekeeping.

17.2 Spills. All spills on lab benches or floors will be immediately cleaned and properly disposed of. Large spills will necessitate the implementation of the

emergency action Plan per 29 CFR 1910.38 and .120. For large spills, contact *911 at Daytona Beach and 0, at Prescott.

- 17.3 Only "in-use" chemicals are allowed to remain in the work area; all other chemicals will be properly disposed of or stored.
- 17.4 The work area will be thoroughly cleaned and placed in order once per day.
- 17.5 All floors, aisles, exits, fire-extinguishing equipment, eyewashes, showers, electrical disconnects, and other emergency equipment will remain unobstructed at all times.

18. PROCUREMENT OF CHEMICAL MATERIALS.

- 18.1 Responsible use. Chemicals purchased by this laboratory will be used in a responsible manner through disposal.
- 18.2 Requests for material. Requests for new materials or material quantities in excess of normal usage quantities will be routed through the Chemical Hygiene Officer for approval.
- 18.3 Hazard information. Before the chemical is received for use, a MSDS and any other safety information (and personal protective equipment) must be obtained. Employees will be trained on the hazards and equipment to safely use the material before use.

19. LABORATORY EQUIPMENT AND GLASSWARE. Each employee and student is responsible to keep his or her work area clean and uncluttered. All chemicals and equipment will be properly labeled in accordance with section 5. At the completion of each work shift or operation, the work area will be thoroughly cleaned and all equipment properly cleaned and stored.

- 19.1 Equipment will be used only for its intended purpose.
- 19.2 Glassware will be handled and stored with care to minimize breakage; all broken glassware will be immediately disposed of in the broken glass container.
- 19.3 Evacuated glassware will be shielded to contain fragments/chemicals should implosion occur.
- 19.4 Labels will be attached to all chemical containers, identifying the contents and related hazards.
- 19.5 All waste receptacles will be identified.

19.6 All laboratory equipment will be inspected on a periodic basis.

20. CHEMICAL SPILLS, RELEASES, AND ACCIDENTS. In the event of a chemical spill or other accident, adhere to the procedures as designed for each campus.

21. GLOSSARY. The following terms are used as part of the Chemical Hygiene Plan:

ACUTE - An adverse effect with symptoms of high severity coming quickly to a crisis.

CARCINOGEN - A substance capable of causing cancer.

CHEMICAL AGENTS - A wide variety of fluids that have a high potential for body entry by various means. Some are more toxic than others and require special measures of control for safety and environmental reasons.

CHRONIC - An adverse effect with symptoms that develop slowly over a long period of time or that frequently recur.

COMBUSTIBLE - Able to catch on fire and burn.

DOT - Department of Transportation

EPA - Environmental Protection Agency

FLAMMABLE - Capable of being easily ignited and of burning with extreme rapidity.

LABORATORY SCALE - Work with chemicals that can easily and safely be manipulated by one person excluding the commercial production of chemicals for sale.

LABORATORY USE - A workplace where relatively small quantities of hazardous chemicals are used on a non-production basis.

LC 50 - The concentration of a substance in air that causes death in 50% of the animals exposed by inhalation. A measure of acute toxicity.

LD 50 - The dose that causes death in 50% of the animals exposed by swallowing a substance. A measure of acute toxicity.

MSDS - Material Safety Data Sheet

MUTAGEN - Capable of changing cells in such a way that future cell generations are affected. Mutagenic substances are usually considered suspect carcinogens.

OSHA - Occupational Safety and Health Administration, the regulatory branch of the Department of Labor concerned with employee safety and health.

PEL - Permissible Exposure Limit. This is the legally allowed concentration in the workplace that is considered a safe level of exposure for an 8-hour shift, 40 hours per week.

pH - A measure of how acidic or caustic a substance is on a scale of 1 to 14. A pH of 1 indicates that a substance is acidic; a pH of 14 indicates that a substance is basic.

PHYSICAL AGENTS - Workplace sources recognized for their potential effects on the body. Heat exposure or excessive noise levels are examples of this risk group.

SENSITIZERS - Agents to repeated exposure over time creating an allergic reaction at some point in time.

STERILITY - Changes made in male or female reproductive systems resulting in inability to reproduce.

TERATOGENS - A substance that causes a deformity in newborns if a significant exposure exists during pregnancy.

TLV - Threshold Limit Value. The amount of exposure allowable for an employee in an 8-hour day.